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Editors' Introduction

Jackie Smith
Jennifer Bair
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This issue of the *Journal of World-Systems Research* is an extremely rich collection of diverse content, much of which points to the role of peripheries and semi-peripheries in world-system stability and change. R. Scott Frey, Paul K. Gellert, and Harry F. Dahms are guest editors of a special collection of research articles on unequal ecological exchange, which examine inequities between cores and peripheries in the global distribution of environmental goods and bads. These essays will help advance our thinking about environmental conflicts, as our guest editors elaborate.

Environmental and land struggles and inequality are further explored in the research articles by Hanne Dominique G. J. Cottyn and Ryan P. Thombs. Cottyn uses a frontier perspective to analyze the historical incorporation of indigenous lands into Bolivia's land rights regime. She shows how frontier/indigenous groups "negotiated" the terms of the incorporation of their land into that national land rights regime and preserved communal land rights. The "uneven trajectory of land commodification" is shown as a contested process in which peripheral actors have some agency. Thombs reveals a "renewable energy paradox" whereby renewable energy use has the most impact on reducing emissions in low-income countries, while its impact on emissions reduction in high-income countries is minimal, due to high rates of consumption. Thombs provides

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a clear and useful set of policy prescriptions to help expand the use of renewables in low-income countries while reducing consumption in rich countries.

In addition to our usual peer-reviewed content, we include two special features that grew from panel sessions organized by the Political Economy of the World-System (PEWS) section of the American Sociological Association (ASA) at the 2015 ASA convention in Chicago. Then Section Chair William I. Robinson organized a special panel on Race in the Capitalist World-System, which became a special symposium published in JWSR (Vol. 22[1] 2016). Continuing to explore this critical and complex theme, we feature a more developed and elaborated version of the essay by Wilma Dunaway and Donald Clelland, who offer a critical assessment of prevailing notions of race and ethnicity and the processes through which they are reproduced. Dunaway and Clelland have marshalled a great deal of evidence to challenge racial binaries in our analyses of the capitalist world-system. They see semiperipheries as essential to the reproduction and expansion of global capitalism and its inequalities and argue that semiperipheral ethnic exploitation defies classification according to existing racial categories. We've enlisted a diverse array of experts to engage in a dialogue with Dunaway and Clelland, and their contributions show that we've touched on a powerful set of ideas that offer much room for scholarly investigation and dialogue. While our readers may not see a decisive "victor" in this debate, these contributions certainly enhance and enrich our thinking about the operation of power in the world-system and the role of race and other categories of difference in reproducing world-system inequalities.

The second special feature here that grew from the 2015 ASA meeting is a tribute to a pioneer and leading thinker in world-systems research, JWSR's founding editor Christopher Chase-Dunn. This tribute to Chris has been organized and curated by Jeffrey Kentor and Andrew Jorgenson, and readers will gain insights into Chris's personal and intellectual trajectory that will enrich and inform readers' understandings of how world-systems scholarship has developed. Indeed, Chris is a prolific, energetic, and creative scholar, who has done much to advance the field of world-systems scholarship, as our contributors show. Chris has dedicated his career to the work of understanding the world so we can figure out how to change it, and we are especially grateful for his work to build the *JWSR* as a platform for world-systems scholars to exchange ideas freely among a worldwide audience of people, regardless of whether they have access to a resourceful library.

Our book review section includes five reviews: Aldon D. Morris's *The Scholar Denied: W.E.B. Du Bois and the Birth of Modern Sociology* is reviewed by Michael Schwartz; Alexander Anievas and Kerem Nişancioğlu's *How the West Came to Rule: The Geopolitical Origins of Capitalism* is reviewed by Sung Hee Ru; William Carroll's *Expose, Oppose, Propose: Alternative Policy Groups and the Struggle for Global Justice* is reviewed by Marisa Von Bülow; Neil M. Coe and Henry Wai-chung Yeung's *Global Production Networks: Theorizing economic development*

in an interconnected world is reviewed by Marion Werner; and, Mark Hibben's *Poor states, Power and the Politics of IMF Reform: Drivers of Change in the Post-Washington Consensus* is reviewed by Mulatu Amare Desta. Please keep an eye out for a major symposium on "Cities and the World-System," which will appear in the next issue of *JWSR*, and will feature reviews from leading scholars, including Saskia Sassen and Leslie Sklair, among many others. A final reminder regarding our book review section: if you know of foreign-language books that you believe would be of interest to JWSR's readership, or if you would like to offer your services to review books in a foreign language, please contact our book review editor, Jennifer Bair.

As we conclude our introduction we want to recognize two of our recent authors who have received awards for their articles in JWSR. Tanya Golash-Boza received honorable mention in the Distinguished Contribution to Scholarship Article Award of the Race, Class, and Gender Section of the ASA for her article, "Parallels Between Mass Incarceration and Mass Deportation: An Intersectional Analysis," published in *Journal of World-Systems Research* 22(2) (2016). And Irene Pang received the PEWS Section Terence K. Hopkins Student Paper Award for her article, "Banking Is for Others: Contradictions of Microfinance in the Ghanaian Market," *Journal of World-Systems Research* 22(2) (2016). Congratulations to these authors for such outstanding work. We are proud to bring such high quality scholarship to our global readership.

The *Journal of World-Systems Research* remains one of the leading open access peer reviewed scholarly journals, and we are working to create a sustainable structure for the journal while supporting the Open Access movement more broadly. We invite readers to support the journal with financial contributions (see the "donate" link on our website) or by assisting with copyediting or translating (email jwsr@pitt.edu to volunteer). We also remind you that Open Access Week 2017 is October 23-29th. Please take some time to recognize the week by increasing your own understanding of the importance of open access publishing, helping colleagues and students learn about this vital movement, promoting the work of journals like the *Journal of World-Systems Research* (or submitting your own work for consideration!), or by attending or organizing an event on your campus. In its current form, the information economy leads to the increased enclosure of the knowledge commons, and scholars and readers play a critical role in helping keep access to information open and free. As one of the very first open access scholarly journals, *JWSR* is committed to helping our readers be part of the movement to keep our research free and open to readers.

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Introduction to Ecologically Unequal Exchange in Comparative Perspective[1]

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Ecologically unequal exchange (EUE) is generally understood as the unequal material exchange relations among countries holding different positions in the world-system. Proponents of this perspective center attention on the harms created in the process of withdrawing energy and other resources from less developed countries (and regions) by developed countries (and regions) and the export of hazardous production and waste disposal activities from the developed to the less

[1] Acknowledgement: We would like to thank the authors, reviewers, and the editor of the journal, Jackie Smith, for making this special issue possible. We also would like to thank the original co-sponsors of our conference at the University of Tennessee, Knoxville, including the Department of Sociology, the Haines-Morris Grant Program of the College of Arts & Sciences, the Howard H. Baker Center for Public Policy, Africana Studies, Global Studies, Latin American & Caribbean Studies, Asian Studies, and the Department of Anthropology.

developed countries. uch relations not only damage the environment, but they have adverse health, safety, and socio-economic consequences for the human populations of less developed countries and they represent a form of environmental injustice and a legacy of ecological debt. Less developed countries are particularly vulnerable to the risks posed by material withdrawals and hazardous exports because less developed states and domestic firms have limited means for or interest in managing risks and many workers and citizens are often unaware of the risks associated with these hazards. EUE relations are also a source of many environmental distribution conflicts throughout the world-system.

EUE continues to be a vibrant area of scholarship within world-systems analysis. Its origins can be traced to the work of Stephen Bunker (1984, 1985, 2005; Bunker and Ciccantell 2005). Bunker introduced the idea of ecologically unequal exchange by building on earlier structural analyses of unequal economic exchange, including those by Latin American economists Raúl Prebisch and Celso Furtado within the UN Commission for Latin America and the Caribbean, as well as the critical analyses of unequal economic exchange by Arghiri Emmanuel (1972) and Samir Amin (1976). Interest in ecologically unequal exchange has grown over the past decade as witnessed by the publication of several collections (Jorgenson and Clark 2009; Hornborg and Martinez-Alier 2016) and important contributions by Foster and Holleman (2014), Hornborg (1998, 2011, 2015), and Jorgenson (2016a, 2016b). We add to and extend this literature by including articles that explore various qualitative, quantitative, and evaluative dimensions of ecologically unequal exchange in the contemporary world-system.

The Contributions: Quantitative, Qualitative, and Evaluative

This special issue of the *Journal of World-Systems Research* presents six articles that were (with one exception, Henderson and Shorette) first presented at the *Conference on Ecologically Unequal Exchange: Environmental Injustice in Comparative and Historical Perspective* organized by the co-editors at the University of Tennessee, Knoxville on October 15-16, 2015. Additional papers from the conference will appear in a forthcoming book to be published by Palgrave-Macmillan in early 2018 (Frey, Gellert, and Dahms forthcoming). This set of articles provides quantitative and qualitative work that builds on the EUE literature and also pushes the boundaries of EUE work in productive ways, ending with an article evaluating the relevance of the EUE frame to contemporary climate change negotiations.

Three quantitative contributions highlight the increasing scope and depth of the impact of ecologically unequal exchange on the world's environment. They also advance our knowledge and perspectives on EUE in novel directions. We begin with Mark Noble's addition to this stream of literature that has come to be shaped by Andrew Jorgenson (2016a, 2016b) and his students and colleagues. He uses the case of cacao production and the adverse environmental consequences of

unequal ecological exchange relations between core and peripheral countries. Extending the scholarship on the effects of EUE on environmental degradation and specifically deforestation, Noble hones in on the temporal effects of cacao production on deforestation for samples of less-developed countries engaged in cacao production. He demonstrates not just that there *is* an effect, but that the effects are *increasing*. This increase, moreover, is attributed to the spatial expansion of cacao production, a geographical extensification that investors and producers find cheaper than investments in intensification or expansion via historical practices of growing cacao in the shade of more ecologically complex forest landscapes.

Kent Henderson and Kristen Shorette note that core-based resource extraction from peripheral nations disproportionately benefits core nations, but seeking to integrate world society and world-systems approaches, they argue that a "global environmental regime" has emerged as an important feature of the contemporary world-system. Moreover, they posit that this regime tempers the negative effects of EUE with its positive environmental consequences, as stronger ties to global institutions create more positive environmental outcomes in the periphery. They add a methodological nuance to much quantitative research that they believe swamps out the positive effects of global institutions by including most countries in the global South. Instead, in their case study of palm oil production and its relationship to deforestation, they analyze a small sample of 15 palm oil exporting states. Based on unbalanced panels of these states for the period from 1990 to 2012, they find that stronger national embeddedness in the world society through citizen memberships in INGOs is associated with greater primary forest area, and the pattern holds even for Indonesia and Malaysia—two countries that produce palm oil at a much higher rate than the other producers included in the analysis. The authors clearly demonstrate "the variable importance of national embeddedness into global institutions within the periphery" in reducing forest loss under conditions of unequal ecological relations.

John Bradford and Alex Stoner's study of the effects of military spending on per capita carbon emissions across the period of 1960-2014 in a series of cross-sectional and panel analyses is a substantial contribution to the existing literature. They extend prior studies of military expenditures and demonstrate the existence of an "enduring relationship between militarism and carbon emissions in cross-sectional comparisons…. [that has become stronger in recent decades]." They find that economic level moderates the effect of military spending, with military expenditures having a greater relative (and net effect) on emissions in more economically affluent countries and the effect of military expenditures becoming greater after the 1990s. In sum, economically powerful and militarily strong nations displace environmental bads to the global commons and the peripheral zones of the world-system. In a world-system that is built in part on geopolitical competition and military prowess, the ecological implications of attempting "ascent" are thus clear.

Qualitative research allows us to unpack the usually more local and regional nuances of the effects of relations of unequal ecological exchange. While the quantitative studies demonstrate different dimensions of the continued macro-level deleterious effects of EUE (potentially tempered by global institutions), the two qualitative case studies included in this issue dig deeper into the adverse environmental and socio-economic consequences of unequal exchange relations in Uganda and India, respectively. Kelly Austin identifies the mechanisms that underlie unequal exchange relations between core and periphery by focusing on the perspectives and experiences of coffee growers in Uganda. She presents an intriguing case study examining the environmental and socio-economic consequences of coffee cultivation in Bududa, a rural area located in the eastern part of Uganda. Bududa supplies a large proportion of the coffee marketed to consumers in the core. Interviews with coffee cultivators indicated that the coffee economy has adverse effects on gender relations, health, deforestation, and overall economic conditions. Austin concludes that "there are some material benefits from cultivating and selling coffee beans, but a lack of long-term economic stability for households and the consequences for the status of women, health of the community, and the local environment calls into question the efficacy of coffee production as a viable development scheme that significantly enhances overall community well-being."

Raja Swamy examines the relationship between humanitarian aid and EUE as related to the post-disaster reconstruction efforts in India's Tamil Nadu state following the 2004 Indian Ocean tsunami. He examines how the humanitarian "gift" of housing by NGOs played an important role in the state's efforts to displace fishers to inland areas, allowing the state to grab coastal lands for various development projects such as ports, infrastructure, industries, and tourism. The humanitarian "gift" depoliticized critical issues of land, resources, and livelihood that were the source of long-standing political conflicts between local fishers and the state. Differing significantly from Henderson and Shorette's argument that global institutions can help sustain peripheral environments, Swamy finds that fishers were displaced and "underdeveloped by reconstruction" via an uncomfortable alliance of a developmental state and well-intentioned NGOs. Swamy concludes,

> …humanitarian aid, despite its associations with benevolence and generosity, presents a troubling and disempowering set of options for political struggles over land, resources, and social entitlements such as housing, thereby intensifying existing ecological and economic inequalities.

The difference in perspective may be attributed to the still macro-sociological perspective of Henderson and Shorette and the anthropological perspective of Swamy, but it also reminds us to pay attention to the risks of overgeneraliziing either the benefits or harms of global institutions.

In the last paper in this collection, David Ciplet and Timmons Roberts analyze the ways in which the global South is "splintering." They take to task the classic world-systems perspective, or better-said dependency perspective, for dividing the world into a small group of rich countries and a large group of poor, peripheral, and dependent ones. Ciplet and Roberts present rich insights into the series of Conference of Parties (COP) meetings and how they have unraveled due to the splintering of previously unified global South representatives.

As they point out, the EUE discourse becomes more difficult to maintain as a result. Their argument is well-taken, although we are left wondering about two things. First, Wallerstein (1976) was emphatic from the start about the role of the semi-periphery in legitimizing the structures of inequality in the world-system by holding up the 'developmentalist illusion' (Arrighi and Drangel 1986; see also Wallerstein 1991). Later, others have noted that the semi-periphery is characterized by authoritarian political systems. The developmental states of the 1980s and 1990s, including the bureaucratic authoritarian industrializing regime of South Korea (Cumings 1989), are earlier examples of the kinds of ironies that Ciplet and Roberts illustrate in more recent years in India and South Africa. Second, by demonstrating the multiple 'splinters' and infighting in the global South, they appear to risk an analysis that overemphasizes diversity in the periphery (even at one point referring to a modernization theory like "continuum" of states). To be sure, like the competition among peripheral producers of all kinds, the structure and ideology of the world-system create a world in which it appears that there is a competitive continuum, in this case of those not only striving to 'develop' but also to avoid the deleterious consequences of climate change literally lapping on their shores. And, Ciplet and Roberts remind us that politics matters while the core countries continue to triumph over the periphery with the help and legitimation of the semi-periphery. Since ecological debt (the approach taken by Hornborg and Martinez-Alier 2016 in their recent special issue) faces serious political obstacles, the problem remains of how to create a unified movement for socio-ecological justice (see Martinez-Alier et al. 2016; Smith et al. 2016).

Hidden Debates

Beneath the surface of these six articles is a debate or more accurately a "nondebate" (Arrighi 1998) between the 'metabolic rift' (Foster 1999, 2000; Foster et al. 2010) and the 'world-ecology' (Moore 2011, 2015) perspectives. The metabolic rift perspective has led to the production of a stream of literature on the ecological crises induced by the national and global expansion of capitalism (Clark and Foster 2009; see the detailed bibliography on the metabolic rift at www.monthlyreview.org/commentary/metabolic-rift). This literature serves as a theoretical foundation for and meshes well with 'ecological footprint' studies pioneered by York et al. (2003, 2009; see also Jorgenson and Clark 2009, 2012). Due to a combination of the data that is used and the relative acceptance of the ontological separation of humans from 'their' environment, these

studies do not take on the ontological challenge of a dialectical understanding of socio-nature or "humans-in-nature."

In contrast to this tradition, Moore and the network of world-ecology scholars (see https://worldecologynetwork.wordpress.com/) encourage us to entertain the simultaneity of humans in/of nature. In this effort, Moore (2000, 2011) for several years attempted to debate John Bellamy Foster and his colleagues. When they at last took up the challenge, the venom perhaps overshadowed the insights that such a debate hoped to facilitate. In brief, Foster defends metabolic rift as deeply and truly dialectical (Foster and Burkett 2000; Foster and Holleman 2014; Longo et al. 2015), while Moore (2011, 2015:75ff.) insists on his ontological critique that their approach separates out and "adds up" the effects o humans on a putatively separate nature. This debate was taken up vociferously at our conference at the University of Tennessee, but remains unresolved by the contributions included here.

Future Directions, or What Is Needed in Ecologically Unequal Exchange Research

In a series of contributions, Wallerstein (1991, 1996) identified world-systems research as "unidisciplinary" and called on social scientists to revisit and rethink the 19th century intellectual fetters on our creativity. Unlike multidisciplinarity, unidiscplinarity means that we not only include quantitative and qualitative methods from various disciplinary foundations, but we strive to unify them. Yet, achieving unidisciplinarity is obviously not easy, in many regards, and may well by beyond our grasp. Thus, the contributions here demonstrate the continuing challenge of integrating different approaches and disciplines. As noted above, quantitative research is, with increasing precision and sophistication, continuing to measure the effects of ecologically unequal exchange via cross-national research, while qualitative research unpacks the usually more local and regional nuances of these effects. Like other quantitative world-systems research, quantitative studies in EUE research rely on nationally produced statistics, the quality of which is often questionable, especially in the African states (Jerven 2013). As a result, we run the risk of being lulled into complacency about the precision with which we can measure and evaluate the causal impact of EUE. At the same time, qualitative studies highlight processes and experiences at the raw material starting points of commodity chains that are at one and the same time clearly conditioned by the world-system dynamics of EUE and also manifestations of more idiosyncratic characteristics of the historically-produced cultures and politics, including gender and labor relations. These relations clearly are functional to the expansion of EUE, but are they *necessary*? These qualitative studies, then, run the converse risk of being dismissed as too particularistic.

So, our ambition remains to create a body of work that would adequately address these challenges. And, yet, there are even greater ones, most particularly, the query of Marx's thesis XI: not just how to understand the world but how to *change* it. As if the methodological, ontological,

and epistemological challenges were not daunting enough, we also need more contributions from and conversations with various actors from across the world. Just as tracing the different kinds of impact of commodity chains across the globe can turn into a futile effort to "keep up" with capitalist financiers and their allied political actors, tracking the negotiations over climate change agreements can lead to limitations in identifying but not fully grasping the multiple struggles over how best to redress EUE in the 21st century world-system. We hope that the contributions here encourage us all, then, to forge onward in our efforts to create an *ecological civilization* (Magdoff 2011) and a more just and sustainable world.

About the Authors

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Harry F. Dahms is Professor of Sociology, co-director of the Center for the Study of Social Justice, and co-chair of the Committee on Social Theory at the University of Tennessee – Knoxville. He has been the editor of *Current Perspectives in Social Theory* since 2008 and is the director of the International Social Theory Consortium. His recent work has been in the area of critical theory and he is in the process of completing a book for Routledge, entitled *Modern Society as Artifice: Critical Theory and the Logic of Capital*.

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Chocolate and the Consumption of Forests:
A Cross-National Examination of Ecologically Unequal Exchange in Cocoa Exports

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Abstract

This study explores the potential links between specialization in cocoa exports and deforestation in developing nations through the lens of ecologically unequal exchange. Although chocolate production was once considered to have only minimal impacts on forests, recent reports suggest damaging trends due to increased demand and changing cultivation strategies. I use two sets of regression analyses to show the increased impact of cocoa export concentration on deforestation over time for less-developed nations. Overall, the results confirm that cocoa exports are associated with deforestation in the most recent time period, and suggest that specialization in cocoa exports is an important form of ecologically unequal exchange, where the environmental costs of chocolate consumption in the Global North are externalized to nations in the Global South, further impairing possibilities for successful or sustainable development.

Keywords: Chocolate, Environment, Unequal Exchange, Ecologically Unequal Exchange, deforestation

Chocolate is ubiquitous in American culture and is associated with major commercial holidays such as Valentine's Day, Easter, and Christmas. People in the United States enjoy a significant amount of chocolate and each year Americans consume on average 9.5 pounds of chocolate per person (Confectionery News 2014). Yet, Americans are not alone in their love for chocolate and it is consumed in even greater quantities in Western Europe. In fact, Switzerland, Germany and

Austria lead the world in yearly chocolate consumption, eating 19.8, 17.4, and 17.2 pounds of chocolate a year per person, respectively (Confectionery News 2014). Worldwide demand for chocolate treats is at an all-time high (World Resources Institute 2015). Most of this demand is driven by the Western world, but the popularity of chocolate is quickly rising in rapidly developing nations, such as China and India, and this fact is not lost on confectionary companies (Reuters 2015). For example, Hershey has recently invested $250 million into a strategically-placed manufacturing plant in Malaysia, looking to these countries for the future expansion of their products (Business Wire 2013).

Despite high levels of chocolate consumption in the United States and other developed nations, people rarely consider where chocolate comes from, or the conditions under which the cocoa[1] trees, which produce the beans to make chocolate, are grown. Chocolate production involves a long and highly unequal commodity chain that transforms the raw cocoa bean into the chocolate treats we love and crave (Fairtrade Foundation 2016). In fact, these commodity chains have been restructured in recent years with increased economic globalization and become even more unequal. As an example, despite millions of cocoa growers, just nine companies now control the processing and manufacturing of chocolate worldwide (Fairtrade Foundation 2016). This concentration has the potential to distort the market and drive profit down for small cocoa growers (Fairtrade Foundation 2016). The production of chocolate likely entails environmental costs in the regions in which the cocoa in grown, which are typically far from the sites of consumption facilitating processes of ecologically unequal exchange (Bunker and Ciccantell 2005; Jorgenson et al. 2009).

This paper examines the environmental costs of chocolate through the lens of ecologically unequal exchange, specifically focusing on links between cocoa exports and deforestation. World-systems theory, which espouses thinking on ecologically unequal exchange, provides an excellent theoretical lens from which to view the environmental consequences of chocolate production. While chocolate is a luxury item almost exclusively enjoyed in the developed world, cocoa is exclusively grown in places such as West Africa, Asia, and Central and South America; regions that on average have extremely small demand for the product that they often depend on for their livelihoods (Confectionery News 2014; Fairtrade Foundation 2016). Although ecologically unequal exchange has been used to examine links between agricultural products more generally (e.g. Jorgenson, 2006; Jorgenson et al., 2009, 2010; Shandra et al., 2009), as well as key commodities, such as coffee and beef (Austin 2010a, 2012), the potential role of cocoa exports specifically in promoting deforestation in developing nations has not been empirically examined

[1] I use the term cocoa throughout this analysis despite the fact that Theobroma cacao is the scientific name of the cocoa tree. The terms cocoa tree and cacao tree are used interchangeably in the literature. This is not to be confused with the coca plant that is used as the main ingredient in cocaine.

in comparative analyses. Furthermore, the extent to which cocoa negatively impacts forests may represent a newly emerging phenomenon; while traditional approaches relied on semi-shade conditions that preserved primary forests, recent pressures have propelled small-holders and some large-scale farmers to search for new forested lands to expand cocoa cultivation and there has been a transition to hybrid varieties of high-yield trees that grow in monocultures without shade (e.g. CNN 2008). Specifically, the Amazon hybrids that tolerate full sun are now expanding to famers in West Africa who are trying to meet growing world-demand, where about 70 percent of the world's cocoa is grown (Wessel and Quist-Wessel 2015). Thus, this paper is timely and seeks to fill this lacuna by providing an empirical examination of the connections between cocoa production and deforestation.

Cocoa: History, Characteristics, and New Production Patterns

History

Chocolate consists of cocoa, sugar, and milk, but it is the cocoa that is the main ingredient. The cocoa tree's scientific name, Theobroma Cacao, means "food of the gods" (World Cocoa Foundation 2017a). Although most cocoa grown today comes from West African countries such as Cote d'Ivoire, Ghana, and Nigeria, cocoa originated in Central and South America. The regions around the Orinoco (in present day Venezuela and Colombia) and Amazon Rivers (in present day Brazil) are thought to be the evolutionary birthplace of Theobroma Cacao (Young 2007:2-3).

The earliest harvesting of cocoa by the Amazonian Indians was for the sweet tasting white pulp (Young 2007:11-12), and several indigenous peoples of Mesoamerica also cultivated cocoa. Cocoa cultivation has a long history, as the Olmec Indians were cultivating cocoa by the time of Christ and perhaps even a thousand years before this (Coe and Coe 2013; Young 2007). Cocoa was held in high esteem by indigenous peoples, as evidenced by a jadeite carving depicting a Maya lord holding a cocoa tree found in the cenote of Chichén Itzá. (Young 2007). Other examples abound as images of warrior-priests and nobles with cocoa trees dating back to 200 A.D. have been found throughout the Mayan territories of Mexico and Central America (Young 2007). Other indigenous peoples of the region (e.g., Aztecs and their descendants, the Pipil-Nicarao Indians) had several uses for cocoa. It was consumed in a drink, used for currency, and used as tributes to rulers of the Aztec empire (Coe and Coe 2013; Young 2007). Although early indigenous groups in Mexico and Central America farmed cocoa intensively, their respect for nature helped them develop environmentally sustainable methods of agriculture. Cocoa was part of a diversified agricultural plan that included other taller trees that provided the needed shade for the cocoa tree (Coe and Coe 2013; Young 2007).

Although Columbus brought cocoa beans back from the new world around 1502, they went largely unnoticed (Cadbury 2017). Hernando Cortés witnessed Montezuma II being offered a

chocolate drink made from cocoa in fifty gold chalices and tributes being paid to him in the form of cocoa beans in 1519 (Young 2007). Realizing that it held the potential for commercial value he took it back and introduced it to the Spanish royal court circa 1530 (Cadbury 2017; Young 2007). Cocoa did not become immediately popular in this form as it was too bitter. It was not until a decade later when cocoa was mixed with sugar and cinnamon that it began to increase in appeal (Cadbury 2017; Coe and Coe 2013). However, broad popularity had to wait until the late 19th century when the Swiss candle maker Daniel Porter worked with Henri Nestle to perfect the process of making milk chocolate (Cargill 2017; Coe and Coe 2013).

Cocoa Production Today

Approximately 90 percent of the world's cocoa is grown by five to six million small farmers. In total, 40 to 50 million people in the developing world rely on the cultivation of cocoa as their main source of livelihood (Afoakwa 2014). Since the 1930s, West African farmers have been world leaders in cocoa production led by Côte d'Ivoire, Ghana, Nigeria, and Cameroon (Afoakwa 2010). The average size of the small cocoa farms is around one to four hectares (Barrrientos 2016; Wessel and Quist-Wessel 2015). Despite a majority of the world's cocoa being grown in West Africa, it has recently expanded to other countries where different growing methods are used. In India, for instance, cocoa is grown on a mix of small and large-scale farms, and in Indonesia it is mostly grown on large-scale farms using monoculture techniques (Barrrientos 2016). While it is easy to link large-scale agri-businesses to deforestation practices, there are also several reasons for small farmers to increase pressures on forests as well, such as expanding cultivation sites into new areas due to rising world demand, older cocoa trees becoming less productive, and new government-led initiatives in several West African countries to increase production (Wessel and Quist-Wessel 2015).

Today the process of making chocolate begins with the cocoa tree. Cocoa trees only grow within a 20-degree swatch of the equator (Cadbury 2017; World Cocoa Foundation 2017) and are highly fragile and unproductive in climates that are too hot or too windy (ICCO 2015). These trees typically take three to four years to mature before producing the colorful pods, and tend to produce fruit or pods for about 10 years. Cocoa pods are rather distinct in that they grow directly from the trunk and large branches of the tree (Cadbury 2017). A typical tree is less than 25 feet high which traditionally made it ideal to grow under the shade of larger trees in its natural rainforest habitat. There are typically two growing seasons for cocoa and the average yield is about 30 cocoa pods per tree. The pods are about 7 to 8 inches long and weigh about one pound each. Once these pods are harvested, usually by hand with a machete, they are split to reveal about 20 to 50 almond-sized beans encased in a whitish pulp (World Cocoa Foundation 2017). Once removed from the pulp, the beans begin a multi-stage process of fermentation and drying in the countries where they are

grown before the dried beans are bagged and shipped to processing plants where they are winnowed, roasted, grinded, and pressed (World Cocoa Foundation 2017). The typical tree produces only enough cocoa to make 450 grams or approximately 16 ounces of chocolate in a year (Cadbury 2017).

Today, there are three main segments of the chocolate market: the high quantity but low-quality chocolate, a good quality chocolate for the mainstream market, and a niche market consisting of fair trade and organic chocolate. The largest growth has been in the niche markets, but overall it is estimated that less than one percent of the chocolate market is designated as fair trade (ICCO 2016). Over the last 15 years, the chocolate industry has grown by about 3 percent per year, but since the market liberalizations of the 1980s, the world chocolate prices have been quite volatile. From the mid-1980s to the late 1990s there was a pronounced downward trend in prices. Some recovery took place in the early 2000s but prices in 2005 were still about 13 percent lower than in 1995. Since then there has been rising prices (Barrrientos 2016).

Cocoa represents an important commodity in the world economy; for example, in 2010, the value of the global cocoa crop was over $5 billion (Afoakwa 2014). To some, especially poor economies in West Africa, the role it plays in generating export revenues cannot be overstated. For example, in countries such as Cote d'Ivoire and Ghana it represents a significant share of their total export earnings. While cocoa trees are grown in several world regions including Africa, Asia and Oceania, and Central and South America, about 75 percent of the world's cocoa exports come from Africa, 16 percent from Asia and Oceania and 6 percent from Central and South America (Afoakwa 2014).

Since the vast majority of cocoa produced in the world today is done by small farmers, it is important to examine recent developments in the way in which small farmers in West Africa have been integrated into the world economy, which is relevant for understanding unequal exchange. In West Africa from the 1950s to 1980s, the cocoa industry was organized by the state through export marketing boards. These boards set prices, held a monopoly on export cocoa, allowed for stable prices, and ensured the uniform quality cocoa bean (Barrrientos 2016). However, in the 1980s, these marketing boards were abolished and the world market was liberalized as exporting countries fell under the structural adjustment policies of the World Bank and International Monetary Fund (Barrrientos 2016). While the goals of these liberal policies may have been to increase efficiency of production and increase profits from cultivation, this has not been the result (Oxfam 2009). Instead small-scale farmers are subject to global fluctuations and market volatility as layers of protections were removed (Barrrientos 2016).

Since the 1980s there has also been a trend toward increased concentration in the cocoa commodity chain in terms of processing (grinding) and manufacturing (Barrrientos 2016; Fold 2002). Producing countries now export cocoa beans to be processed in other, more developed

countries (Barrrientos 2016; Fold 2002). By the early 2000s, corporations within six more-developed countries, including the United States, controlled about 60 percent of the chocolate manufacturing market (Oxfam 2009). Thus, the world has seen significant changes in the global commodity chain of chocolate since the 1980s. On the one hand, small cocoa farmers are now directly linked to the world economy and on the other, there has been increased concentration of production and manufacturing processes (Barrrientos 2016; Fold 2002).

While the chocolate industry is big business today for corporations of the Global North involved in the processing, marketing, and distribution of chocolate, many of the small farmers growing cocoa live in poverty, as only about 3 percent of the price of each chocolate bar goes to the famer (Oxfam 2013). Many cocoa farmers are food insecure; for example, one study indicates that about 60 percent of households who farm cocoa in Nigeria's top cocoa producing state were food insecure (Oluyole et al. 2009). Thus, it is possible that households that specialize in cocoa cultivation do so at the expense of producing other local food products, as we see with other products such as coffee (e.g., Austin 2012). These trends are consistent with the discussion of the commoditization of food and inequitable access to food in the new global economy (Scalan 2003).

Unique qualities of cocoa trees create pressures on the industry and may enhance negative impacts on the environment. Importantly, cocoa trees are highly fragile and are plagued by several diseases such as Witches' Broom, Frosty Pod Rot, and Phytophthora Pod Rot that have been harmful to yields (ICCO 2015). It is not uncommon to lose anywhere from 30 to 40 percent of a cocoa crop in a given year due to one or more of these diseases (World Cocoa Foundation 2017a). Climatic changes, such as a lack of rainfall, and the depletion of soil nutrients over time, reduce yields (Bloomberg 2015). Further, reliance on aging trees and political instability in West African countries also has negative impacts on cocoa production (World Resources Institute 2015). The marked increase in worldwide demand in recent years intensifies these factors (World Resources Institute 2015). Deficits in production yields from prior years are being carried forward to create enhanced pressure on farmers to produce and export more cocoa and search for ways to increase their output (Fairtrade Foundation 2016). One such solution is the call for increased use of fertilizers (Gockowski and Sonwa 2011). While fertilizer use often leads to impressive increases in cocoa yields, small farmers are often reluctant to use them. Wessel and Quist-Wessel (2015) document that fertilizer is shown to increase cocoa yields by as much as 50 percent in 5-year trials in Ghana, however, they have little effect on the yields during the first two years of use and are expensive. Thus, it is hard for poor farmers to invest in a solution that does not produce timely results (Wessel and Quist-Wessel 2015).

Instead of using fertilizers, small plot farmers are increasingly felling new forests as a solution to older, unproductive areas with poor soil fertility (CNN 2008). Recent policy and news reports provide numerous examples, such as the rainforests in the Peruvian Amazon and Cavally Forest

in Côte d'Ivoire, which have been sacrificed for additional lands to grow cocoa trees (allAfrica 2016; Bloomberg 2016; World Resources Institute 2015). Farmers are increasingly encroaching onto these forests, felling trees, selling off the timber and undertaking slash and burn strategies to eliminate the forest undergrowth. These recently cleared areas are then planted with Amazon hybrid seeds in monoculture plantations (Bloomberg 2016).

Although typically a smallholder crop, production is increasingly coming under the control of larger multinational agribusinesses (e.g. Bloomberg 2016; World Resources Institute 2015), and large-holders commonly use plantation agriculture techniques that create increased pressure on forests. A look at the recent trends of cocoa production in Peru, for example, demonstrates that agribusinesses have sought out new parts of the Peruvian Amazon for cultivation, leading to great increases in cocoa production in Peru over the last 30 years (World Resources Institute 2015). While the expansion into the Amazon is unauthorized, satellite technology from NASA documents the harmful impacts of cocoa plantations on forests in the region (World Resources Institute 2015).

While the research presented here focuses on one of the main environmental consequences of cocoa farming, deforestation, it is important to point out that there are also other negative environmental consequences, such as increases in countries' carbon footprints, changing weather patterns, soil depletion, and the creation of other metabolic rifts (World Resources Institute 2015). Further, the negative social consequences of cocoa cultivation are well-documented, including the displacement of indigenous peoples, the continued reliance on child labor, and the trafficking of children in modern-day slavery (Business Wire 2016, Tulane University 2015).

Some actors in the chocolate industry are working hard to find other ways to keep up with demand. Cocoa research labs are looking for genetically modified cocoa strains that are more resistant to diseases (Bloomberg 2014). In addition, some are also calling for increased use of pesticides and fertilizers to enhance yields (Gockowski and Sonwa 2011). Others promote continuation of the more traditional methods of production, mixing cocoa trees with larger shade trees, which could help offset some of the carbon deficient being created by clear-cutting of forests. However, there are real costs and economic limits associated with each of these potential solutions, such as the costs of planting or maintaining larger trees, producing inferior quality cocoa, and the obvious environmental consequences associated with the use of pesticides and fertilizers.

Cocoa is perhaps the prototypical commodity to view through the lens of world-systems analysis. Although chocolate is consumed almost entirely in core nations, the natural resources needed to produce it come from poor, less developed nations. Spatial inequalities between the providers or growers of cocoa and the corporations and countries who profit most from chocolate processing, manufacturing, and distribution facilitate increased environmental degradation at the sites of production (e.g. Bunker and Ciccantell 2005). Inequalities in global power and development are attenuated through unequal exchange relationships and the unequal commodity

chain of cocoa cultivation and processing obscures the potential negative consequences to forests out of the view of consumers in the Global North (Bunker and Ciccantell 2005). World-systems theory and related concepts of unequal exchange and ecologically unequal exchange provide insight into the global processes in which the benefits of chocolate consumption are enjoyed in highly developed nations while the negative environmental consequences, especially forest loss, are experienced in peripheral nations.

World-Systems Theory and Ecologically Unequal Exchange

World-systems theory is heavily influenced by Marxist political economic thought, dependency theory, and by the writings of the United Nation's Economic Commission for Latin America headed by Raúl Prebisch in the 1970s (Timmons and Grimes 2002). World-systems theory emerged as a reaction to the failed promises of modernization theory and the more mainstream neoclassical economic approaches that became popular among those in the developed world in the 1960s (Sheppard 2008; Timmons and Grimes 2002). Modernization theory is exemplified by the writings of Rostow (1960) who wrote that all countries could embark on a path from a traditional society toward a modern capitalist consumption based economy. A typical country would need some sort of external shock or assistance to spur them on the path toward development (Rostow 1960).

Missing from modernization theory, especially the version developed and propagated in the United States, is the fact that the current members of the developed world could not have undertaken this development without the exploitation of the third world with its roots in colonization (Roberts and Grimes 2002; Wallerstein 1974). Specifically, it was imperative to have weaker countries that could be exploited either through direct colonial relationships, as in the case of European countries, or through indirect hegemonic pressures, as in the case of the United States (McMichael 2012; Wallerstein 1974). Thus, the modernization approach to development is ahistorical in nature as it does not consider how these exploitative relationships propelled Western development. In addition, the modernization perspective is consistent with earlier ideas about comparative advantage, which describes that countries best opportunity to develop economically would be to find what they have a natural comparative advantage in, and then build the economy around this specialization (e.g., Ricardo 1817; Smith 1776). While there is some merit to the idea that specialization can lead to efficiencies in production and global trade, and that these can help to stimulate economic growth in a country, it is not a sustainable approach for all countries. Some newly industrialized countries (e.g., South Korea, Taiwan) were able to parlay this strategy into economic growth, but specialization in low-value, low-wage commodities, including agricultural items leaves many lesser-developed countries behind (e.g. McMichael 2012).

World-systems theory was advanced simultaneously by Samir Amin, an Egyptian-French economist, and by Immanuel Wallerstein, an American sociologist (Sheppard et al. 2009). One of the main insights of world-systems theory is that the focus of action or unit of analysis in not an individual state, but rather the world-system and the interactions therein (e.g., Chase-Dunn 1998; Wallerstein 1974). Thus, if seeking to explain events that take place in once country, such as a small-holding cocoa farmer moving deeper into protected national forests in Côte d'Ivoire to find more suitable lands for cultivating cocoa trees, it would be insufficient to look for explanations for these actions solely by focusing attention on the direct relationship between the farmer and the local market. Instead, because the world operates as a system, the driving force leading to the farmer's actions would have its roots elsewhere in the world-system (e.g., Wallerstein 1974).

Wallerstein (1974) conceptualized that relations between countries in a capitalist world economic system have a relational aspect and that world is divided into three strata of economic processes: the core, semi-periphery, and periphery. Core economic processes are those that focus on heavy industrial production and high-value production processes, while peripheral economic processes are those that focus on the export of minerals and primary agricultural products (as well as some light manufacturing) (Sheppard et al. 2009). Wallerstein (1974) posits that core and peripheral processes tend to be spatially clumped together in modern nation-states, the main political unit within a capitalist world system. Counties higher up on this relational continuum actively exploit those below it, thus leaving the semi-peripheral counties in a rather unique position to be both exploited by some and the exploiter of others as they engage in a mix of core-like and periphery economic processes (Chase-Dunn 1998; Wallerstein 1974). One mechanism by which peripheral countries are exploited by those closer to the core is through the underlying process of unfair trade patterns, or unequal exchange.

Unequal Exchange

The concept of unequal exchange, originally conceptualized by Emmanuel (1972), posits that countries in the core and periphery exchange commodities that are inherently unequal in value. The exchange value of primary of commodities produced in the periphery (with the exception of some mineral commodities such as diamonds and oil) is typically lower than manufactured or finished goods produced in the core (Sheppard et al. 2009; Wallerstein 1974). When core and periphery countries trade with each other, those countries exporting higher-valued goods typically receive better terms of trade and increased profits relative to those countries who export low-value primary goods. Thus, trade is unequal and the related power imbalance allows core countries to distort the terms of trade to their own economic benefit (McMichael 2012; Wallerstein 1974). Specialization in primary commodities, natural resources, and low-valued manufactured goods in which peripheral countries have a "natural" comparative advantage does not provide an avenue

for all countries to spur substantial and lasting economic development (McMichael 2012). While there are several mechanisms that drive unequal exchanges, it is beneficial to delineate a few of these to demonstrate how this works in practice.

First, neoclassical approaches to development encourage countries in the periphery to specialize and place efforts in agricultural items, as poor nations have a natural comparative advantage of being located in tropical areas conducive to growing crops (e.g. World Bank 2008). This leaves these peripheral countries heavily dependent on a relatively few number of products or commodities. While at times this can be beneficial and may lead to big gains if the product is highly sought-after, diversification, not concentration, provides more protections against worldwide economic fluctuations (Emmanuel 1972). Furthermore, the agricultural products that periphery nations are pressured to produce are very competitive in that they are alike one another. Competition between producing nations for the same product (like cocoa) drives down prices and bargaining power.

Additionally, primary commodities do not possess the flexibility of production that high valued manufactured goods have to respond to market fluctuations. For instance, in a manufacturing plant in times of high demand, shifts can be extended, new shifts can be added, and workers can be brought on the payroll all to take advantage of this increase of demand. In the opposite situation when demand is low, the steps described above can be reversed. However, for those that grow cocoa and other similar items, it takes years for a cocoa tree to mature to the point where it produces pods and there are a limited number of growing seasons in a year. Thus, production of primary products is rather inflexible and too much of a product on the market drives the prices down restricting economic gains.

Relational aspects of trade, such as differentials in political power, also affect trade. In bilateral trade agreements and multilateral trade mechanisms, such as the World Trade Organization (WTO), those with more political power have more leverage to determine the terms of trade in these agreements (McMichael 2012). Countries in the periphery with relatively less political power are not able to negotiate the most favorable terms of trade.

The mechanisms discussed above demonstrate numerous problems for economic development strategies that rely on primary sector specialization. Peripheral countries also face environmental costs and related adverse consequences that arise out of specialization in the primary sector and the unequal relations between core and peripheral countries in the world-system. These relations are best understood in terms of ecologically unequal exchange.

Ecologically Unequal Exchange

A growing body of research examines how the structure of the world-system, especially how the organization of international trade leads to negative environmental outcomes for some countries

and not others (e.g. Bunker and Ciccantell 2005). This research originated with Bunker's (1985) *Underdeveloping the Amazon: Extraction, Unequal Exchange, and the Failure of the Modern State*. Bunker argued that insufficient attention was placed on the environmental inequalities inherent in the capitalist world-system created and maintained through unequal exchange relationships. Unequal exchanges do not just focus on environmental degradation such as deforestation, but also encompass the unequal use of natural resources, over-utilization of environmental space, and the displacement of environmental risks to poor nations (Frey 2003; Jorgensen 2016; Rice 2008).

Unequal trade relations and the specialization on commodity production in poorer nations allows the environmental consequences of consumption in affluent nations to be shifted or externalized to the poorer countries where primary commodities are produced (e.g. Bunker and Ciccantell 2005; Frey 2003; Rice 2008). Countries closer to the core are able to shift a majority of the environmental costs of consumption and waste generation to more peripheral countries, leading to increased environmental degradation in poor nations relative to the core (e.g., Jorgenson 2016; Rice 2008). Higher levels of environmental destruction lead to an increasing inability of these peripheral counties to consume their own resources and protect their natural assets, fostering underdevelopment (e.g., Bunker and Ciccantell 2005).

Previous cross-national research using the world-systems frame and applying the concept of ecologically unequal exchange yields insight on the impact that specializing in export of primary commodities has on a variety of ecological outcomes, such as biodiversity loss of mammals and birds (Shandra et al. 2009b), the environmental footprints of nations (Jorgenson and Burns 2007), climate change (Roberts and Parks 2007), organic water pollution (Shandra et al. 2009c), the use of environmental space (Frey 2003; Rice 2007), and deforestation (Austin 2010a, 2010b; Jorgenson 2004, 2006; Jorgenson et al. 2010).

Several quantitative studies using the concept of ecologically unequal exchange attempt to assess the environmental impacts of the vertical flow of exports from less developed countries to more developed countries. This has been carried out in a variety of ways, using weighted export flow indicators for various products or product categories (e.g. Jogenson 2006; Jorgenson et al. 2010), the concentration of certain export types to core countries (e.g. Shandra et al. 2009a, 2009b), or simply export concentration in certain commodities that are exclusively produced in poorer nations, such as coffee (e.g., Austin 2012). Regardless of how ecologically unequal exchange is operationalized,[2] there is overwhelming empirical support for negative impacts across a variety of environmental outcomes, including deforestation.

[2] Jorgenson (2012) found a correlation of .9 between both measures (weighted indicators or concentrations of exports) of ecologically unequal exchange in this study of carbon dioxide emissions.

Table 1. Top 10 Cocoa Bean Exporting Countries in 2009 by Export Value

Rank	Country	Export Value (1000 US$)
1	Cote d'Ivoire	2595897
2	Ghana	1090910
3	Indonesia	1087485
4	Nigeria	599000
5	Cameroon	540281
6	Ecuador	334925
7	Togo	285480
8	Dominican Republic	154716
9	Malaysia	37026
10	Uganda	27829

Table 2. Top 20 Chocolate Consuming Countries in 2014

Rank	Country	Lbs. / per capita
1	Switzerland	19.8
2	Germany	17.4
3	Austria	17.2
4	Ireland	16.5
5	UK	16.5
6	Norway	14.6
7	Estonia	13.2
8	Slovakia	11.9
9	Sweden	11.9
10	Kazakhstan	11.7
11	Russia	11.7
12	Finland	11.7
13	Belgium	11.5
14	Australia	10.8
15	Netherlands	10.4
16	New Zealand	9.9
17	USA	9.5
18	France	9.3
19	Denmark	9.3
20	Lithuania	9.3

Source: Confectionery News 2014

I extend this line of research by examining the impact of cocoa export concentration on deforestation. This measure is appropriate as cocoa is almost exclusively grown in less-developed countries and consumed in highly developed countries. Indeed, Table 1 indicates that the major countries growing and exporting cocoa beans are located in peripheral areas of West Africa and Central, South America, and South-East Asia. In comparison, Table 2 depicts where chocolate is consumed, and indicates that the largest consumers are those mainly located in the countries of Western Europe such as Switzerland, Germany, Austria, Ireland, and the United Kingdom.

Hypotheses

My study builds on previous empirical analyses and examines whether specialization in the export of cocoa leads to heightened deforestation in cocoa-producing nations. Two hypotheses are tested. The first hypothesis follows:

H1: Current specialization in cocoa exports leads to deforestation in developing nations, net of other relevant factors.

As emphasized previously, many reports highlight the increased demand for chocolate over time and that demand is now at historically elevated levels (World Resources Institute 2015). Additionally, new production patterns, where farmers are increasingly mono-cropping cocoa trees as compared to traditional semi-shade cultivation, may be leading to additional demands on forests and appear to be a relatively recent phenomenon. Thus, I examine the intensity of the relationship between cocoa exports and deforestation in the period, 2009 to 2014, compared to the period, 1999 to 2004. Therefore, my second hypothesis is:

H2: Increased pressure on famers in recent years because of demand and altered cultivation patterns leads to more intense deforestation in the most recent period (from 2009 to 2014) as compared to an earlier time period (from 1999 to 2004), net of other relevant factors.

Methods

This study examines the impact of cocoa exports on forest loss over two time periods: 1999 to 2004 and 2009 to 2014. The dependent variable, deforestation, is the change in forest cover during the specified five-year period, and the independent and control variables are measured at the beginning of each time period (i.e., 1999 or 2009). While there is a temporal aspect to cthe two

analyses, each is technically cross-sectional.[3] These specific time periods are chosen for two reasons. First, by using the contemporary time period, I incorporate the most recently available data on forest stocks from 2014 and recent levels of cocoa exports. The examination of cocoa exports on deforestation from 1999 to 2004 allows for a time gap between the two analyses, facilitating a richer comparison. To ensure that my results were not driven by the time periods chosen, I investigated other time periods and found similar results.[4]

Samples

This study is based on two samples of less developed countries across the two different time frames. Two different (though highly overlapping) samples were used to maximize the number of cases in each sample.[5] Both samples include all countries for which there are available data on cocoa bean exports for the years 1999 and 2009. Results are based on a sample of 51 countries for 1999 to 2014 and 52 countries for 2009 to 2014. Samples of countries are displayed in Tables 3 and 4 below, along with the value of the key independent variable, export concentration in cocoa.

The source for all variables used in the analysis is the World Bank's *World Development Indicators* (WDI), unless otherwise noted. Table 5 displays the correlation matrix for the five-year deforestation period ending in 2004 and Table 6 displays the correlation matrix for the five-year deforestation period ending in 2014.

Dependent Variable: Deforestation

To capture the process of deforestation I used a change score calculated from FAO estimates of forest area from 1999 to 2004 and from 2009 to 2014. The forest stock variable is reported in square kilometers. To qualify as forest area, the land must be larger than .5 hectares and have trees at least 5 meters high and producing a canopy area of more than 10 percent of this area or at least have trees that can reach these standards. In addition, it is does not include land that is currently used for agriculture or urban use. Following Shandra (2007) the change scores were subsequently multiplied by -1 to reflect deforestation and aid in the interpretation of the regression results.

[3] Longitudinal analyses are not preferable or possible for a few reasons. First, the quality of data on forest stocks have improved greatly over time, so researchers should be cautious in comparing across wide time frames using multiple measures of forest stock. Data on deforestation before 1990 should not be compared with more recent data (Shandra 2007). Thus, my analyses focus only on the most recent comparable data. Also, the sample size is inherently very small, as relatively few nations produce cocoa. In creating a longitudinal dataset, missing data on key controls would have further limited the sample size to unacceptable levels. Creating two analyses across two different time periods of a narrower time window lessens these limitations, but still adds the time dimension needed to examine if the pressures on forests from cocoa production are more applicable in recent years, as current reports suggests (e.g. Wessel and Quist-Wessel 2015).

[4] These are available from the author upon request.

[5] However, I also ran the analyses with one consistent sample that contained the same members and achieved consistent substantive results involving cocoa exports and deforestation. However, the sample size was greatly reduced; thus, I chose to retain the two samples in the final results presented here.

Previous studies of deforestation have examined change over 5-year (e.g. Austin 2010b) and 15-year periods (e.g. Jorgenson et al. 2010).

Table 3. Countries in the 200

Country	Export Concentration in Cocoa	Country	Export Concentration in Cocoa
Belize	0.04	Lebanon	0.01
Benin	0.03	Madagascar	1.53
Bolivia	0.07	Malaysia	0.41
Brazil	0.03	Mexico	0.09
Bulgaria	0.02	Moldova	0.01
Cameroon	27.03	Nicaragua	0.06
Colombia	0.01	Nigeria	58.05
Congo (Dem. Rep.)	6.70	Panama	0.16
Congo (Rep.)	1.47	Peru	0.10
Costa Rica	0.01	Philippines	0.01
Cote d'Ivoire	52.64	Russia	0.31
Cuba	0.07	Solomon Islands	12.89
Dominica	0.02	South Africa	0.00
Dominican Republic	3.78	St. Lucia	0.07
Ecuador	4.00	Swaziland	0.00
Egypt	0.01	Tanzania	0.98
El Salvador	0.00	Thailand	0.00
Fiji	0.06	Togo	6.00
Ghana	77.89	Tunisia	0.00
Grenada	5.87	Turkey	0.00
Guinea	6.79	Uganda	0.35
Honduras	0.07	Ukraine	0.00
India	0.00	Vanuatu	6.78
Indonesia	5.77	Venezuela	1.94
Jamaica	0.40	Zimbabwe	0.00
Kenya	0.00		

Table 4. Countries in the 2014 Sample

Country	Export Concentration in Cocoa	Country	Export Concentration in Cocoa
Belarus	0.00	Indonesia	5.12
Belize	0.03	Iran	0.00
Brazil	0.00	Kazakhstan	0.00
Bulgaria	0.00	Kenya	0.00
Cameroon	55.67	Lebanon	0.00
Central African Rep.	0.10	Madagascar	7.90
China	0.00	Malawi	0.00
Colombia	0.11	Malaysia	0.20
Congo (Dem. Rep.)	4.03	Mexico	0.00
Congo (Rep.)	0.22	Niger	0.00
Costa Rica	0.03	Nigeria	60.44
Cote d'Ivoire	50.89	Pakistan	0.00
Cuba	0.07	Panama	0.48
Dominica	0.03	Peru	0.83
Dominican Republic	15.18	Philippines	0.02
Ecuador	8.76	Sao Tome & Principe	91.05
Egypt	0.00	South Africa	0.00
El Salvador	0.00	Tanzania	2.44
Equatorial Guinea	94.83	Thailand	0.00
Fiji	0.00	Timor-Leste	0.19
Ghana	77.14	Togo	76.47
Grenada	37.42	Tunisia	0.17
Guatemala	0.00	Turkey	0.03
Guinea	4.38	Uganda	3.59
Honduras	0.02	Ukraine	0.00
India	0.01	Venezuela	12.48

I examined change over a shorter period of time due to the increase in reports in the most recent time frame indicating increases in cocoa demand and changes in cultivation practices to more mono-cropping techniques rather than semi-shade cultivation especially in the first decade of the 21st century (e.g. Wessel and Quist-Wessel 2015).

Table 5. Correlation Matrix, Means, and Standard Deviations for 5-Year Deforestation Ending 2004

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(1)	Deforestation (1999-2004)	1								
(2)	Export Concentration Cocoa in 1999	0.162	1							
(3)	Percent of Land Area Forests in 1999	0.263	-0.035	1						
(4)	GDP per capita in 1999	-0.209	-0.289	0.092	1					
(5)	Primary Schooling in 1999	0.066	-0.304	-0.082	0.448	1				
(6)	Liberal Democracy in 1999	0.052	-0.161	0.129	0.316	0.341	1			
(7)	Agriculture (% of GDP in 1999)	0.282	0.428	-0.013	-0.712	-0.403	-0.192	1		
(8)	Rural Population Change 1999-2004	0.266	0.141	-0.068	-0.326	-0.285	-0.155	0.548	1	
(9)	Population Change 1999-2004	0.308	0.239	0.078	-0.164	-0.192	-0.206	0.469	0.798	1
	Mean	0.801	5.54	38.285	1883.811	102.355	68.639	18.171	3.776	0.085
	S.D.	6.298	15.375	20.722	1509.189	20.279	28.223	11.218	6.323	0.059

Table 6. Correlation Matrix, Means, and Standard Deviations for 5-Year Deforestation Ending 2014

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1)	Deforestation (2009-2014)	1							
(2)	Export Concentration Cocoa in 2009	0.334	1						
(3)	Percent of Land Area Forests in 2009	-0.141	0.089	1					
(4)	GDP per capita in 2009	-0.244	0.111	0.248	1				
(5)	Primary Schooling in 2009	0.07	-0.125	0.14	-0.133	1			
(6)	Liberal Democracy in 2009	-0.016	-0.066	0.398	0.093	0.302	1		
(7)	Agriculture (% of GDP in 2009)	0.431	0.171	-0.229	-0.669	-0.152	-0.189	1	
(8)	Rural Population Change 2009-2014	0.333	0.159	-0.168	-0.201	-0.133	-0.13	0.464	1
(9)	Population Change 2009-2014	0.324	0.22	-0.122	-0.193	-0.122	-0.124	0.446	0.808
	Mean	1.825	11.737	34.66	4027.674	106.681	63.608	15.375	3.352
	S.D.	7.61	25.54	20.992	3764.6	14.969	23.503	11.547	8.246

Key Independent Variable: Export Concentration in Cocoa

To capture the extent to which a country is dependent on the export of cocoa beans, I calculated the export concentration by using data for two variables. The first is the value of cocoa bean exports obtained from the FAOSTAT database. While the FAOSTAT database contains data on several cocoa products such as beans, butter, powder, and paste, this paper focuses on the export of cocoa beans as they are the primary source of chocolate, and as the values for export of cocoa butter, powder, and paste were very low, if a nation exported these at all.[6] The export value of cocoa beans were then divided by the total export value for all agricultural products in a country in the given year and multiplied by 100 to calculate the percent of total agricultural export dollars that are from cocoa beans or the export concentration in cocoa. The total agricultural export value was obtained from the World Bank's *WDI* databank and both of these variables were measured in thousands of current U.S. dollars. This variable was created for 1999 to predict deforestation from 1999 to 2004 and created for 2009 to predict deforestation from 2009 to 2014. [7]

Control Variables

Forest Stock. It is important to control for forest stock when undertaking analyses of deforestation. It is possible that the rate of deforestation could be influenced by whether a nation has a relative high amount or low amount of forest available to be deforested (e.g., Austin 2010b; Jorgenson 2008; Rudel 1989). Thus, the amount of forest area in a country as a percent of all land was included as a measure of forest stock.

Control Variable: GDP per capita. According to the ecologically unequal exchange perspective, countries with higher levels of GDP per capita are likely to experience lower levels of resource degradation within their borders, as they are able to export the negative environmental consequences of their consumption to poorer countries. Thus, GDP per capita was expected to have a negative effect on deforestation.[8]

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[6] To illustrate that my results were not influenced by analyzing data only on cocoa beans are the re-analyzed the final models for both time periods creating a new variable export concentration in all cocoa products and the results were consistent with my original models with export concentration in cocoa beans.

[7] When examining the data, it was clear that there were some countries that had missing values for these specific years, but reported cocoa exports for neighboring years, suggesting issues of data availability. In these cases, I averaged the three preceding and three subsequent years to fill in these idiosyncratic missing values. In practice, it was a very small handful of countries in which this was an issue (~5). I also tested the analyses only with the data available for the specific years used in the analyses, and achieved consistent results.

[8] I also examined whether or not the concentration of wealth as measured by the Gini had an impact on deforestation. The variable was non-significant and also did not change the substantive conclusions of the analysis. In addition, due to missing data on the Gini variable, the sample size was further reduced to 45 nations and thus was omitted from the final analysis.

Education. To measure the extent to which education may impact deforestation I used gross enrollment ratios of primary schooling. Schooling can impact deforestation in two ways. As education expands, so does knowledge of the environment as well as the harmful effects of deforestation. In addition, it is likely that with increased schooling there are fewer people working the land and adding to the pressure to deforest the land.[9]

Liberal Democracy. Previous studies have suggested that counties with higher levels of liberal democracy are more likely to have increased environmental protection due to higher levels of environmental activism and the increased accountability of leaders (Shandra 2007; Shandra et al. 2009b). The measure of liberal democracy used here is Bollen's recently updated Liberal Democracy Series I Indicator. This is a continuous variable that ranges from 0 to 100 and has been shown to be superior to alternative indicators such as the Polity or Freedom House's combined political rights and civil liberties index because it controls for measurement error (Noble 2016).[10]

Agriculture as a Percent of GDP. It is also important to control for other forms of agricultural production in order to demonstrate that concentration in cocoa exports has a unique effect on deforestation, even when considering the impact of all other agricultural products. If there is evidence that concentration in cocoa exports impacts deforestation while controlling for all types of agricultural production (domestic production as well as export production), then this would demonstrate the exceptional effect of cocoa on deforestation, even when taking into account the cultivation of other agricultural commodities.[11]

Rural Population Growth. Rural encroachment has been theorized to lead to greater environmental degradation (e.g., Rudel 1989). Migrants from urban areas typically are typically poor, unskilled, and lack the education of their urban counterparts. Thus, they are more likely to depend on the land for survival and this may increase prospects for environmental degradation. Rural population growth is included as an additional control variable. Growing rural populations within a country often place additional pressures on forests that can lead to deforestation (e.g., Austin 2010b; Jorgenson and Burns 2007; Rudel 1989). Rural population growth was calculated from 1994-1999 in the first set of analyses, and from 2004-2009 in the second set of analyses.

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[9] Analyses were based on primary education because data for gross enrollment in secondary education were limited and would have led fewer cases. However, the main findings regarding cocoa exports on deforestation did not change when additional tests using the secondary schooling enrollment data were used. I prefer to use primary education in the final models to maximize the sample size.

[10] The analyses were also tested using a democracy measure from Freedom House and achieved consistent results with those presented here.

[11] Another control for agricultural exports was created which subtracted cocoa exports from total agricultural exports, then divided this by GDP. This measure therefore controlled for specialization in non-cocoa agricultural exports. This measure was not significant and did not impact the substantive findings reported here. I chose to use the agriculture as percent of GDP in the final models displayed here to also capture the potential influence of domestic production of food items.

Total Population Growth. Total population change was included as a control for each of the five-year periods under investigation. Previous studies have shown that population change overall can cause environmental degradation, including deforestation (e.g., Burns et al. 2003; Jorgenson 2008; Jorgenson and Burns 2007; Rudel and Roper 1997). Those nations with more rapid population growth were expected to have higher levels of deforestation. Total population growth was calculated from 1994-1999 in the first set of analyses, and from 2004-2009 in the second set of analyses.

Results

Four models were estimated using OLS regression techniques in Stata.[12] These models consisted of a baseline model (Model 1) that included the key independent variable, export concentration in cocoa, and two important control variables, the percent of forested land area and GDP per capita. Model 2 is based on the introduction of social variables, specifically educational enrollment and the level of liberal democracy. Model 3 included the variable agriculture as a percent of GDP to account for other forms of agricultural production. Model 4 included the previously mentioned variables and variables accounting for population dynamics.[13] I built the models in this step-wise fashion to help alleviate concerns of multicollinearity. The VIFs indicated that multicollinearity is not a major limitation in the present analyses.

Cocoa Exports and Deforestation from 1999 to 2004

The results of the regressions predicting deforestation from 1999 to 2004 are displayed in Table 7 and demonstrate that few variables included in the analyses appear to have a significant impact on the deforestation during this period. Models 1-4 show that the percent of land area that is forested has a positive and statistically significant influence on deforestation across all four models in this analysis at the 0.05 level. The positive effect can be interpreted as countries with higher levels of forested land area had higher levels of deforestation from 1999 to 2004. The size of the effect is relatively consistent across all four models.

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[12] In addition to the standard OLS regression, I also examined the STIRPAT (Stochastic Impacts by Regression on Population, Affluence, and Technology) formulation of my model in which the logged version of all variables is used. STIRPAT is a reformulation of IPAT and posits that the effects of predictors are multiplicative and has been recommended by previous researchers. See York, Rosa, and Dietz (2003) for more information. In the present analysis, I found that the logged version of all predictors did not change the substantive results in a significant manner. It did, however, introduce multicollinearity into the model as evidenced by inflated VIFs for several of the predictors. Thus, I retained use of more traditional OLS regression analyses in the final models presented here.

[13] In addition to the control variables noted, I also tested for the influence of a number of other measures, including urban population growth, debt and debt service, GDP growth, regional dummy variables for Latin America, Sub-Sharan Africa, and SE Asia, as well as interactions between these regions and cocoa exports. None of these were significant in predicting deforestation, and none of these impacted the results surrounding cocoa exports and deforestation. For the sake of parsimony, results of these alternative models are not presented here, and I only focus on the measured featured most prominently in prior unequal exchange and deforestation research (e.g. Austin 2010a, 2010b).

There is some evidence that GDP per capita in 2009 has a negative and significant effect on deforestation from 1999-2004, however this effect was not consistent across all models. Somewhat surprisingly, the results in Table 7 also reveal that primary schooling has a positive impact on deforestation. This suggests that countries with higher levels of pupils enrolled in primary school experienced higher levels of deforestation from 1999 to 2004. These latter results run counter to what was expected.

Most importantly, the results displayed in Table 7 suggest that specialization in cocoa exports did not have a negative impact on forests during 1999-2004. In other words, no significant association between cocoa exports and deforestation is evidenced from 1999-2004, net of other factors.

Cocoa Exports and Deforestation from 2009 to 2014

The second set of OLS regression estimates are for the period 2009 to 2014 and displayed in Table 8. A key finding of these analyses is that export concentration in cocoa has a positive and statistically significant effect on deforestation across all models. Overall, the relationship between cocoa exports and deforestation from 2009 to 2014 is quite robust, although slightly attenuated with the inclusion of control variables in Models 3 and 4. These findings indicate that export concentration in cocoa has a unique and significant positive effect on deforestation, even after controlling for other factors, including other forms of agricultural production. The size of the effect of cocoa export specialization on deforestation is 0.084 in the final model, Model 4, meaning that for each additional percent increase in agricultural exports accounted for by cocoa, there is on average a 0.084 percent increase in the deforestation rate.

In addition to the robust impacts of specialization in cocoa exports, the results in Table 8 also demonstrate that agriculture as a percent of GDP also has a positive and statistically significant effect on deforestation (as displayed in Models 3 and 4). These findings are consistent with world-systems theory and specifically the concept of ecologically unequal exchange. Somewhat surprising is the result that the percent of land area forested is no longer a significant predictor of deforestation in the most recent time period as it was in the earlier period. One could speculate that the size of the forested area in a country no longer matters in terms of whether it uses these forests for economic development. The pressure to reap forest resources may be intensified, regardless of the size of forest stocks.

Table 7. OLS Regression Predicting Deforestation (1999-2004)

	Model 1	Model 2	Model 3	Model 4
Export Concentration Cocoa in 1999	0.047	0.070	0.047	0.054
	(0.058)	(0.058)	(0.061)	(0.063)
	[0.114]	[0.170]	[0.115]	[0.131]
Percent of Land Area Forests in 1999	0.087*	0.096*	0.093*	0.092*
	(0.041)	(0.042)	(0.041)	(0.043)
	[0.285]	[0.315]	[0.305]	[0.304]
GDP per capita in 1999	-0.001	-0.001*	-0.001	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)
	[-0.203]	[-0.327]	[-0.177]	[-0.273]
Primary Schooling in 1999		0.085+	0.089+	0.095+
		(0.049)	(0.049)	(0.050)
		[0.273]	[0.288]	[0.307]
Liberal Democracy in 1999		0.011	0.008	0.017
		(0.033)	(0.033)	(0.034)
		[0.050]	[0.035]	[0.076]
Agriculture (% of GDP in 1999)			0.131	0.013
			(0.114)	(0.131)
			[0.234]	[0.023]
Rural Population Change 1999-2004				0.133
				(0.251)
				[0.134]
Population Change 1999-2004				17.688
				(26.546)
				[0.165]
Constant	-1.184	-10.113	-13.680*	-14.034*
	(2.119)	(5.174)	(6.011)	(5.944)
N	51	51	51	51
R^2	0.136	0.199	0.223	0.275

Notes: Coefficients flagged as follows *** p < .001, ** p < .01, * p < .05, + p < .10 (two-tailed tests); Standard errors in Parentheses; Standardized Coefficients in Brackets

The results in Table 8 also illustrate that GDP per capita has a negative and statistically significant effect on deforestation from 2009 to 2014 in some of the models, similar to the findings from the earlier time period in Table 7.

When it comes to evaluating the two hypotheses stated above, I find partial evidence for Hypothesis 1 stating that specialization in cocoa production leads to deforestation in poor nations.

Table 8. OLS Regression Predicting Deforestation (2009-2014)

	Model 1	Model 2	Model 3	Model 4
Export Concentration Cocoa in 2009	0.111**	0.116**	0.087*	0.084*
	(0.039)	(0.040)	(0.040)	(0.041)
	[0.372]	[0.390]	[0.292]	[0.282]
Percent of Land Area Forests in 2009	-0.040	-0.056	-0.051	-0.047
	(0.048)	(0.053)	(0.051)	(0.052)
	[-0.110]	[-0.154]	[-0.141]	[-0.129]
GDP per capita in 2009	-0.001+	-0.000+	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)
	[-0.258]	[-0.243]	[0.066]	[0.038]
Primary Schooling in 2009		0.045	0.090	0.090
		(0.071)	(0.071)	(0.071)
		[0.088]	[0.176]	[0.176]
Liberal Democracy in 2009		0.022	0.027	0.027
		(0.048)	(0.046)	(0.047)
		[0.067]	[0.082]	[0.083]
Agriculture (% of GDP in 2009)			0.287*	0.232+
			(0.124)	(0.137)
			[0.435]	[0.352]
Rural Population Change 2009-2014				0.108
				(0.203)
				[0.117]
Population Change 2009-2014				4.018
				(25.391)
				[0.035]
Constant	4.006	-1.757	-13.609	-13.428
	(2.019)	(7.527)	(8.823)	(9.076)
N	52	52	52	52
R^2	0.202	0.216	0.300	0.316

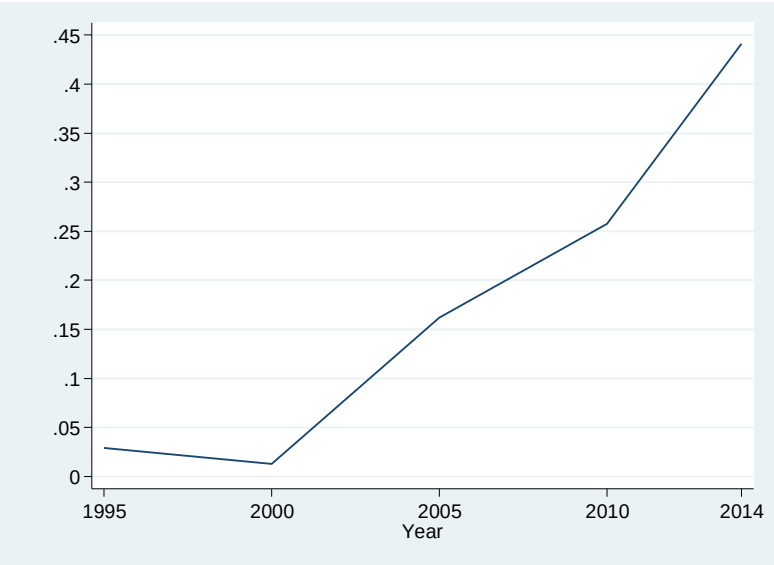
Notes: Coefficients flagged as follows *** p < .001, ** p < .01, * p < .05, + p < .10 (two-tailed tests); Standard errors in Parentheses; Standardized Coefficients in Brackets

This hypothesis was validated in the models for the contemporary time period, but not in the earlier one. This evidence suggests that there is nothing inherent in the specialization of cocoa production that leads to deforestation. Rather, the confirmation of Hypothesis 2, that the impacts of cocoa exports on deforestation have become more robust in recent time periods, likely illustrates that increased pressures on farmers to expand cultivation sites and engage in unsustainable growing practices contributes the most to deforestation.

To further examine how the impacts of cocoa production on deforestation have changed over time, I calculated the bivariate correlation for cocoa export concentration and deforestation for the

intervening years of the analyses. These results are displayed in Figure 1 below. The results presented in Figure 1 provide compelling evidence that the effects of cocoa exports on deforestation have greatly changed over time, with a large upswing in the correlation between cocoa exports and deforestation in the 2000s. In particular, the correlation between cocoa export concentration and deforestation prior to 2000 is near 0, but by 2014, the correlation has increased to nearly .45. This provides further evidence of the recent detrimental impact of cocoa exports on deforestation that was not present in earlier time periods.[14] This finding is consistent with evidence presented in Wessel and Quist-Wessel (2015) as well as policy and media reports (allAfrica 2016; Bloomberg 2014; World Resources Institute 2015) indicating large increases in cocoa production in West African countries as well as other nations in the first decade of the 21st century and that the increase in production is generated by felling new forests.

Figure 1. Deforestation and Cocoa Export Dependency Correlation 1995-2014



[14] My argument may be furthered strengthened if I could demonstrate that the size of the average cocoa farm has increased over time. Yet, I also argue that the current pressures and challenges on small and large farmers alike may not be dependent on farm size. However, specific data on the average size of cocoa farms by country does not exist and thus cannot be incorporated into this analysis.

Conclusion

Taken together, the results of this study point to an important and newly emerging relationship between cocoa export concentration and deforestation. In particular, I find that cocoa export concentration is not important in predicting deforestation in earlier time periods. However, regression results predicting deforestation from 2009 to 2014, as well as the correlational results in Figure 1, demonstrate that cocoa exports are a significant cause of deforestation in most recent years, net of other factors. Thus, specialization in cocoa is a form of ecologically unequal exchange, where the environmental costs of chocolate consumption are placed on more peripheral nations where cocoa is produced and exported. Overall, the higher the concentration of cocoa exports in 2009, the more elevated the rates of deforestation from 2009 to 2014 across producing nations.

The findings in Table 8 show that the impact of cocoa specialization on deforestation is robust, even when taking into account the production of other agricultural commodities. This analysis did not set out to explain all causes of deforestation in cocoa exporting countries, nor is it making the claim that cocoa is the only driver of deforestation in these countries. Rather, the results from this study demonstrate that cocoa has unique and detrimental impacts on forests in developing nations, net of other forms of agricultural cultivation, in recent years. While the main finding surrounding cocoa export concentration and deforestation from 2009-2014 confirms the propositions of world-systems theory and ecologically unequal exchange, specifically, some of the other findings reflect this perspective as well. For example, the positive association between agriculture as a percent of GDP and deforestation for 2009-2014 also confirms the basic tenants of ecologically unequal exchange more generally. Additionally, some of the models across Tables 7 and 8 show a negative association between GDP per capita and deforestation, where nations with higher levels of economic development tended to have lower levels of forest loss.

Although the direct causal mechanisms cannot be accounted for in cross-national analyses, the findings presented here regarding the increased role of cocoa exports in damaging forests in more recent years fit with current reports that document heightened demand for cocoa globally by any means necessary, as well as increased use of more harmful mono-cropping techniques (e.g. Bloomberg 2014; Wessel and Quist-Wessel 2015; World Resources Institute 2015). Certainly, more case study and qualitative research is needed to fully parcel out these mechanisms and how strategies in cultivating or establishing cocoa plantations have changed in recent years, which present a potential avenue for future research.

Based on current consumption patterns that point to increasing demand in rapidly developing nations like China and India, this situation is likely to worsen over time. Indeed, as mentioned previously, many chocolate company executives are looking to rising Asian nations as untapped markets for chocolate and places of enormous future growth (Reuters 2015). As demand in the two

most populous countries in the world increases, this will no doubt place significant additional strains on cocoa farmers to expand cultivation sites. The problems associated with deforestation are well documented and include a loss of biodiversity, climate change, increased soil erosion, and rifts in the water cycle. In these ways, deforestation resulting from cocoa production is likely to have further negative impacts on other aspects of the environment and local ecology.

This research focuses on one environmental problem associated with the concentration of cocoa exports, deforestation. While deforestation is a significant environmental threat, other externalities are associated with cocoa production. In recent years, social issues such as the use of child labor and even child slaves on cocoa plantations have been uncovered and highly publicized in world media reports, including a documentary film, *Slavery: A Global Investigation* (BBC 2000). These reports have led governments to act; in the U.S. there was a congressional action in the form of the Harkin-Engle Protocol which demands that companies comply with International Labor Organization's Convention 182. This was only a voluntary agreement, but it was signed by most of the largest chocolate companies. While the industry is working to guarantee that child labor and child slaves are not used in the cultivation or harvest of cocoa beans, there is still evidence of this practice. Another documentary film, *The Dark Side of Chocolate,* released in March 2010, claimed the practice was still taking place almost 10 years later. A recent report published in 2015 documented an increase over the prior five years in the use of child labor in Côte d'Ivoire and Ghana (Tulane University 2015).

While there has been an increase in fair trade cocoa production, which ensures safer environmental and social practices and better economic returns to growers, the International Cocoa Organization (ICCO), reports that in 2015 only 0.5% of chocolate on the market is designated as fair trade (ICCO 2016). Considering the detrimental environmental and social consequences in poor nations involved in the cocoa industry, this statistic is staggering and indicates that more work is needed to ensure safer and more sustainable forms of production. In addition, in response to deforestation trends related to cocoa production, in some nations, such as Côte d'Ivoire, governments have chosen to eject small farmers from areas around protected forests in attempts to stem forest loss (allAfrica 2016). While this could bring some immediate relief to forests, the basic rights of indigenous people to the land are overlooked with these types of policies. In general, victimizing poor, smallholding farmers who are influenced by larger structural trends inherent in the capitalist world economy to undertake unsustainable growing practices, does nothing to address the roots of these environmental problems.

The main limitation of this study, and much of the other cross-national research using an unequal exchange framework, is that only restricted aspects of these processes can be examined here. While increased demand coming from Western Europe, North America, and the rapidly growing middle-class in Asian countries such as China and India that put the pressure on farmers

to engage in unsustainable and environmentally deleterious practices, including deforestation, this demand is not captured in the empirical model. I make a compelling case that chocolate trade is an example of ecologically unequal exchange as it has grown almost exclusively in low-income countries and consumed mainly in high-income countries, and the unequal exchange framework is based on the exchange of low-value, environmentally damaging products for high-value products and services. However, both sides of this dynamic are not included in the empirical model in this study, nor in much of the research in this tradition. Measuring demand as well as both parts of the exchange inherent in unequal exchanges is important and future work on unequal exchange should aspire to do this.

An additional limitation of this study is that the social or additional environmental consequences of cocoa production are left unexamined. While this analysis is limited to deforestation, there are other important adverse social and environmental consequences of cocoa cultivation and monocropping, as discussed previously. Future research could also build on the work presented here to empirically examine the other potential harmful impacts of specialization in cocoa production across developing nations engaged in cocoa cultivation.

To adequately make real headway on deforestation and likely other environmental and social problems associated with cocoa production, we must propose solutions that address the underlying inequalities within the world-system. Although nations may be encouraged to cultivate cocoa due to increased demand in global markets for chocolate, it is clear that this form of specialization has had important costs on forests in recent years. As export concentration in cocoa is leading to heightened rates of forest loss in poor nations, it is not likely that this will spur successful development, but in fact, environmental decline of a nation's most vital resource may only lead to longer-term trends of underdevelopment. In these ways, ecologically unequal exchange in cocoa is not a viable development strategy. Mechanisms of unequal exchange continue to underpin inequalities between the Global North and the Global South, and chocolate represents a key luxury product in affluent nations that contributes to patterns of underdevelopment in poor nations.

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Disclosure Statement

Any conflicts of interest are reported in the acknowledgement section of the article's text. Otherwise, author has indicated that he has no conflict of interests upon submission of the article to the journal.

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Environmentalism in the Periphery:

Institutional Embeddedness and Deforestation among Fifteen Palm Oil Producers, 1990 – 2012

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Abstract

Environmental sociologists highlight the exploitative nature of the global capitalist economy where resource extraction from nations in the periphery tends to disproportionately benefit those of the core. From the Brazilian Amazon to mineral-rich Sub-Saharan Africa, the practice of "unequal ecological exchange" persists. Simultaneously, a "global environmental regime" has coalesced as a prominent feature of the contemporary world system. In the post-World War II era, legitimate nation-states must take steps to protect the natural environment and prevent its degradation even at their own economic expense. Stronger national ties to global institutions, particularly international nongovernmental organizations (INGOs) consistently yield more positive environmental outcomes. However, previous work suggests that normative expectations for improved environmental practices will be weak or nonexistent in the periphery. We use the case of palm oil production and its relationship to deforestation to provide a more nuanced analysis of the relationship between material and institutional forces in the periphery. Using unbalanced panels of fifteen palm oil producing countries from 1990 to 2012, we find that stronger national ties to world society via citizen memberships in INGOs result in greater primary forest area among palm oil producers. However, this effect is strongest where production is lowest and weakens as production increases. Even in the cases of Indonesia and Malaysia, where palm oil production is substantially higher than any other producer, ties to global institutions are significantly related to reduced forest loss. These results indicate the variable importance of national embeddedness into global institutions within the periphery of the world system.

Keywords: Environment; Unequal Ecological Exchange; Institutionalism; Palm Oil

Peripheral states occupy a subordinate position within the world economy generally (Emmanuel 1972; Wallerstein 1974) and in regard to environmental practices specifically (Austin 2012; Rice 2007). [12] Unequal exchange, or the disproportionate extraction of resources from poor nations to benefit the rich, is a key mechanism in maintaining global stratification (Chase-Dunn 1989; Raffer 1987). Rich core countries tend to externalize their environmental damages to the periphery in the process that environmental sociologists term "ecological unequal exchange" (Bunker 1985). Natural resource-intensive modes of production in the periphery of the world system result in levels of environmental degradation, including deforestation, that is disproportionate to their levels of consumption (Jorgenson 2006).

Peripheral exploitation and environmental degradation occur alongside the global expectation that all nations protect the natural environment (Frank Hironaka and Schofer 2000). The establishment of the United Nations' Environment Program, subsequent multi- and bilateral treaties addressing environmental concerns, and a myriad of international nongovernmental organizations focused on protection of the natural environment all constitute a world cultural context of environmentalism in which nation-states are embedded (Hironaka 2014). Stronger national ties to global institutions consistently correspond with more environmentally friendly policies (Frank et al. 2000), practices (Schofer and Hironaka 2005), and opinions (Jorgenson and Givens 2014).

We argue that the separate theoretical and empirical treatment of these well-established phenomena—ecological unequal exchange and global environmental norms—limits our understanding of environmental practices across the world system. Resource extraction contributes to the continued subordination of peripheral states. At the same time, national ties to global institutions contribute to improved environmental practices. We advance political economic and institutional perspectives of environmental sociology with the examination of the mediating effects of ecological unequal exchange on national ties to global institutions across a sub-set of theoretically significant peripheral countries. How does subordination in the global political economy affect the relationship between national ties to global institutions and environmental practices?

In order to answer this question, we focus on the production of palm oil and its relationship to deforestation. We move away from the large-N studies typical of cross-national environmental research. Instead, we focus specifically on key palm oil producers, the extraction of those natural resources, and their relationship to global institutions with a specific focus on international

[1] The authors are grateful for constructive feedback from Evan Schofer, John Shandra, three anonymous reviewers, and participants in the 2016 World Society Mini Conference.
[2] This paper is a collaborative endeavor. Authors are listed alphabetically.

nongovernmental organizations (INGOs) and the pro-environmental scripts they diffuse to nation-states (Frank et al. 2000; Hironaka 2014). The cultivation of palm oil, derived from the oil palm tree (*Elaies guineenisis*), requires tropical conditions and the carbon emission-intensive conversion of primary forest area into plantations.[3] This ecologically harmful extractive production in the periphery paired with the widespread use of palm oil in food and industrial products globally, but especially in the core of the world system, makes palm oil production the prototypical example of ecological unequal exchange. Because of its direct relationship to the production of palm oil, we analyze the practice of deforestation across our targeted sample.

We proceed with a brief elaboration of the palm oil production process and it relationship to deforestation. We then review previous work in the field of global sociology and the natural environment from the perspectives of ecological unequal exchange and sociological institutionalism. We then elaborate on the advantage of integrating these perspectives in order to better understand global environmental practices and their determinants. We conduct cross-national regression analyses on an unbalanced panel of primary forest loss rates across fifteen palm oil producers from 1990 - 2012. Results indicate the variable importance of global institutions in explaining deforestation across the periphery. Overall, palm oil producers with stronger ties to INGOs have lower rates of primary forest loss. However, this relationship varies substantially across palm oil producers where higher levels of production reduce the size of this relationship. However, even where production is highest, ties to global institutions are significantly predictive of lower levels of forest loss. We conclude with a discussion of the theoretical and policy implications of these findings.

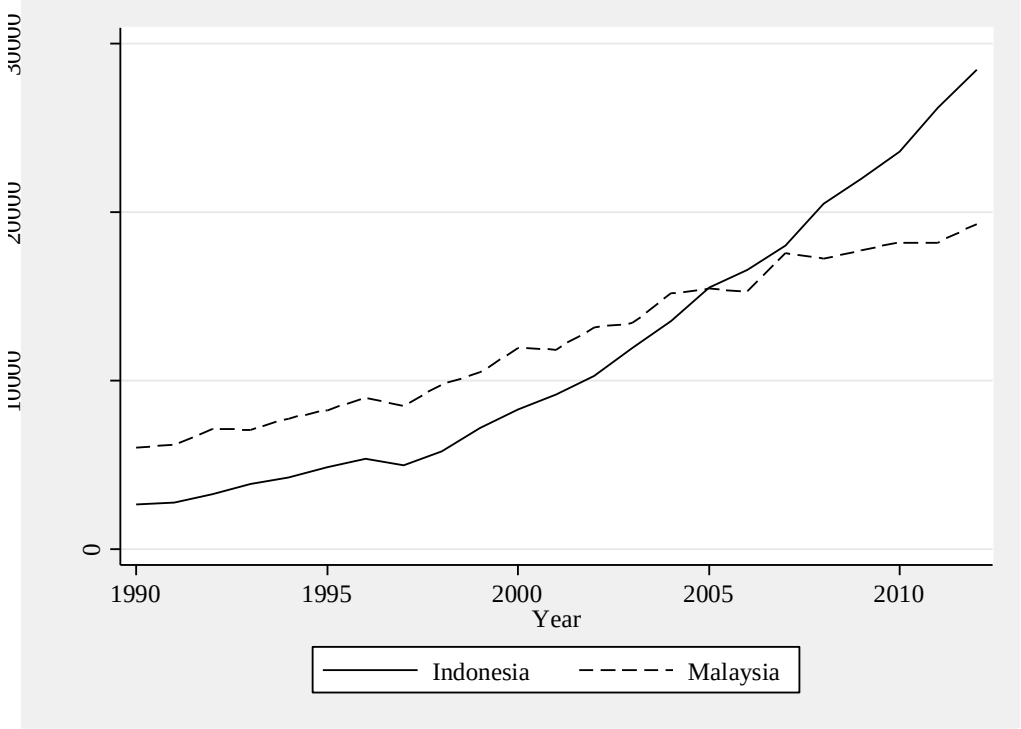
Palm Oil Production and Deforestation

The primary contributors to global climate change are the burning of fossil fuels and clearing of forests (Rosa et al. 2015). Palm oil production contributes to both phenomena. Production originated as part of mixed farming practices in West Africa. It has now expanded to industrial-scale monocropping with considerable environmental risk and impacts on local societies (Colchester and Chao 2011). Contemporary production requires the intensive use of synthetic fertilizers and pesticides and massive land-use transfers. The conversion of forest area to palm oil plantations is associated with substantial greenhouse gas emissions (Hansen et al. 2014; Reijnders and Huijbregts 2008). The subsequent reduction in forest area creates a “carbon sink,” or a reduced ability to absorb carbon dioxide from the atmosphere (Hansen et al. 2014).

[3] The Food and Agricultural Organization classifies primary forest as forest of native species where there are no signs of human disturbance

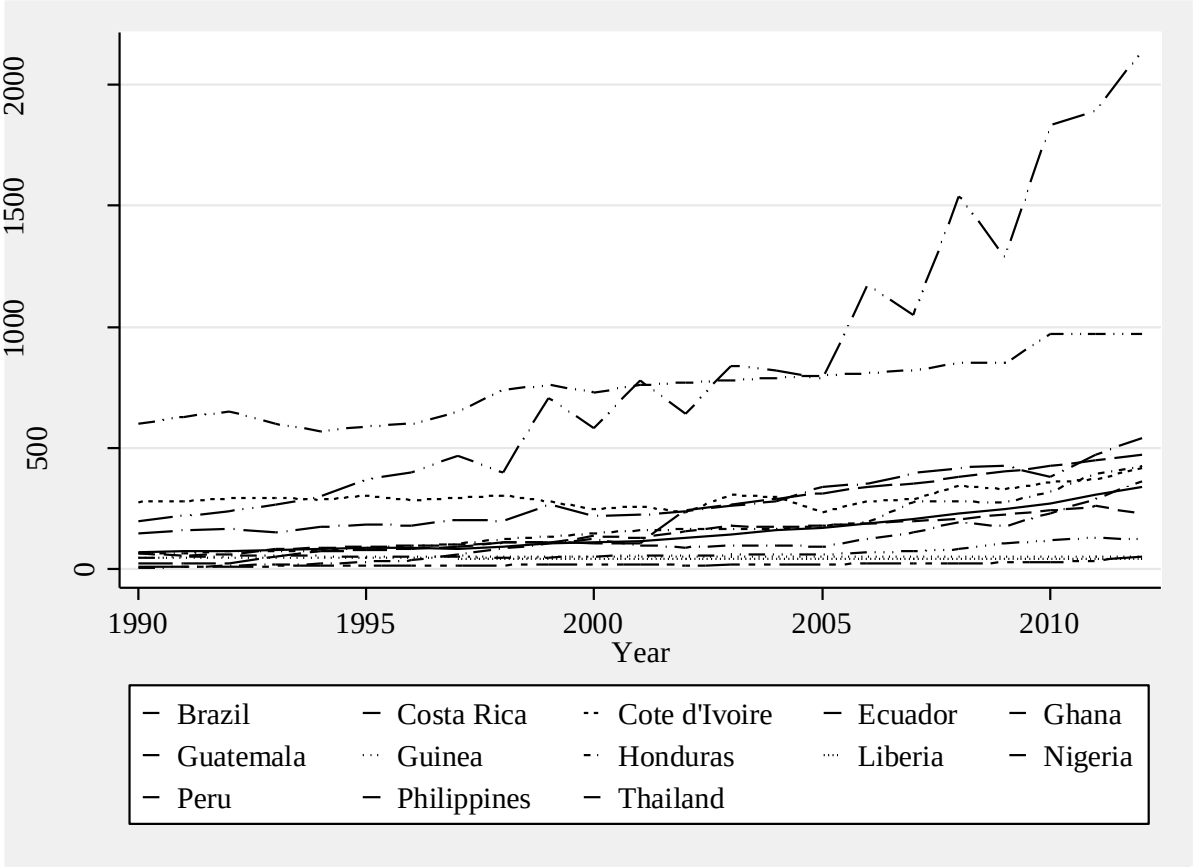
In addition to the global effects of carbon sinks, disruptions in the carbon cycle due to deforestation contribute directly to the loss of livelihoods as well as biodiversity. An estimated three hundred million people annually earn part or all of their livelihoods and food from forests (Pimentel et al. 1997). Deforestation is included as one of seven indicators in Diener's (1995) quality of life index.[4] Additionally, large-scale palm oil production generally involves the exploitation of workers. The International Labour Organization identifies numerous safety and health hazards associated with palm oil production. Hazards include injuries from cutting tools, poisoning and long term health effects from pesticide exposure, high levels of sun exposure, and snake and insect bites (ILO 2004). Additionally, orangutan populations, native to Indonesia and Malaysia, are "seriously endangered" in part to due to the expansion of palm oil plantations.

Figure 1. Palm Oil Production in Indonesia and Malaysia, 1990 – 2012



[4] The other six indicators are purchasing power, homicide rate, fulfillment of basic physical needs, suicide rate, literacy rate, and gross human rights violations.

Figure 2. Palm Oil Production in Thirteen Peripheral Countries, 1990 – 2012



Palm oil is used in foodstuffs such as cooking oil, margarine, and pastries as well as in industrial products including cosmetics, soaps, and candles (UNEP 2011). Its uses continue to increase, thus increasing demand for its production. For example, palm methyl ester is a direct derivative of palm oil and increasingly used as a biodiesel (FAO 2010; Hansen et al. 2014). Palm oil is also popular with food manufacturers and is increasingly used as an alternative to industrially produced "trans fats" (Nellemann et al. 2007). Driven primarily by India, China, and the European Union, global demand for palm oil is projected to double from 2010 to 2020 (UNEP 2011). Figures 1 and 2 illustrate recent trends in palm oil production across the periphery.

Malaysia and Indonesia are consistently the world's largest palm oil producers. In fact, we illustrate their production trends separately from all other producers because of the drastic differences in scale. They each begin the time period under examination with around five million metric tons and reach twenty and thirty million metric tons respectively. In comparison, the thirteen other producers included in our sample produce between one thousand and two hundred thousand metric tons each yearly over the same time period.

Global Sociology and the Natural Environment

Cross-national research on the natural environment generally takes either a political economic or institutional approach. These traditions are largely separate, though recent work suggests the utility of their synthesis (Shorette 2012). Political economic work, specifically related to unequal exchange, highlights the importance of qualitative differences between processes of production and effects of international economic relationships based on a country's relative location within the world-system. The creation and maintenance of a global economic hierarchy keeps the periphery in a perpetually subordinate position (Chase-Dunn 1989; Mahutga 2006). In contrast, sociological institutionalism highlights the global institutional context in which nations are embedded. The level of policy isomorphism despite vast differences in levels of development and capacity to implement environmental policy is striking (Hironaka 2014). Below we review each of these perspectives on the natural environment and argue for the utility of examining the role of global environmental institutions specifically in the periphery of the world system.

Ecological Unequal Exchange

Political economic approaches to macro-historical change posit that the less developed nations are often relegated to the most labor-intensive and extractive economic activities with little chance of upward mobility (Smith and White 1992; Mahutga 2006). From this perspective, inequalities between countries are a result of global capitalism; and less developed "peripheral" nations, are exploited by richer "core" countries (Chase-Dunn 1989; Wallerstein 1974). The relative mobility of investment capital and relative immobility of labor creates unequal exchanges between highly developed and underdeveloped countries where surplus value is extracted from the periphery and relocated in the core (Emmanual 1972). These unequal exchanges lead to negative developmental outcomes both economically and ecologically (Bunker 1985; Chase-Dunn 1989).

Unequal exchange allows foreign capitalists to maintain low wage, labor and capital intensive production processes in the periphery while retaining the most profitable production processes for the core (Emmanual 1972). This mode of production also relegates the most resource intensive industries to the periphery, leading to high levels of extraction of natural resources from those nations (Bunker 1985). Taken together, unequal exchange research shows that peripheral nations have few options aside from engagement in low-wage, labor-intensive and extractive industries.

Building on this work, environmental sociologists conceptualize the effects of states' relative positions within the world system in an ecological framework with the articulation of a theory of ecological unequal exchange (Austin 2012; Bunker 1985; Rice 2007). Unequal economic exchanges between core and periphery countries entail a component of uneven natural resource exchange that leads to environmental degradation in peripheral nations (Bunker 1985; Hornborg

1998 2001; Rice 2007; Austin 2012). Oulu (2016) argues that ecological unequal exchange operates on a ‘treadmill logic’ where endless extraction (of capital and resources) from the periphery drives capital accumulation in wealthy nations. Economic growth, under these conditions, is prioritized over qualitative national development that could include better management of natural resources (Oulu 2016).

Numerous cross-national studies confirm that unequal exchange leads to negative environmental outcomes for the developing world. Austin (2012) and Jorgenson (2006) find that unequal exchange increases deforestation; Shandra et al. (2009) find that biodiversity is reduced under the conditions of unequal exchange; and Jorgenson (2012) finds that vertical trade flows associated with unequal exchange are correlated with higher national CO_2 emissions. More recent research builds on this logic and argues that importing nations owe an 'ecological debt' (a debt that cannot be reduced to a monetary value) to nations that have been historically exploited through colonialism or those who export their natural resources for the benefit of wealthy nations (Mayer and Haas 2016; Warlenius 2016).

Unequal exchange is only one of several mechanisms world systems theorists use to explain environmental inequalities. Reliance on extractive industries, industrialized agriculture, and fossil fuels are integral parts of the global capitalist system and result in massive damage to the natural environment (Clark and York 2005; Magdoff, Foster and Buttel 2000). Alongside studies examining unequal exchange, world systems research shows the negative environmental outcomes of dynamics like foreign direct investment and international finance (Jorgenson 2007; Shandra et al. 2010). Another explanation offered is that ecological damage in peripheral countries is a result of externalizing the costs of production to developing nations by moving more hazardous production to countries with less strict environmental regulations (Frey 2003). Empirical studies in these areas have linked these various dynamics of the world system to greenhouse gas emissions, deforestation, water pollution, and biodiversity loss among other negative outcomes (Burns Kick and Davis 2003; Jorgenson 2007; Shandra et al. 2009).

Deforestation has been a particularly important subject in the world systems literature in recent years. Researchers have highlighted several ways that the world economic system contributes to disproportionate forest loss in developing countries. Peripheral nations experience deforestation as a result of core countries exploiting their forests through directly consuming forest products like paper and wood (Burns et al. 2003; Jorgenson 2008). Like the case of palm oil, forests are also cleared to make room for a number of agricultural goods. Austin (2010, 2012) links cattle and coffee production in the developing world to forest loss in coffee and cattle producing nations. This system of production has made it possible for core countries to retain some of their remaining forests by outsourcing their consumption patterns to other economic zones (Burns et al. 2003). Similarly, as primary sector production in the periphery becomes consolidated under the control

of foreign direct investors, it becomes more integrated into the system of global trade, production expands, and more forest is cleared to meet demands (Gellert 2015; Jorgenson 2008).

International financial institutions contribute to both of these processes with terms of their structural adjustment loans which encourage specialization in forestry export products and selling public land to foreign investors (Shandra et al. 2009; Shandra, Shircliff and London 2011a). Austin (2012) highlights how primary sector exports of non-forestry products can exacerbate forest loss within a global system of production. She examines negative externalities of coffee production, a product grown exclusively in developing nations and consumed mainly by core countries, finding that coffee production is linked to deforestation as well as malnutrition and decreased school enrollment. Palm oil production, as it is done in the periphery of the world system, follows these broad patterns of unequal exchange, typifying the environmentally destructive processes highlighted in unequal ecological exchange.

Hypothesis 1: *higher levels of palm oil production promote higher rates of forest loss.*

Global Environmental Institutions

Another line of inquiry within environmental sociology focuses on the institutional context in which nations are embedded.[5] Like the world-system perspective, sociological institutionalism, or world society theory, places the impetus for world historical change outside the individual nation-state. However, these approaches to explaining social change diverge in key assumptions and focus. Whereas political economic perspectives on social change emphasize unequal power relations and material interests, world society theory emphasizes the institutional character of global processes (Schofer et al. 2012). Global institutions including intergovernmental organizations, treaties, and especially international nongovernmental organizations embody scripts that define the nation-state and what it can and should do (Boli and Thomas 1997; Meyer et al. 1997) and legitimate particular formations of domestic activity (Schofer and Longhofer 2011). Rather than actors pursuing *a-priori* interests, sociological institutionalists conceptualize states as enactors of these global scripts.

An increasingly global political culture comprises legitimate societal goals, such as equality, human rights, and environmentalism (Boli and Thomas 1999; Frank et al. 2000). State responsibility for the protection and preservation of the natural environment is a particularly salient script in the post-World War II world society (Frank et al. 2000; Hironaka 2014). Harm to the natural environment is now institutionalized as a social problem as evidenced by widespread

[5] See Shorette et al.(forthcoming) for a detailed review of the world society approach to explaining macro-social change including the rise of the global environmental regime and how this compares to other theoretical perspectives.

participation in the United Nations' Kyoto Protocol and Paris Agreement. Both are multinational voluntary agreements that commit states to reducing carbon dioxide emissions. Environmental norms, i.e. expectations that legitimate nation states must take measures to protect the natural environment even at their immediate economic cost, are embodied in global institutions, especially international nongovernmental organizations (INGOs) (Boli and Thomas 1997, 1999). INGOs, a substantial proportion of which focus specifically on the natural environment, proliferate over this time period (Frank 1997; Hironaka 2014). Empirical work in this tradition points to the rise of global institutions and their subsequent effects on national-level policies and practices.

Early work focuses on the trend itself. Global institutions proliferated following the Second World War and the world cultural norm of environmentalism grew increasingly salient (Boli and Thomas 1997; Frank et al. 2000). This period marks a shift in our understanding of the natural environment from a collection of resources to be exploited to a global ecosystem in need of our stewardship (Frank 1997). International environmental treaties, for example, were nearly nonexistent prior to 1945 but their establishment is increasingly frequent thereafter (Frank et al. 2000). Frank (1997) illustrates that the dramatic increase in global level discourse and activity regarding environmental problems, including deforestation, is not a consequence of the problems themselves. Rather, it represents a "conceptual reconstitution of the entity 'nature'… that spurred world-level discourse and activity" (Frank 1997: 411).

In turn, the reconceptualization of nature represents the coalescence of a "global environmental regime" which results in a striking trend of worldwide policy isomorphism.[6] In the next stage of empirical work researchers demonstrate the relationship between national embeddedness into global institutions and national policy outcomes. Global institutions, especially INGOs, provide blueprints for legitimate nation-state behavior which includes environmental protection (Boli and Thomas 1997, 1999). Despite vast differences in economic development, systems of governance, and the capacity of state institutions to implement political commitments, nation-states across the world adopted remarkably similar internal structures intended for the protection of the natural environment (Frank et al. 2000). Frank et al. (2000) demonstrate that the growing number of national parks, chapters of international environmental associations, memberships in intergovernmental environmental organization, environmental impact assessment laws, and environmental ministries are all better explained by environmental scripts institutionalized at the global level than by dynamics internal to states.

Those states which are more connected to these world society scripts tend to enact the proscribed policies even when they are contrary to states' material interests (Finnemore 1996;

[6] Hironaka (2014) provides a detailed explanation of the formation and expansion of the "global environmental regime."

Meyer 2004). National embeddedness into global institutions shapes domestic policy in a wide range of fields including the criminal regulation of sex (Frank et al. 2010) and neoliberal (Fourcade-Gourinchas and Babb 2002; Henisz Zellner and Guillén 2005), environmental (Frank et al. 2000), and human rights (Hafner-Burton and Tsutsui 2005) policies.[7] Longhofer and Schofer (2010) demonstrate that state ties to global cultural models, net of domestic economic, political and institutional dynamics, explain the rise of domestic voluntary associations devoted to environmental protection, across the global South. Work on policy isomorphism led to speculation on the potential non-effect on actual environmental outcomes (Buttel 2000).

This criticism spurred the next stage of empirical work in the tradition of sociological institutionalism focusing on practical outcomes. A growing body of work finds national embeddedness into networks of global institutions to be consequential for practical environmental outcomes including greenhouse gas emissions (Schofer and Hironaka 2005), agrochemical use (Shorette 2012), biodiversity loss (Shandra et al. 2009), and concern for environmental issues (Jorgenson and Givens 2014), for example. In the first of these studies, Schofer and Hironaka (2005) demonstrate that fewer emissions of carbon dioxide and chlorofluorocarbons are related to the extent to which states are tied to the global environmental regime, state participation in organizations constituting the regime, and the length of time since its emergence. Subsequent research generally supports the relationship between ties to global environmental institutions and positive environmental outcomes cross-nationally. These findings demonstrate the link between changing understandings of legitimate societal goals, state policies and the concrete outcomes addressed by these policies. Accordingly, they point to the importance of cultural change for practical social change. Consistent with this work, we focus specifically on INGOs.

Hypothesis 2: stronger ties to global institutions, specifically international nongovernmental organizations, are associated with lower levels of forest loss.

Environmentalism in the Periphery

Drawing on insights from world-systems theory and sociological institutionalism, we argue that processes of ecological unequal exchange mediate normative pressures to protect the natural environment in the periphery. We suggest that the phenomenon of global environmentalism – or the tendency of national ties to global institutions to associate with more environmentally friendly practices – is not uniform across the world system. Rather, environmentalism in the periphery is uniquely shaped by peripheral states' qualitatively distinct relationship to global production. The

[7] National ties to global institutions are traditionally measured as citizen memberships in INGOs in general, but also as ties to INGOs with specific focuses, and also sometimes state participation in international treaties and membership in intergovernmental organizations (IGOs).

reliance on labor-intensive natural resource extraction for economic development creates a unique tension between material and normative forces in the periphery that is the focus of our study.

Sociological institutionalism takes a global focus with the assumption that institutional context is less salient in the periphery. Overall, as global institutions expand and national ties to them increase, environmentally friendly policies are increasingly widespread. Perfect and immediate compliance with such policies is unlikely. The observed disconnect, or decoupling, between policy and practice varies considerably cross-nationally. Coupling between environmental norms and practices tends to be strongest in the core and weakest in "poor countries that lack the resources for effective policy implementation" (Hironaka 2014: p. 150). Weak states in the periphery lack the capacity to enforce environmental policies. Accordingly, environmentalism is often assumed to serve as mere "window-dressing" in the periphery.

Qualitative differences between the zones of the world-system are central to the theory of ecological unequal exchange. However, empirical work on global institutions tends to analyze their role across a large set of countries – either globally or across the entire Global South. Sampling such a wide array of nations is problematic because it implies that the effect of a given variable, such as the effect of world society ties, is relatively uniform across all countries. As a result of this approach, many of these studies find an effect of global institutions, while others do not. For example, Jorgenson Dick and Shandra (2011) find that global institutions have no direct effect on carbon emissions or water pollution (although they do find an indirect effect where ties mediate pollution from foreign direct investment), and find mixed results supporting a direct effect of world society ties on deforestation. Their sample includes the bottom three quarters of the World Bank's income quartile classification. This results in samples of forty to eighty countries analyzed together. The inclusion of all countries across the global South where data are available is very common in cross-national environmental research.

We suggest that an over-reliance on large-N cross-national analyses is problematic. On the one hand, massive amounts of worldwide variation obscure important difference across the periphery. For example, average income in members of the Organization of the Petroleum Exporting Countries (OPEC) is forty times greater than average income in the "low income" countries as classified by the United Nations. However, average income varies by a nontrivial factor of five within the periphery itself (World Bank 2016). There also exists a great deal of variation in the extent to which nations are integrated into global environmental institutions in the periphery. The number of organizational ties ranges from 205 to 2,350 even within our small sample.

Our approach to this problem is to limit our sample size to nations that produce a common crop, resulting in a smaller sample where the effects of global institutions is likely to be more uniform This approach is similar to Austin's (2012) study of unequal exchange in the coffee

producing nations of the world. Limiting our sample in this way allows us to focus on the effect of world society ties in a small part of the globe and within the context of a single industry. This is desirable because the effect may be more uniform and thus possible to detect in statistical models that assume uniformity across observed effects.

Drawing further on the theory of ecological unequal exchange and the importance of qualitative differences between zones of the world system, we argue for the examination of specific rather than general processes. Instead of testing for an institutional effect across the entirety of the periphery, we suggest that a more theoretically targeted sample will yield more informative results. Peripheral states are affected specifically by environmentally harmful natural resource extraction. Palm oil production results in the carbon-intensive process of clearing natural forests and the carbon sinks left in their place. For these reasons palm oil producers and their rates of deforestation are the subject of this study.

Following previous work within the world society tradition, we expect variation in the extent to which states are tied to global institutions to be consequential for environmental outcomes. However, we expect global institutional factors to be mediated by the resource-extractive production processes that are unique to this zone. We hypothesize that forest loss will be lowest among palm oil producers with the strongest ties global institutions, specifically international nongovernmental organizations (INGOs). We further hypothesize that relationship to be mediated by the production of palm oil. National ties to INGOs will be less important for forest loss in the highest producing states and will be most important for forest loss where palm oil is produced the least.

Hypothesis 3: the intensity of palm oil extraction mediates the relationship between national ties to INGOs and forest loss. More intensive palm oil production mitigates the effects of INGO ties on forest loss across palm oil producers.

Data

The data for these analyses come from four sources. Primary forest area and palm oil exports by dollar amount are from the United Nation's Food and Agricultural Organization. Data on palm oil production by volume is from the United States Department of Agriculture's Foreign Agricultural Services. Data on international organizations is from the Union of International Associations' Yearbook of International Organizations. All other variables are from the World Bank's Open Data Catalogue. Data used in the analysis are available for all years across all countries except for Liberia. Data are missing for one variable, Liberia's total exports, from 1990 to 1996. Because we use casewise deletion, this results in Liberia being included in the analysis from 1997 to 2012. Table One presents descriptive statistics for each variable that we describe below and includes data

from 1990-2012 across all countries unless otherwise noted. The distribution of most variables is skewed. We natural log transform variables to reduce skew for all continuous variables except for protected land area, which is normally distributed throughout our sample.

Primary Forest Area

The Food and Agricultural Organization classifies primary forest as forest of native species where there are no signs of human disturbance. In these areas, the last significant human intervention was long enough ago to allow natural species and processes to re-establish themselves and they exhibit the occurrence of dead wood and natural age structure. These forests may be naturally regenerated but not managed. Biologists assert that primary forest areas are particularly important for species richness and biodiversity because they contain more complex ecosystems and significantly more species than agroforests or other managed forest areas (Thiollay 1995). Data are from the FAO's most recent Forest Resource Assessment and measurements are standardized by total land area. Primary forest area is measured in square kilometers and standardized as a percent of the total amount of land in a country.[8]

Palm Oil Production

Data are gathered from the United States Department of Agriculture's Foreign Agricultural Services. The FAS database contains information on palm oil production, exports, imports and domestic consumption for all countries in this analysis from 1987 to 2016. Production values are measured in 1000 metric tons.

Global Institutions

Consistent with work in sociological institutionalism, we measure national embeddedness in global institutions as the total number of international nongovernmental organizations (INGOs) in

[8] In some years, FAO measurements of primary forest area are done manually with remote sensing surveys, while in others experts provide estimates. One of the difficulties with large scale forest data lies in collecting measurements of forest area. The cost of measuring large areas of forest is high and, in developing countries, regular field surveys are sometimes not possible. When field survey data are not available, the FAO may rely on experts in a particular field to estimate the amount of primary forest area in a nation. We control for variability that may arise due to the measurement technique utilized in a given year comparable to Shandra et al. (2011a). The highest quality estimates are measured manually with remote sensing surveys or field samples (1=higher quality) while in other years measures are estimated by experts in a given country often with extrapolation methods from previous year's estimates (0=lower quality). Data are available from the FAO.

which a country's citizens have membership.[9] Data are from the Union of International Association's *Yearbook of International Organizations*.

Gross Domestic Product per capita

This variable is included as a control for the level of a country's development. Studies have found mixed results when examining the effects of per capita GDP on deforestation. Shandra et al. (2011a) find that countries with higher levels of development have lower rates of deforestation. Burns, Kick and Davis (2003) suggest that this is partly due to unequal exchanges in the world system. In comparable studies, models have shown the effect of per capita GDP to be insignificant (Jorgenson 2007; Shandra Shircliff and London 2011b). Data are downloaded from the World Bank (2016) and are measured in constant 2000 U.S. dollars.

Exports

We measure this variable as total dollar amount of exports less the amount of palm oil exports in constant 2000 dollars. The final dollar amount is standardized by a country's gross domestic product. Research in political economy has shown that a country's level of total exports is associated with a number of negative environmental outcomes including reduced biodiversity and increased greenhouse gas emissions (Shandra et al. 2010, Jorgenson 2007). Data for this variable are missing for Liberia from 1990-1996, but otherwise available across all years used in this study for all countries. Because we use casewise deletion, this results in Liberia being included in the analysis from 1997 to 2012.

Population

As populations grow, they consume more resources leading to more stress on the environment and subsequent deforestation (York Rosa and Deitz 2003). This makes population an important variable to control for when assessing factors that determine rates of forest loss. Estimates are taken at mid-year and published by the World Bank (2016).

Urban Population

It is also important to consider population dynamics when examining changes in forest areas. Jorgenson and Burns (2007) find that urban population growth is negatively related to deforestation. They suggest that this occurs because rural workers migrate to cities as nations

[9] Some studies index INGOs with international treaties and intergovernmental organizations. We focus on INGOs for ease of coefficient interpretation. We also note the very high correlation between the three.

industrialize, thus reducing dependence on rural agriculture and associated forest loss. Estimates are also from the World Bank (2016) and are measured as a percent of the total population.

Table 1. Descriptive Statistics

	Mean	Median	St. Dev.	Min.	Max.
Key Variables					
Primary Forest (sq. km)	2,432	131	5,390	4.04	21,824
Primary Forest (% of Total Land Area)	.0163	.0131	.0172	.00004	.0556
Total Primary Forest Loss (% of Total Primary Forest)	-7.18	-.685	7.09	-28.46	4.04
Palm Oil Production (1,000 tonnes)	1,851	180.5	4,705	6.00	4,705
Ties to INGOs	846.5	825.0	426.7	205.0	2,350.0
Economy					
GDP in millions	126,376.8	33,101.47	259,643.4	316.55	2,001,994
GDP per capita	2,045.53	1,554.17	1,771.38	122.55	9,984.13
Exports (% GDP)*	37.50	32.12	22.03	6.71	121.37
Imports (% GDP)*	40.71	36.20	22.64	7.00	144.73
Population					
Total population (millions)	54.12	20.17	66.56	2.37	248.04
Urban population (% total)	50.53	47.27	14.45	28.02	84.90
Biophysical					
Forested area (100,000 sq. km)	5.62	1,02	13.47	23.76	57.48
Forested area (% land area)	43.75	46.03	15.60	9.03	72.71
Protected land (% land area)	16.35	15.78	7.11	1.63	30.93
Political					
Democracy (freedom house index, 1-7)	3.17	3.5	1.11	1	5

Note: *Data are missing for Liberia from 1990-1996

Forest Area

We also control for the total square kilometers of forested area in a country. This variable is important because countries with relatively more or less forest resources experience deforestation in different ways. Previous work has shown that that net of relevant controls, countries with larger forest tend to experience lower rates of deforestation (Shandra et al 2011a; Burns, Kick and Davis 2003).

Protected Land Area

We control for the amount of land that is protected in each country, which is vital to national forest protection efforts. Laurance et al. (2012) suggests that protected areas are quickly becoming the last refuge of biodiverse areas in many countries around the world. As such, losses in a nation's protected land area may result in a loss of primary forest. This variable, measured as a percent of total land area, and is not log transformed in our analysis.

Methods

For these analyses, we use an unbalanced panel of 15 palm oil producing countries from 1990 to 2012. In order to focus on variance within palm oil producing nations, we limit our sample countries that produce and export palm oil. This approach is comparable to Austin (2012) which examines unequal ecological exchange in coffee production. Table 2 summarizes the key indicators for all included and excluded countries. Countries are included based on two criteria: whether they (a) face economic pressure to produce palm oil for exports and whether they (b) have any primary forest area. To meet the first criteria, a country must produce at least as much palm oil as it exports and export more palm oil than it imports (production ≥ exports > imports). If a country meets this criterion for at least one year, it is included in the analysis.

The first criterion excludes six countries that produce very small amounts of palm oil primarily for domestic consumption. Six countries are further excluded based the second criterion because they already have no primary forest left at the beginning of the period analyzed.[10] Since the vast majority of palm oil is produced for export by heavily forested nations, 91.14% of global palm oil production that took place during the time period of our analysis is included in our sample.

We use Prais-Winston regression analyses with panel corrected standard errors and corrections for first order autoregressive correlation. This is a more efficient variation of the Cochrane-Orcutt model in that it does not omit the first observation for each panel. In addition, we

[10] Results are robust to the inclusion of countries with no primary forest area, non-net exporters, and all palm oil producers. Results are also robust to the exclusion of Indonesia and Malaysia.

Table 2. Summary of Key Indicators for All Palm Oil Producers

		Mean			Primary Forest 1990	Δ Primary Forest Area
	N	GDP per capita	Palm Oil Production	INGO Ties	% Land Area	
Brazil	23	5,016.49	151.00	1901.52	.0261	-.0018
Costa Rice	23	4,346.22	146.61	789.39	.0257	.0039
Cote d'Ivoire	23	874.61	299.17	544.87	.0020	0
Ecuador	23	2,568.62	278.04	762.09	.0527	-.0016
Ghana	23	592.31	209.61	604.26	.0020	0
Guatemala	23	1,748.99	110.00	604.26	.0275	-.013
Guinea	23	410.31	48.70	246.96	.0003	0
Honduras	23	1,137.97	176.22	451.00	.0041	0
Indonesia	23	1,274.23	11,709.78	1,065.96	.0273	-.0015
Liberia	16	186.33	42.00	226.44	.0018	0
Malaysia	23	4,867.90	12,389.65	1,101.22	.0116	.0034
Nigeria	23	677.36	750.48	939.00	.0017	-.0016
Peru	23	2,555.51	20.35	1,049.35	.0544	-.0027
Philippines	23	1,200.92	67.87	1,115.74	.0029	0
Thailand	23	2,660.21	822.70	1,073.57	.0132	0
Palm Oil Producers Excluded from Analyses						
Angola	23	1,430.89	48.52	231.26	0	0
Benin	23	451.54	36.43	371.78	0	0
Cameroon	23	849.25	175.57	560.91	0	0
Congo, D.R.	20	207.31	153.08	479	.0463	-.0009
Colombia	23	2,997.42	543.70	1,151.10	0	0
Dominican Rep.	23	2,859.16	22.09	559.48	0	0
India	23	607.21	40.78	1,787.44	.0052	0
Mexico	23	6,167.30	31.09	1,629.35	.0203	-.0033
Papua New Guinea	23	957.72	338.30	384.22	.0691	-.0267
Sierra Leone	23	275.60	38.30	325.82	.0031	-.0017
Venezuela	23	5,188.77	55.22	1,151.09	.0528	-.0003
Togo	23	369.25	11	354.48	0	0

correct for autoregressive correlation in the first order AR(1), or the tendency of observations to be correlated strongly with observations from previous time points within the same case (Becketti 2013; Prais and Winston 1954; Woolridge 2010). A Woolridge F statistic indicates the strong first order autoregressive correlation correlation in all of our models and thus the need for the Prais-

Winston model with AR(1) correlation. The regression model is represented by the equation below.

$$Y_{it} = \beta_n X_{nit} + \alpha_p + e_{it}$$

Y is the dependent variable for country *i* at time *t*. It is the equivalent to the sum of all coefficients (β_n) multiplied by their respective independent variables (X_n) for country *i* at time *t* plus the unobserved time period-invariant country effect (α_p) and the error (e_{it}).

Results

In Table 3 we present findings for Prais-Winston regression estimates of primary forest from 1990 to 2012. All models estimate coefficients for palm oil production, ties to INGOs, population, urban population, GDP per capita, exports, forest and protected land areas, and control for measurement technique. The linear effects of palm oil production and ties to INGOs are shown in model one and their interaction is shown in models two and three. All coefficients are small because of the scaling of all variables. Readers should keep in mind that although these coefficients are small, they explain more than half of the variance in our dependent variable.

The results of model one support the hypothesis that palm oil production is associated with decreased primary forest area. The coefficient for palm oil production is negative and statistically significant (-.0008 $p<.001$). This demonstrates that, net of other factors, as a country produces more palm oil its percentage of primary forest area decreases. Model one also demonstrates support for our second hypothesis, that greater embeddedness into global institutions is associated with having more primary forest. The coefficient for INGO ties is positive and statistically significant (.0101, $p<.001$) indicating that as nations are more strongly tied to world normative expectations for environmental protection, they retain more primary forest over time. This finding supports previous research that indicates that NGOs are overall effective at reducing deforestation (Shandra 2007). Our next models examine the interaction between our political economy and institutional variables.

Models two and three support our hypothesis that the relationship between national ties to global institutions and environmental practices is mediated by palm oil production. Our second and third models include a term for the interaction of palm oil production and INGOs as well as the constitutive terms (those that make up the interaction effect). Model two includes the uncentered palm oil and INGO variables while model three shows the coefficient for those variables centered with a mean of zero. We interpret the results of both interaction models following Brambor, Clark and Golder (2006).

The uncentered coefficients in model two show the conditional effect of INGO ties and palm oil production when the other constitutive variable is equal to zero (Brambor et al. 2006). In

other words, the coefficient for INGO ties (.012, p<.01) is the coefficient when palm oil production is equal to zero. Likewise, the coefficient for palm oil production (.002, p>.05) is the coefficient conditional upon a country having zero INGO ties.

Table 3. Unstandardized Coefficients for Prais-Winston Regression Models of Primary Forest Area with AR[1] Corrections

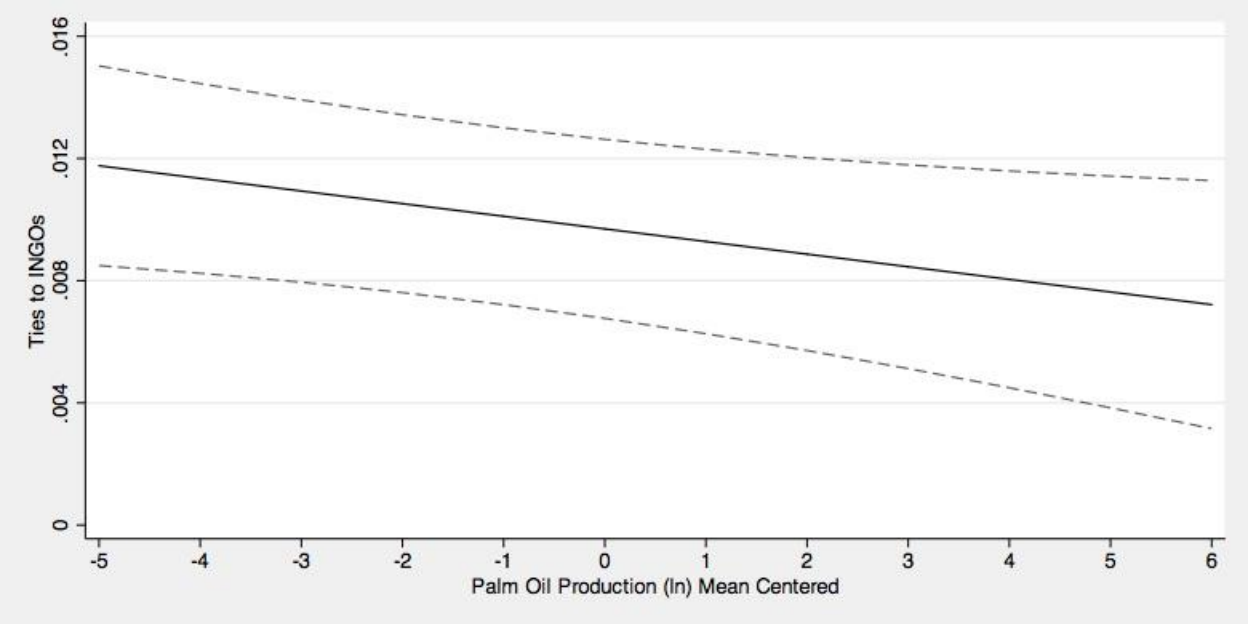
	Model 1	**Model 2**	**Model 3**
Palm Oil Production 1000 MT (ln)	-0.0008*** (.0002)	0.0019 (.0014)	--
INGO Ties (ln)	0.0101*** (.0015)	0.0120*** (.0017)	--
Palm Oil Production 1000 MT (ln) Mean Centered	--	--	-0.0008*** (.0002)
INGO Ties (ln) Mean Centered	--	--	0.0097*** (.0015)
INGO*Palm Oil	--	-0.0004* (.0002)	-0.0004* (.0002)
Population (ln)	-0.0063*** (.0006)	-0.0063*** (.0006)	-0.0063*** (.0006)
% Urban Population (ln)	0.0132*** (.0017)	0.0130*** (.0016)	0.0130*** (.0016)
Exports %GDP (ln)	-0.0004 (.0004)	-0.0004 (.0004)	-0.0004 (.0004)
GDP per capita (ln)	0.0012** (.0004)	0.0012** (.0004)	0.0012** (.0004)
Forest Area Sq. KM (ln)	0.0056*** (.0003)	0.0057*** (.0003)	0.0057*** (.0003)
Protected Land	0.0001** (.0000)	0.0001** (.0000)	0.0001** (.0000)
Measurement Technique	-0.0002 (.0002)	-0.0002 (.0004)	-0.0002 (.0004)
Constant	-.0634***	-.0755***	-.00006
N	338	338	338
R^2	.57	.57	.57

Notes: * p<.05 **p<.01 ***p<.001; Standard Errors are in Parentheses.

Since we have no actual observances of countries with zero palm oil production or zero INGO ties, this coefficient is not substantively meaningful and readers should instead interpret the constitutive effects displayed in model three, which recalculates the regression equation after centering the mean at zero. The results for the constitutive terms in model three show the conditional effects of INGOs and palm oil production on primary forest area and demonstrate that higher INGO ties is associated with larger primary forest areas (.0097, p<.001) and higher palm oil production is associated with smaller areas of primary forest (-.0008, p<.001).

The interaction term in models two and three is negative and significant (-.0004, p<.05). This supports our hypothesis that the relationship between environmentalism and protecting primary forests is diminished as palm oil production increases. We also calculate and plot unconditional marginal effects of our interaction terms. Figure 3 illustrates the unconditional marginal effects of ties to INGOs across various levels of palm oil production (represented by the solid line in figure 3) and the 95% confidence interval for these estimates (the dashed lines in figure 3). The negative slope of the unconditional marginal effects further supports our hypothesis that the intensity of natural resource extraction mediates the relationship between national ties to global institutions and environmental practices.

Figure 3. Marginal Effects of Environmentalism by Palm Oil Production



All of our control variables are consistent across both models and results are similar to previous research. Population increase is associated with less primary forest area, whereas total forest area, protected land, GDP per capita and percent urban population are associated with more

primary forest. The only variable that did not reach statistical significance is total exports. In sum, our analyses indicate the importance of national ties to INGOs in mediating rates of forest loss among palm oil producers. Theoretically, results of our study suggest that national exposure to environmental norms institutionalized at the global level temper the environmentally harmful effects of ecological unequal exchange.

Discussion

Results of our study indicate that while the process of palm oil production in the periphery of the world system has significant damaging effects on the natural environment, that damage is mitigatable. Projected increases in the demand for palm oil products for both industrial and foodstuffs suggest the urgency for developing solutions to its negative impact on the natural environment. We consider several policy and practical implications of our findings that complement the theoretical perspectives we engage. We suggest that states, international nongovernmental organizations (INGOs), and international financial institutions (IFIs) can all meaningfully contribute to mitigating palm oil-related deforestation.

World society theory is focused on the overall context in which nation states are embedded and how that context shapes state structures and activities. However, within this context we can conceptualize of INGOs as actors with specific objectives. Several large INGOs, Friends of the Earth and Greenpeace, for example, are dedicated to a wide range of environmental issues. Notably, both highlight the specific environmental problem of palm oil production and its effects on species endangerment and climate change respectively (Friends of the Earth 2005; Greenpeace 2007). Nongovernmental efforts for sustainable production have the potential to contribute to improved environmental practices in palm oil producing countries. The Roundtable on Sustainable Palm Oil, for example, has seen improvement in forest loss and other environmental consequences of palm oil production among its voluntary participants (Garrett et al. 2016). However, it has a very low adoption rate.

Inequalities within the world system as they relate to global capitalism and unequal exchange are central to the problem of palm oil-driven deforestation. Expectations for economic development persist alongside environmental norms. Given the tension inherent in “sustainable development” and that peripheral countries develop economically while minimizing environmental damage, material resources are crucial for success. The international community, and perhaps IFIs in particular, should provide support for sustainable cultivation of palm oil. The projected increase in the use of palm oil as a biodiesel base and the likely investments coming from international financial institutions suggests the importance of governmental support for mitigating its harmful effects in the periphery. However, thus far, IFIs have contributed mostly to destructive palm oil production practices. Political and economic incentives from the Association

of Southeast Asian Nations (ASEAN), for example, reinforce environmentally destructive production in these areas (Stampe and McCarron 2015).

Additionally, individual states have potential to reduce forest loss through policy implementation and enforcements. However, current efforts are largely ineffective. For example, a compromise between the desire for constant expansion and the need for environmental protection has led to schemes where palm oil plantations are permitted to expand if they protect smaller patches of natural areas known as "forest fragments." In addition to being ineffective at protecting biodiversity (Edwards et al. 2009), forest fragment schemes do not address the underlying unequal exchange conditions that push for endless accumulation and expansion of land use for the cultivation of crops. A key insight of the ecological unequal exchange approach to development lies in considering the whole of the global capitalist system. Successful reduction of forest loss and reforestation requires changes in palm oil consumption trends worldwide.

In the meantime, peripheral states should focus on increasing outputs of staple crops grown for national consumption while limiting the areas that are used for export cultivation instead of promoting "sustainable" expansion programs like forest fragment protections. This might be achieved via government subsidies for staple crop production and penalties for land-clearing for the production of palm oil and other commodities. Research has shown that increasing staple crop yield is linked to less per capita agricultural land use and more forest area; however, this effect is strongest in nations with an adequate food supply that do not expand other forms of agricultural land use (Ewers et al. 2009). A sound policy to use less land, therefore, could lie also in a solution to increasing steady food supplies in developing countries which may reduce pressure to expand export commodities such as palm oil. In all, we suggest that a combination of state and non-state support for sustainable palm oil production has the potential to generate closer coupling between environmental norms and forest loss trends across the periphery.

Conclusions

We conclude with the specification of three distinct but related contributions of this study followed by suggestions for future research to extend this line of work. Results of this study contribute to development and environmental sociology with 1) the integration of two largely siloed perspectives on macro social change; 2) a challenge to previous assumptions that global institutions are inconsequential in the periphery; and 3) a specific focus on theoretically relevant cases. We situate the longstanding exploitation of the periphery and its natural resources in the global context of changing environmental norms. Drawing on insights from the theories of ecological unequal exchange and sociological institutionalism enables us to examine the interaction between material and normative processes that relate to environmental outcomes. With a focus on the world's palm oil producers, we take a targeted approach to examining how

subordination in the global economy mediates the extent to which environmental norms and practices are coupled.

Our study provides evidence for the relevance of institutional ties in the periphery and examines how the processes of ecological unequal exchange mediate the relationship between the strength of institutional ties and environmental practices. Among the top palm oil-producing countries, stronger ties to global institutions predict lower levels of forest loss. However, this effect is not uniform across this population. Rather, the relationship between norms and practices is heavily mediated by the extent of production. We find that environmental norms are more strongly coupled with environmentally friendly practices where extractive production is lowest. Increases in production decrease the degree of coupling between norms and practices. However, even in the cases of Indonesia and Malaysia, where palm oil production is substantially higher than any other producer, ties to world society are significantly related to reduced forest loss.

We conclude that while subordination in the global stratification system is generally negative for the natural environment, changes in environmental norms can reduce this consequence. Likewise, we conclude that while the material needs of economic development can outweigh normative commitments to environmental protection, reduced extractive production can enable the tighter coupling between norms and practices. Historically, continued economic development has not affected forest loss in a strictly linear manner. On the contrary, trends toward "reforestation" can follow an initial phase of deforestation (Rudel 1998). Our results suggest that national ties to world society may enable peripheral states' transition toward reversing previous trends in forest loss.

Theoretically, these findings suggest the importance of integrating political economic and institutional perspectives on the natural environment. Processes of unequal ecological exchange have a meaningful effect on the relationship between environmental norms and environmental practices. The extent to which norms and practices are coupled, even within palm oil producer in the periphery, are not uniform. The extent to which these countries are embedded in a global context is consequential for environmental practices. Therefore, the strength of national ties to global institutions in the periphery should be incorporated into institutional analyses. However, these ties should not be considered without context. The qualitative distinctiveness of the periphery as it relates to the global economy should also be accounted for.

This leads us to research implications for scholars of development focusing on environmental outcomes. We see several promising avenues for expanding upon this study. Future work might examine the relationships between global institutions and processes of ecological unequal exchange in the extraction of other natural resources and commodities; how these dynamics operate specifically in semiperipheral states; how normative and political economic pressures vary along global commodity chains spanning all world-system positions.

Additionally, more work should interrogate the complex dynamics of decoupling between cultural norms and practical outcomes related to the natural environment. This might include the elaboration on the tensions between normative expectations for continued economic development and increased environmental protections, for example. Future work might also expand on the scope of global environmental institutions and examine specific relevant intergovernmental organizations such as the United Nations Environment Programme and lending and aid practices of the World Bank and International Monetary Fund. Ultimately, the significant mediating effect of ties to global institutions on ecological unequal exchange suggest the importance of integrating these theoretical traditions in future empirical work.

About the Authors

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Any conflicts of interest are reported in the acknowledge section of the article's text. Otherwise, authors have indicated that they have no conflict of interests upon submission of the article to the journal.

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The Treadmill of Destruction in Comparative Perspective:
A Panel Study of Military Spending and Carbon Emissions, 1960-2014

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Abstract

This article analyzes a unique panel data set to assess the effect of militarism on per capita carbon dioxide emissions. We extend previous research examining the effects of military expenditures on carbon emissions by including in our analyses over 30 years of additional data. In addition, we compare our preliminary results to those obtained from other estimation procedures. Specifically, we report and visually illustrate the results of 54 cross-sectional models (one for each year) and 36 unique panel regression models on both balanced and unbalanced panels. We assess how this relationship has changed over time by testing for interactions between military spending and time and by systematically re-analyzing our data across 180 panel regressions with varying time frames. A strong and enduring association between military spending and per capita carbon emissions is indicated in cross-sectional comparisons. Our panel analyses reveal a much weaker and varying relationship that has become stronger in recent decades. Moreover, we find that the effect of military spending on per capita carbon emissions is moderated by countries' level of economic development, with military spending of more wealthy countries having relatively larger net effects on carbon emissions. We partially confirm previous findings on the temporal stability of the environmental impacts of militarism. Our analyses show, however, that this temporal stability has emerged relatively recently, and that the relationship between military expenditures and carbon emissions is weaker prior to the 1990s.

Keywords: Militarism, Militarization, Carbon emissions, Treadmill of destruction, Treadmill of production

Human reliance upon nonrenewable, carbon-based energy has generated unprecedented atmospheric concentrations of carbon dioxide, leading to global warming (Intergovernmental Panel on Climate Change 2013). Because the existing capitalist world system has historically been predicated upon an exponential growth in the use and depletion of scarce ecosystem resources, the eminent constraints imposed upon growth by nature permanently threaten the health of the global economy while decimating poor populations and degrading ecosystems (Schnaiberg 1980; Schnaiberg and Gould 1994). In addition, looming "peak oil" and other resource shortages render more likely an increase in the frequency, intensity, and duration of military conflicts fought over the control of these resources.

In response to these and related issues, a growing number of scholars have begun to examine the connections between militarism and the environment. These scholars have brought attention to the harmful pollutants that are generated from the manufacture of military weaponry as well as the massive quantities of resources that are depleted in order to sustain militaries' permanent preparedness for war (e.g. Clark and Jorgenson 2012; Hooks and Smith 2005, 2012; Jorgenson, Clark, and Kentor 2010; Jorgenson and Clark 2009, 2016; Smith, Hooks, and Lengefeld 2014). Politicians and international organizations in the past decade have expressed increasing concern over resource scarcity and the related possibility of armed conflict (Theisen 2008). Moreover, key indicators suggest that the increasing scarcity of key resources relative to global demand renders more likely an increase in the frequency, intensity, and duration of military conflicts over their control (Homer-Dixon 1999; Parenti 2011).

This study analyzes cross-sectional time series data to examine a prominent political economy approach to studying the environmental impacts of militarism: the Treadmill of Destruction. More specifically, we examine how military expenditures affect per capita emissions of carbon dioxide. The most recent published study (to our knowledge) to also examine the effects of military expenditures on carbon emissions uses as its dependent variable total consumption-based CO2 emissions (Jorgenson and Clark 2016). We extend this research in three important ways: first, we focus on how military expenditures affect the *intensity* of carbon emissions (i.e. CO2 per capita), rather than on total emissions; second, we use as our dependent variable territorial emissions data rather than CO2 emissions embodied in trade (i.e. consumption-based estimates); and finally, we analyze a much longer period of time.

In the following sections, we first review the specific theories of relevance for our panel analysis. We then describe our estimation procedures and methods before turning to the results of our analysis. And finally, we conclude by summarizing our main findings and explaining their theoretical relevance.

Treadmill of Destruction

A burgeoning literature within the environmental social sciences explores the underlying logic of warmaking and its harmful effects to societies and the natural environment. Hooks and Smith (2004, 2005, 2012) refer to the unique environmental impacts of militarism and war as the "Treadmill of Destruction," in order to distinguish these effects from those produced by economic forces such as the pursuit of profit and the expansion of capital.

Militaries generate massive withdrawals of energy and resources. Increases in military spending and armed conflicts cause environmental degradation, reducing the biological capacity available to human populations (Bradford and Stoner 2014). In the United States, the military is the largest consumer of fossil fuels (Santana 2002). Militaries generate massive amounts of carbon dioxide waste (Dycus 1996) as well as toxic waste (LaDuke 1999; Shulman 1992). According to Hooks and Smith (2005), militaries exert negative environmental effects even when they are not actively engaged in warfare. Moreover, the environmental effects of militarism and warfare cannot be explained solely in terms of economic motives (Hooks and Smith 2005: 21). Military decision-making regarding actions that can (and do) have devastating social and biophysical consequences, such as the use of nuclear weapons amid geopolitical competition, or the recent spike in "drone" (unmanned aerial vehicles) strikes, cannot be reduced to the logic of profitability, even though these decisions as well as their socio-ecological consequences, may indeed be interconnected with the economic imperatives of capital.

The development of weapons of mass destruction (WMDs), including nuclear, chemical, and biological weapons, dramatically transformed war in the second half of the twentieth century. Today, the extent of environmental damage inflicted by militaries depends more on the technological sophistication of the weapons they employ than on the number of soldiers and other personnel that militaries possess (Hooks and Smith 2012; Kentor and Kick 2008). Whereas most wars fought throughout human history brought about environmental degradation indirectly, WMDs are intentionally designed to make ecosystems uninhabitable by humans (Hooks and Smith 2005). Jorgenson and Clark (2009), in their analysis of panel data for 53 developed and less-developed countries, find a positive association between per capita ecological footprints and military expenditures per soldier. They interpret this as evidence that more capital-intensive militaries place additional strains on the environment (Jorgenson and Clark 2009: 640). Downey, Bonds, and Clark (2010) find evidence of a significant positive relationship between resource extraction and armed violence, suggesting an intricate and complex web of industrial production and state power. Jorgenson et al. (2010) find that the ratio of military expenditures to the number of military personnel as well as the ratio of military personnel to the total population significantly effects total and per capita carbon dioxide (CO2) emissions and Footprint per capita.

More recently, Jorgenson and Clark (2016) find that the environmental impacts of military expenditures and military personnel have been relatively stable between 1990 and 2010. Jorgenson and Clark (2016) estimate the net effects of militarism on total consumption-based CO2 emissions. Consumption-based CO2 emissions are "calculated as the territorial emissions minus the 'embedded' territorial emissions to produce exported products plus the emissions in other countries to produce imported products (consumption = territorial − exports + imports)" (Le Quéré et al. 2015: 357). In contrast, we estimate the effects of militarism on per capita territorial CO2 emissions (see below). Examining data both prior to 1990 and after 2010, our findings suggest that, with respect to territorial emissions, militaries have become significant and independent contributors *on average* only within the past 20 to 30 years. We suspect that the relationship between total *consumption-based* carbon emissions and military spending reported by Jorgenson and Clark (2016) has also emerged recently and would probably be weaker in earlier time periods, although we cannot at this time test our intuition directly because data for consumption-based estimates are not available prior to 1990.

Empirical Analyses: Data Set

We analyze both balanced and unbalanced panel data at 1-year increments. Our balanced panels include 40 observations each for 62 countries between 1975 and 2014. Our unbalanced panels include 162 countries between 1960 and 2014. Sample sizes for the unbalanced panels range from 47 countries in 1960 to a maximum of 154 in 2005. Data availability precludes us from including time points before 1960 and after 2014. Table 1 lists the countries included in our balanced and unbalanced panels and the number of observations per country.

To minimize skewness, our response and explanatory variables except Democracy (an ordinal measure) are transformed by taking the natural logarithms of one plus their respective values. Because our variables are log transformed, variable coefficients for all models indicate the average change in per capita carbon dioxide emissions over time when the explanatory variable increases by one unit. The units of change analyzed can therefore be interpreted as elasticity coefficients, or percentages (York, Rosa, and Dietz 2003, 2009). Table 2 provides descriptive statistics and bivariate pooled correlation coefficients for our response and explanatory variables for all cases.

Response Variable

Our response variable for all models is territorial carbon dioxide emissions measured in metric tons per person (CO2/population). We obtain our data from the Global Carbon Atlas (2016). For most countries and years (1959-2013), the Global Carbon Atlas obtains its CO2 estimates from

Table 1. Number of Observations per Country

Afghanistan 11	Djibouti 15	Latvia 20	***Rwanda** 42
Albania 35	***Dominican Republic** 55	Lebanon 26	Saudi Arabia 43
***Algeria** 52	***Ecuador** 55	Lesotho 25	Senegal 36
Angola 30	***Egypt** 50	Liberia 39	Serbia 19
***Argentina** 55	***El Salvador** 50	Libya 12	Seychelles 30
Armenia 22	Equatorial Guinea 6	Lithuania 20	Sierra Leone 52
***Australia** 55	Eritrea 10	***Luxembourg** 55	***Singapore** 45
***Austria** 55	Estonia 20	Madagascar 52	Slovakia 22
Azerbaijan 23	Ethiopia 34	***Malawi** 50	Slovenia 20
Bahrain 35	***Fiji** 45	***Malaysia** 55	***South Africa** 55
***Bangladesh** 42	***Finland** 55	Mali 46	***Spain** 55
Belarus 23	France 55	Malta 29	***Sri Lanka** 54
***Belgium** 55	Gabon 31	Mauritania 27	Sudan 46
Belize 29	Gambia 30	Mauritius 39	Swaziland 38
Benin 43	Georgia 19	***Mexico** 55	***Sweden** 55
***Bolivia** 50	***Germany** 45	Mongolia 28	Switzerland 35
Bosnia and Herzegovina 13	***Ghana** 54	Montenegro 10	Tajikistan 19
Botswana 38	***Greece** 54	***Morocco** 49	***Thailand** 55
***Brazil** 55	***Guatemala** 55	Mozambique 35	Macedonia 19
Brunei Darussalam 31	Guinea 15	Namibia 24	Timor-Leste 10
Bulgaria 26	Guinea Bissau 23	***Nepal** 45	Togo 45
***Burkina Faso** 55	Guyana 39	***Netherlands** 55	Trinidad and Tobago 30
Burundi 49	Haiti 17	New Zealand 38	***Tunisia** 40
Cabo Verde 28	Honduras 48	Nicaragua 38	***Turkey** 55
Cambodia 22	Hungary 24	Niger 30	Turkmenistan 6
***Cameroon** 45	Iceland 4	***Nigeria** 55	Uganda 33
***Canada** 55	***India** 55	***Norway** 55	Ukraine 22
Central African Rep. 14	***Indonesia** 41	Oman 44	United Arab Emirates 18
Chad 30	***Iran** 55	***Pakistan** 55	***United Kingdom** 55
***Chile** 55	Iraq 25	Panama 28	Tanzania 27
China 26	***Ireland** 45	Papua New Guinea 37	***United States** 55
***Colombia** 55	***Israel** 55	***Paraguay** 55	***Uruguay** 43
Congo 29	Italy 55	***Peru** 55	Uzbekistan 9
***Costa Rica** 55	Jamaica 36	Philippines 55	***Venezuela** 55
Côte D'Ivoire 47	***Japan** 55	Poland 25	Viet Nam 20
Croatia 20	Jordan 40	***Portugal** 55	Yemen 24
Cuba 5	Kazakhstan 22	Qatar 9	Zambia 26
Cyprus 30	***Kenya** 52	***Rep. of Korea** 55	Zimbabwe 47
Czech Rep. 22	Kuwait 20	Rep. of Moldova 22	-
DR Congo 32	Kyrgyzstan 23	Romania 25	-
***Denmark** 55	Laos 22	Russia 23	-

Countries included in balanced panels are flagged by asterisks. Balanced panels include 40 obs. per country.

the U.S. Department of Energy's (2017) Carbon Dioxide Information Analysis Center (CDIAC).1 For 40 countries (1990-2014), official national estimates reported to the United Nations (UNFCCC 2017) Framework Convention on Climate Change are used instead. We cross-validated the data obtained from the Global Carbon Atlas with that of the CDIAC.[2]

Table 2. Summary Statistics and Correlation Coefficients

	Mean	Std. dev.	Median	Min.	Max.	Skew	Kurtosis	Missing
tCO2 per person	1.23	0.954	1.055	-0.01	4.613	0.51	-0.686	1647
GDP per capita	8.21	1.511	8.117	4.757	11.886	0.131	-0.947	3996
Urban Pop (%)	3.764	0.645	3.911	1.124	4.615	-0.964	0.648	393
Pop. ages 15-64 (%)	4.083	0.116	4.07	3.835	4.465	0.135	-1.111	1567
Weighted Export Index	9.226	1.052	9.544	1.6	11.233	-0.898	0.28	3971
Exports (% of GDP)	3.396	0.686	3.427	0	5.444	-0.399	0.946	4254
Military (% of GDP)	1.176	0.557	1.109	0	4.774	0.816	1.588	5781
Democracy	4.248	4.126	3	0	10	0.22	-1.667	4295
	1.	**2.**	**3.**	**4.**	**5.**	**6.**	**7.**	**8.**
tCO2 per person	1							
GDP per capita	0.881	1						
Urban Pop (%)	0.669	0.751	1					
Pop ages 15-64 (%)	0.702	0.72	0.58	1				
Weighted Export Index	0.234	0.217	0.282	0.376	1			
Exports (% of GDP)	0.385	0.417	0.341	0.331	0.335	1		
Military (% of GDP)	0.16	0.076	0.102	-0.08	-0.248	-0.066	1	
Democracy	0.381	0.544	0.394	0.462	0.254	0.138	-0.275	1

All variables except *Democracy* are in natural logarithm form (base *e*).

[1] Available online http://cdiac.ornl.gov/.

[2] We found, for example, what appears to be a reporting error in the Global Carbon Atlas data. Carbon dioxide emissions are reported to be zero for Vietnam in 2014, which is otherwise inexplicable. We used instead the CDIAC estimates.

Territorial emissions data attribute carbon dioxide emissions to the country in which the emissions physically occur (i.e. are distinct from 'emissions embodied in trade' or consumption-based estimates). Emissions estimates include emissions from the oxidation of coal, oil, and gas; gas flaring arising from the combustion of vented gas in the oil and gas industry; and the manufacture of cement (see Le Quéré et al. 2015).

Predictor Variables

Military expenditures (% of GDP). Military expenditures data are obtained from the Stockholm International Peace Research Institute's (SIPRI 2017) Military Expenditures Database. Pre-1988 military expenditure data are obtained from the 'beta' version of the dataset obtained via email from SIPRI. Military expenditures data are measured in current local currency units (LCU). We then divide these estimates by estimates of each country's Gross Domestic Product, measured in current local currency units for the appropriate year. The coefficient for Military Spending indicates the average percent change in per capita CO2 emissions that occur when military spending increases by one percent of a country's total gross domestic product.

Included in this measure are expenditures on armed forces, peace-keeping forces, defense ministries and other government agencies engaged in defense projects; paramilitary forces trained and equipped for military operations; military operations in space; military research and development; military aid (of donor countries); wages, pensions and social services for current military personnel. Excluded from these data are veterans' benefits, destruction of weapons, and all other current expenditures for previous military activities.

Gross domestic product (GDP) per capita. We obtain countries' per capita gross domestic products (GDP per capita) from the World Bank's (2017) World Development Indicators (WDI) online database as a measure of economic activity and affluence. These data are measured in constant 2010 U.S. dollars. GDP is commonly used as a proxy measure of standard of living. More accurately, GDP is a flow variable quantifying the total market value of final goods and services produced in a country at a given time. Although an increase in GDP is commonly referred to as "economic growth," it is important to remember that this is not the growth of a stock of material wealth, but rather, an increase in the intensity or rate of monetary exchanges.

Urban population (% of total). To test the hypotheses of urban political economy perspectives, we include as a predictor variable in our analyses the percentage of a country's total population living in urban areas (World Bank 2017). Urban political economy approaches generally predict positive associations between urbanization and carbon dioxide emissions (e.g.,

Molotch 1976; Dickens 2004; Jorgenson and Clark 2012; Roberts and Parks 2007). We infer from these studies that urbanization will be positively correlated with per capita CO2 emissions.

Population ages 15-64 (% of total). We include as a control the percentage of the population between the ages of 15 and 64 (World Bank 2017). This variable has been used in previous studies (e.g. Jorgenson and Clark 2016) and is used as a proxy for countries' non-dependent, adult population. As expected, the coefficient of this variable is positive and statistically significant across nearly all models.

Additional Political-Economic Covariates

Although we focus specifically in this study on the relationship between militarism and carbon emissions, we include for Models 2 and 7 in Table 4 three additional explanatory variables: two measures of export dependence and one measure of institutionalized democracy.[3]

Exports (% of GDP). We obtain from the World Bank's (2017) World Development Indicators estimates of the monetary value of countries' "Exports of goods and services" measured as a percentage of total GDP. Ecologically Unequal Exchange posits that countries with higher levels of export dependence consume fewer resources than countries with lower levels of export dependence because the former export away the resources they would have otherwise consumed. Previous studies indicate a positive association between exports and carbon dioxide emissions (Jorgenson, 2007). Using panel data, Jorgenson (2009) has also reported that among low-income countries, exports to high income countries negatively impact per capita ecological footprints.

Weighted Export Index. Our second measure of export dependence is a "Weighted Export Index" calculated from the International Monetary Fund's (IMF 2017) Direction of Trade Statistics, which captures the degree to which a country's exports are sent to wealthy nations. Similar indices have been used in prior studies to measure export-dependence (e.g. Jorgenson & Rice 2005). The weighted export index of an exporting country i is the average per capita GDP of all n of exporting country i's trading partners j weighted by the proportion of i's total exports received by j, or:

$$\boldsymbol{Export\ Index_i = \sum_{j=1}^{n} GDPpc_j * \frac{Exports_{i\to j}}{\sum Exports_i}}.$$

[3] Based on our preliminary Bayesian model comparisons, we excluded from further consideration two other World Bank measures of trade: "Foreign direct investment, net inflows (% of GDP)" and "Exports of goods and services (constant 2010 US$)."

Countries with relatively high proportions of exports to wealthier nations will have higher weighted export index scores than countries that send proportionally more of their exports to less wealthy nations, regardless how much they export or how large their economies are. Thus, countries that are less dependent on exports can potentially score lower on this index than countries that are more dependent on exports so long as the former export proportionally more of their exports to wealthier countries. When coupled with per capita GDP and exports as a percentage of total GDP as controls, coefficients for the weighted export index indicate the extent to which differences in average wealth of trading partners contributes to differences in per capita carbon emissions *among countries with similar volumes of total exports*.

Institutionalized Democracy. Finally, we include as an additional control a measure of Institutionalized Democracy obtained from the *POLITY™ IV PROJECT* dataset published by the Integrated Network for Societal Conflict Research (INSCR 2016). The "Institutionalized Democracy" variable is an ordinal scale from 0 to 10. It consists of three sub-components: "the competitiveness of political participation, the openness and competitiveness of executive recruitment, and constraints on the chief executive" (INSCR 2016:14). In a recent study, Lv (2017) finds that for 19 emerging countries from 1997 to 2010, democracy is associated with lower CO2 levels only for countries beyond a certain income level.

Analysis of Missing Data

We include only "complete case"— that is, we exclude cases that contain any missing values for variables included in the model. We do not impute missing data. Figure 1 depicts the number of available (non-missing) observations per variable per year. We analyze whether there is any pattern to missing data in Figure 2. We performed separate bivariate regressions of all variables on dummy versions of all other variables, with zero (reference) values indicating cases with missing data (for the independent variable). The coefficients of Figure 2 represent differences in the group means of the response variables (indicated on the rows) between observations for which data are missing on the independent variables (indicated by the columns) compared to observations for which independent variable data are not missing. For example, the first column of Figure 2 indicates that the average per capita GDP, export index, and democracy index are smaller for cases which reported CO2 emissions data compared to cases for which CO2 data are missing. In contrast, the average percent of GDP allocated to military expenditures is larger for cases that reported CO2 data compared to cases for which CO2 data are missing.

Figure 1. Annual Observations per Variable

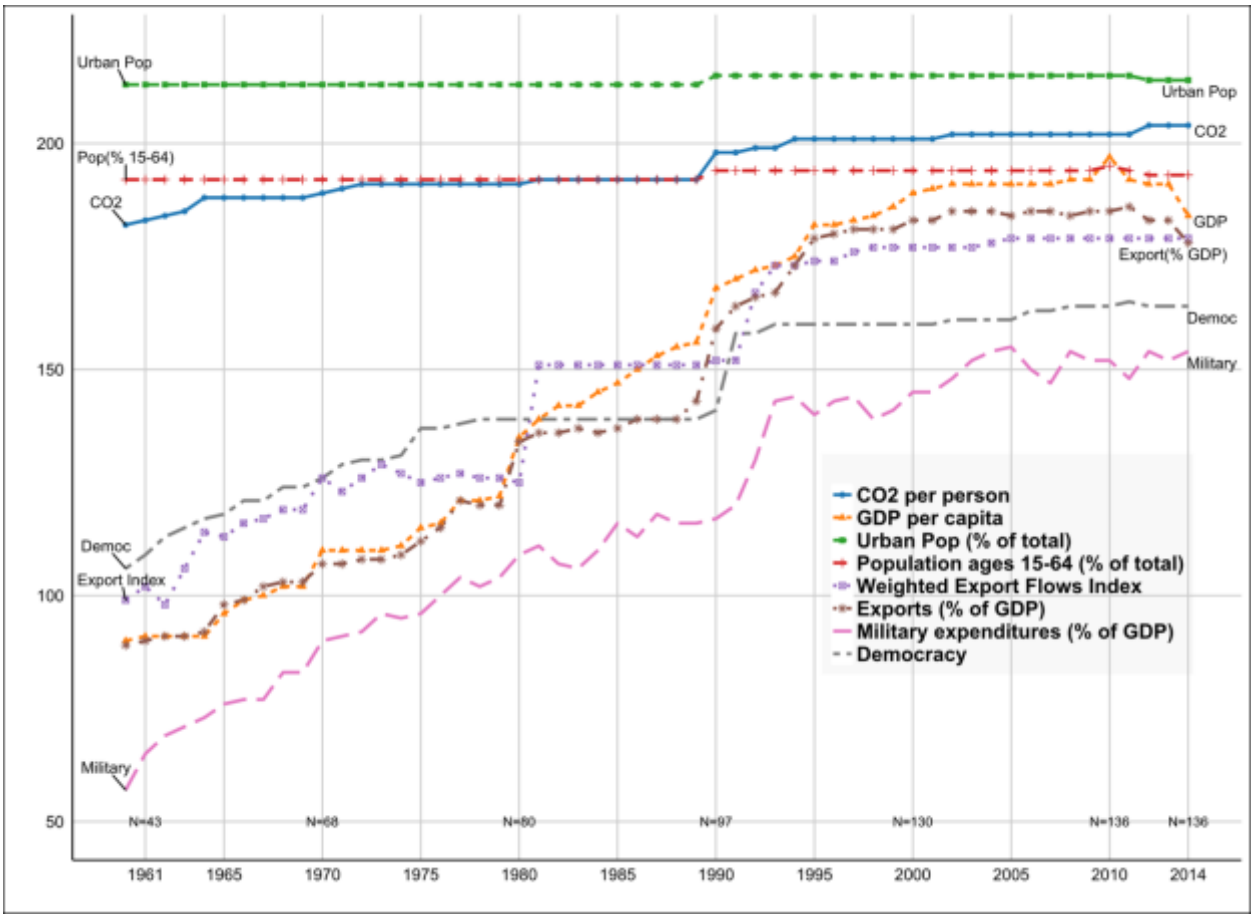


Figure 2. Missing Variable Coefficients

Dependent Variable	CO2 pc	GDP	Urban	Adult Pop. (15-64)	Export Index	Exports % GDP	Military	Democracy
CO2 pc		-0.19	-0.25	-0.45	-0.23	-0.16	0	-0.26
GDP	-0.39		0.22	-1.3	0.15	-0.03	0.14	-0.69
Urban	-0.08	0.04		-0.42	0.02	0.01	0.1	-0.09
Adult Pop. (15-64)	-0.01	0.02	-0.13		0.01	0.02	0.02	0
Export Index	-0.9	0.98	0.98	-0.38		0.85	0.35	-0.06
Exports % GDP	-0.2	0.15	0.49	-0.26	-0.08		-0.15	-0.44
Military	0.16	-0.35	0.72	0.75	-0.13	-0.33		0.13
Democracy	-0.83	3.29	-1.09	-0.55	1.8	3.27	3.23	

Dummy Regressors

We analyze differences between our unbalanced and balanced panels in Table 3 by regressing our selected variables on a dummy variable indicating whether an observation is included in or excluded from our balanced panels. We restrict our analysis to cases beginning in 1975 and include year as a control. Compared to countries included only in our balanced panels, the additional cases utilized in our unbalanced panels have smaller average per capita carbon emissions; smaller average per capita GDPs; less urbanization; and smaller percentages of people with ages 15 to 64. Importantly, *there is no significant difference in the percentage of GDP allocated to military expenditures between cases in our balanced panels and those excluded from our balanced panels.* Figure 3 visually represents variable distributions of cases included in our balanced panels compared to those excluded from our balanced panels.

Table 3. OLS Regression Coefficients of Selected Variables on Balanced Panel Dummy

Dependent Variable (Y)	**Unbalanced Panels (X)** (Reference = Balanced)	**Year**	**Constant**	**Obs.**	**Adjusted R-Squared**
Year	4.37*** (.31)	--	1,995*** (.22)	4,970	.038
tCO2 per person	-.396*** (.027)	.012*** (.001)	-22.642*** (2.41)	4,819	.052
GDP per capita	-1.051*** (.043)	.023*** (.002)	-37.191*** (3.84)	4,819	.118
Urban Pop. (% of total)	-3.18*** (.016)	.012*** (.001)	-20.894*** (1.43)	4,819	.107
Pop. ages 15-64 (% of total)	-.052*** (.003)	.004*** (0)	-4.53*** (.28)	4,819	.181
Military (% of GDP)	-.002 (.015)	-.012*** (.001)	24.75*** (1.34)	4,819	.062

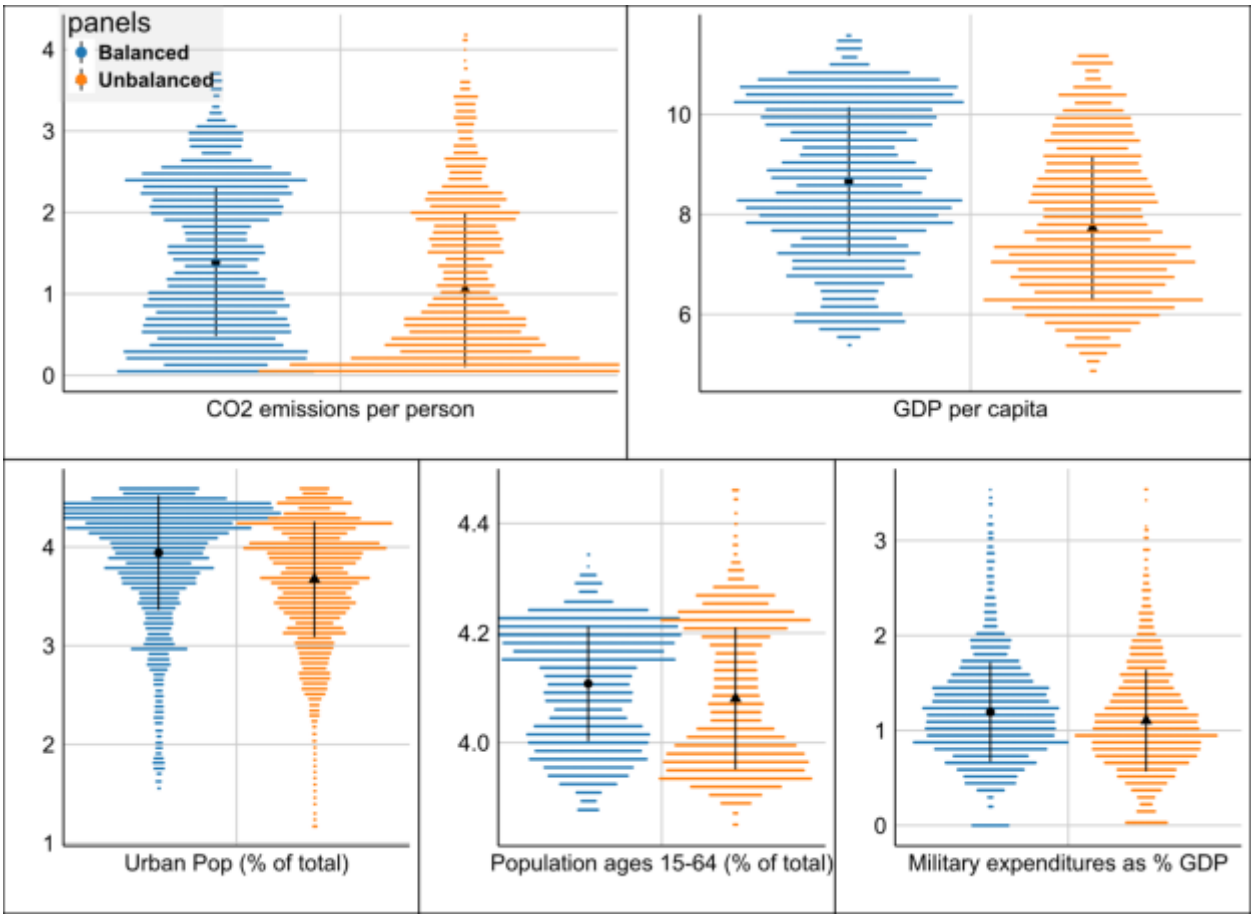
Bivariate Regressions restricted to cases after 1974. All dependent variables except 'Year' are in natural logarithm form (base e). *p<0.05; **p<0.01; ***p<0.001

Estimation Procedures

Our analyses were implemented primarily in R version 3.3.3. We use the *panelAR* package (Kashin 2014) to estimate our Prais-Winsten regression models and the *plm* package (Croissant and Millo 2008) to estimate our first-differences models. We cross-validated our PW regressions in Stata (ver. 12) using the *xtpcse* suite of commands.[4]

[4] In sensitivity tests, we also recalculate the panel-corrected standard errors in R using the package *pcse* (Bailey and Katz 2011). In Stata, we re-estimate the models using the *xtregar* command, an alternative method of conducting fixed-effects models with AR(1) correction. All model results are substantively similar to the ones presented here.

Figure 3. Comparison of Variable Distributions by Inclusion or Exclusion in Balanced Panels



The two-way fixed effects models reported in Tables 4, 5, and 6 are estimated by including dummy variables for each country and each year. This is commonly referred to as dummy variable regression (Wooldridge 2013: 490).[5] Country and time dummies estimate the unit (i.e. country) and period (i.e. year)-specific intercepts, respectively.

Including country dummies controls for all potentially omitted confounders that do not change within each respective country over time (e.g. geographical or cultural factors). The inclusion of dummies for each year, on the other hand, controls for any potentially omitted confounders that are universal or commonly experienced across all cases in each respective year. The inclusion of unit-specific and period-specific intercepts reflects that our primary interest is the

[5] Including unit dummies in an OLS regression generates coefficients that are identical to the so-called 'one-way fixed effects' model; whereas including both unit dummies and period dummies in an OLS regression generates coefficients that are identical to the so-called 'two-way fixed effects model.' Although the coefficient estimates of dummy variable and fixed effects models are identical, the term 'fixed effects' in econometrics is commonly reserved for estimation procedures that utilize the 'within transformation', which first removes the group (i.e. country or yearly) means.

extent to which our selected predictor variables account for the variance in per capita carbon dioxide emissions not attributable to factors invariant within countries across time or invariant within a given year across countries. Our one-way fixed effects models include country dummies but not dummies for each year.

Because PW regression has been used by several other studies of time-series cross-sectional CO2 data (e.g. Jorgenson and Clark 2012; Jorgenson and Clark 2016), and does not result in the loss of first observations, we utilize this estimation procedure to compare coefficients across models including different sets of regressors.[6]

Results: Cross-sectional Regressions

Cross-sectional analyses can provide an insightful contrast to the dynamic panel analyses that follow. We therefore begin by reporting in Figure 4 the coefficients, confidence intervals, and p-values of 54 cross-sectional robust MM Regressions of per capita CO2 emissions on military expenditures, including as controls per capita GDP, urban population (% of total), and the percentage of people ages 15 to 64.[7]

As depicted in Figure 4, in only 4 of 54 regressions is the positive coefficient for military expenditures not statistically significant. Moreover, from 1990 onwards, all coefficients are statistically significant, and 16 out of 25 are significant at $p < .001$. An important finding of these regressions is that for any given year, countries that allocate higher than average percentages of their GDP to the military also have higher than average per capita emissions even after controlling for potential economic and population confounders.

Panel Regressions

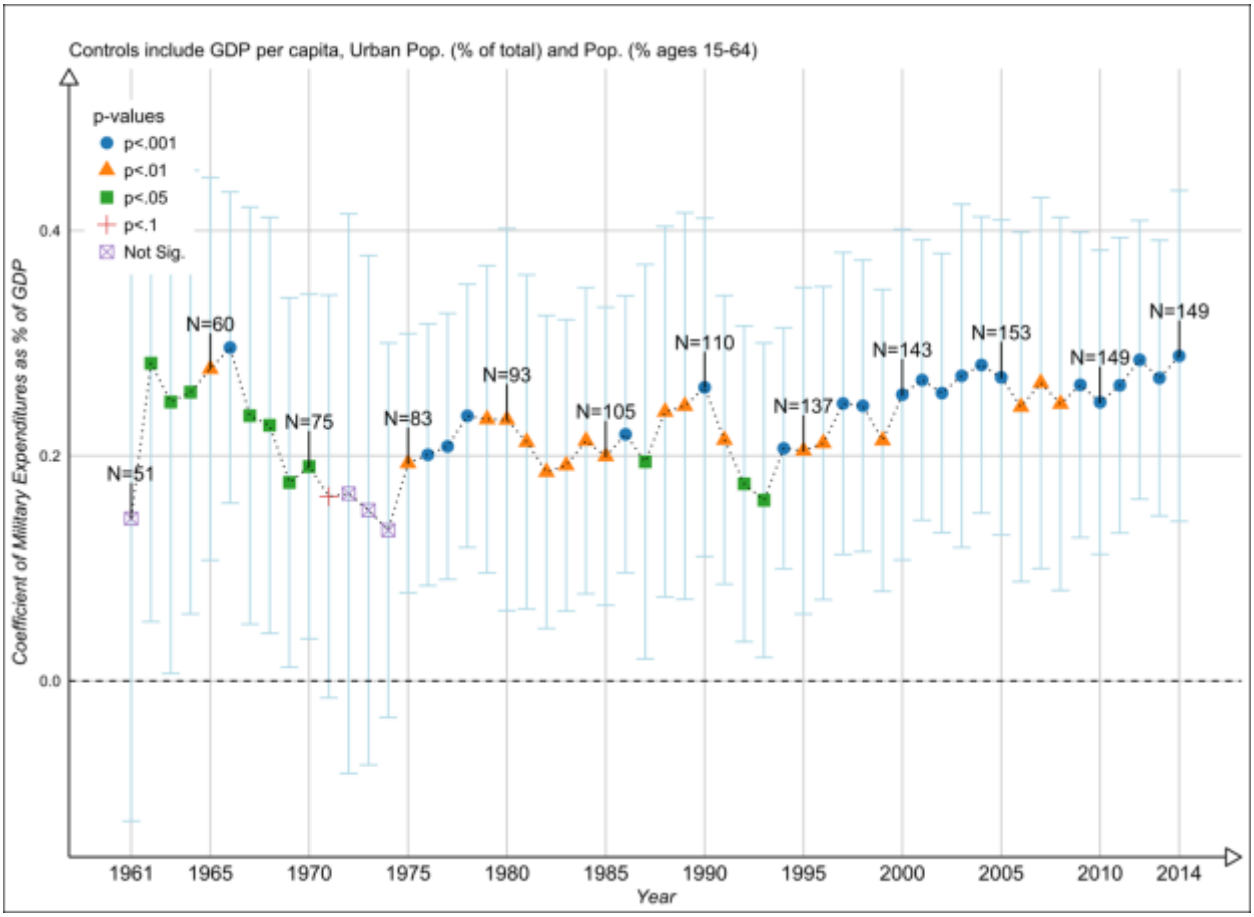
We report in Table 4 a total of ten two-way fixed effects regressions incorporating the Prais-Winsten AR1 correction and Panel Corrected Standard Errors (PCSE) for both unbalanced (models 1-5) and balanced (models 6-10) panels.[8] The PCSE estimates are robust both to unit heteroskedasticity as well as contemporaneous correlation across units, both of which are common in panel data (Bailey and Katz 2011: 2).

[6] The Prais and Winsten (1954) correction for first-order serial correlation is a generalized least squares (GLS) estimator that improves upon the Cochrane and Orcutt (1949) method by preserving the first observation in the series.

[7] We use the *robustbase* R package to perform robust MM regression (Susanti et al. 2014).

[8] The Hausman test statistic (significant at $p<.001$) indicates that a random-effects (RE) estimator would yield inconsistent results, and thus the FE model is preferable. In addition, we conduct an augmented Dickey-Fuller test for unit roots. We reject the null hypothesis that the series has a unit root (i.e. is non-stationary) at a significance level of $p < .001$.

Figure 4. Cross-Sectional Robust MM Regression Coefficients & Confidence Intervals for Military Expenditures



We restrict our attention here to military expenditures, our two measures of export dependence, and institutional democracy. The latter three all have small, statistically insignificant coefficients in both the unbalanced panel model 2 and the balanced panel model 7. Military expenditures in model 1 is positive and statistically significant at $p < .05$. For the countries included in model 1, a one percent increase in GDP allocated to the military is associated with a .015 percent increase in per capita carbon emissions. In model 2, the coefficient for military spending is also positive but too small relative to its standard error to achieve statistical significance. Moreover, the coefficient becomes negative in Models 6 and 7 which utilize balanced panels. The relationship between changes in military expenditures and carbon emissions is not uniform across nations or across time. The average direction of the effect, moreover, changes depending on which counties are included or excluded from analysis.

The results of our panel analyses are in stark contrast to most of our cross-sectional regressions for which military spending coefficients are 10 to 30 times larger than those reported

in Table 4. Although Models 1 and 6 in Table 4 include the same reported covariates as those in the cross-sectional analyses, the former also include country and year dummy variables.

Table 4. Two-Way Fixed Effects Regression of Territorial Per Capita Carbon Dioxide Emissions, with Panel-Corrected Standard Errors and Prais-Winston AR(1) Correction.

	Unbalanced Panels (1960-2014)					**Balanced Panels (1975-2014)**				
	1	2	3	4	5	6	7	8	9	10
GDP per capita	0.346*** (0.017)	0.376*** (0.018)	0.325*** (0.02)	0.345*** (0.017)	0.323*** (0.019)	0.327*** (0.031)	0.345*** (0.035)	0.307*** (0.034)	0.324*** (0.031)	0.312*** (0.034)
Urban Pop (% of total)	0.164*** (0.033)	0.155*** (0.034)	0.152*** (0.032)	0.172*** (0.033)	0.158*** (0.032)	0.120** (0.043)	0.141** (0.044)	0.106* (0.042)	0.142*** (0.043)	0.133** (0.041)
Pop. (% 15-64)	1.178*** (0.112)	1.058*** (0.108)	1.167*** (0.110)	1.160*** (0.107)	1.152*** (0.105)	1.655*** (0.169)	1.445*** (0.189)	1.631*** (0.164)	1.545*** (0.165)	1.536*** (0.162)
Military	0.015* (0.007)	0.011 (0.008)	-0.114* (0.045)	-0.029 (0.023)	-0.154** (0.048)	-0.021 (0.014)	-0.017 (0.014)	-0.159* (0.078)	-0.041* (0.017)	-0.123 (0.080)
Weighted Export Index	-	-0.003 (0.007)	-	-	-	-	0.002 (0.009)	-	-	-
Exports % GDP	-	-0.008 (0.007)	-	-	-	-	-0.016 (0.011)	-	-	-
Democracy	-	0.002 (0.001)	-	-	-	-	0.001 (0.001)	-	-	-
Military x GDP	-	-	0.017** (0.006)	-	0.018** (0.006)	-	-	0.017 (0.010)	-	0.010 (0.010)
Military x 1975	-	-	-	0.060* (0.026)	0.048 (0.027)	-	-	-	-	-
Military x 1985	-	-	-	0.031 (0.027)	0.020 (0.028)	-	-	-	-0.002 (0.019)	-0.003 (0.019)
Military x 1995	-	-	-	0.051 (0.027)	0.047 (0.027)	-	-	-	0.044* (0.021)	0.044* (0.021)
Military x 2005	-	-	-	0.050 (0.026)	0.043 (0.027)	-	-	-	0.045 (0.024)	0.041 (0.024)
Military x 2014	-	-	-	0.082** (0.03)	0.067* (0.03)	-	-	-	0.117*** (0.030)	0.112*** (0.030)
N	5944	5340	5944	5944	5944	2520	2160	2520	2520	2520
Countries	162	149	162	162	162	63	54	63	63	63
R-Squared	0.8843	0.9084	0.8869	0.8907	0.8932	0.903	0.9051	0.9057	0.9055	0.9075

Note: All models include unreported unit specific intercepts and period specific intercepts. Models 4, 5, 9, and 10 include unreported time interaction effects for all available years. Except Democracy, all other variables are in natural logarithm form (base *e*). *p<0.05; **p<0.01; ***p<0.001 (two-tailed)

Interactions of Military Spending and GDP

Models 3, 5, 8, and 10 in Table 4 show the interaction coefficients between military spending and economic development. The main effect of military expenditures in these models represents the percentage increase in per capita CO2 emissions given a one percent increase in military expenditures when (the natural logarithm of) per capita GDP is zero. The interaction term

indicates the second-order change in the effect of military expenditures on per capita CO2 emissions as per capita GDP increases.

Figure 5 shows the net linear effect of a 1 percent increase in military expenditures on per capita CO2 emissions conditional on per capita GDP. The conditional effect of military expenditures on per capita CO2 emissions in Figure 5 is estimated using the same covariates and cases from model 3 of Table 4, setting all other control variables to their mean values.[9]

In model 3, the interaction coefficient is positive and significant at $p < .01$, indicating that for the set of cases included in our unbalanced panels, the effect of military spending on CO2 emissions is moderated by level of economic development. Military spending in wealthier countries exerts a larger linear effect on per capita CO2 emissions than military spending in poorer countries. One plausible explanation is that wealthier countries invest in military technologies that are more carbon intensive. The interaction coefficient in model 8 for balanced panels is the same size as that reported for unbalanced panels in model 3 but fails to achieve statistical significance due to its larger standard error resulting from its comparatively smaller sample size.

Interactions of Military Spending and Time

Models 4, 5, 9, and 10 report interactions between military spending and time, allowing us to assess the extent to which the magnitude of the net effect of militarism on per capita carbon emissions has increased or decreased over time. For models which include the interaction between military spending and time, the main coefficient for military spending represents the unit change in per capita carbon emissions in 1960 (models 4 and 5) or 1975 (models 9 and 10) for each additional one percent of GDP allocated to military spending for the same year. The total effect of military spending on carbon emissions for other years is the sum of the coefficient for military spending and its interaction term.

The main effects of military expenditures for unbalanced panels in model 4 and 5 are both negative. The coefficient in model 5 is statistically significant at $p < .01$. In 1960, an additional 1 percent of GDP allocated to military spending coincided with an average *decline* in per capita carbon emissions of .029 percent for the unbalanced sample in model 4. The interaction of military spending and the year 2014 is positive and statistically significant both in model 4 and in model 9, indicating that the effect of militarism on carbon emissions has increased in magnitude for both unbalanced (since 1960) and balanced (since 1975) panels, respectively.

[9] One difference between model 3 of Table 4 and the regression represented in Figure 6 is that the latter uses a lagged dependent variable as an independent regressor to correct for AR1 residual correlation rather than the PW method.

To save space, Table 4 includes only the military-time interaction coefficients for 1975, 1985, 1995, 2005, and 2014. We depict the full set of military-time interaction coefficients from models 4 and 9 in Figure 6. Importantly, beginning in 1988, all mean estimates for the interaction coefficients are above zero. In addition, all but three interactions during this period have 95 percent confidence intervals that exclude zero.[10] Collectively, these results suggest that although the *independent* effect of the military on carbon (net of other covariates) is relatively small on average, it is nevertheless becoming increasingly important as a contributor to anthropogenic carbon emissions.

Time Sensitivity Analyses

To determine the extent to which the relationship between military spending and CO2 emissions changes across time as well as to assess the sensitivity of the results in Table 4, we re-estimate the military spending coefficient from model 1, systematically varying both which years are included and how many. We perform 45 regressions each on both unbalanced and balanced panel data for a total of 180 separate panel regressions. We report the coefficients and p-values of military spending for all 180 replications in Figure 7.

Figure 7 consists of four series consisting of 45 regressions each. The x-axis represents the total number of years included in a regression, ranging from 10 to 54 years of data. Reading from left to right, an additional year is incrementally added to each series. The two series in the left column are 'forward' series, the first regression of which includes 10 years of data from 1960-1970, with each subsequent regression extending the last year by one. The two series in the right column are 'backward' series, the first regression of which includes 10 years of data from 2004-2014, with each subsequent regression reducing the starting year by one.

It is important to note that for the unbalanced panel series, the sample size always increases as additional years are included. In contrast, the sample size of the forward and backward balanced panel series of regressions is limited to the number of countries for which data are available in 1960 or 2014, respectively. In the forward panel series (top-left), for example, the number of sampled countries never exceeds 45. Because data are more available in 2014, however, the maximum sample size for the backward panel series (top-right) is 132.

[10] The only exceptions are military-time interactions for balanced panels in years 2003, 2004, and 2007.

Table 5. Comparison of Different Model Specifications (Unbalanced Panels – 1960-2014)

	Prais-Winsten (Common AR1)			Prais-Winsten (Panel-Specific AR1)			OLS with lagged DV (pop. weighted)			OLS with lagged DV			First Differences		
	1*	2	3	4	5	6	7	8	9	10	11	12	13	14	15
GDP p.c.	.345***	.343***	.453***	.351***	.354***	.480***	.051***	.034***	.006**	.046***	.034***	.017***	.413***	.425***	.425***
	(.017)	(.019)	(.016)	(.019)	(.017)	(.015)	(.006)	(.006)	(.002)	(.006)	(.006)	(.002)	(.014)	(.013)	(.013)
Urban Pop.	.157***	.116***	.002	.169***	.163***	-.066	.050***	.017*	-.005	.024**	-.005	-.008**	.073	.232***	.232***
(% of total)	(.033)	(.025)	(.033)	(.044)	(.025)	(.037)	(.009)	(.007)	(.003)	(.008)	(.006)	(.003)	(.062)	(.059)	(.059)
Pop.	1.168***	.638***	1.322***	1.030***	.466***	1.404***	.154***	.092***	.126***	.230***	.153***	.034*	.764***	.655***	.655***
(% 15-64)	(.112)	(.108)	(.141)	(.128)	(.111)	(.152)	(.027)	(.027)	(.024)	(.027)	(.025)	(.015)	(.163)	(.151)	(.151)
Military	.015	.019*	.035***	.009	.012	.056***	.009	.017***	.006**	.001	.004	.012***	.028***	.024***	.024***
	(.007)	(.007)	(.008)	(.007)	(.007)	(.010)	(.005)	(.005)	(.002)	(.004)	(.004)	(.003)	(.006)	(.006)	(.006)
Country Dummies	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No
Year Dummies	Yes	No	No	Yes	No	No	Yes	No	No	Yes	No	No	Yes	No	No
AR(1)	0.843	0.854	0.947	0.79	0.814	0.937	0.895	0.907	0.98	0.861	0.868	0.969	--	--	--
R-Squared	0.883	0.866	0.561	0.968	0.954	0.825	0.998	0.998	0.997	0.995	0.995	0.994	0.193	0.164	0.164
Total Obs.	5926	5926	5926	5926	5926	5926	5878	5878	5878	5878	5878	5878	5926	5926	5926

Model 1 is also included in Table 4. For panel-specific PW correction, AR1 is the mean across panels. For OLS, AR1 refers to the coefficient for the lagged DV.

Table 6. Comparison of Different Model Specifications (Balanced Panels – 1975-2014)

	Prais-Winsten				OLS with lagged DV (pop. weighted)			OLS with lagged DV			First Differences		
	1*	2	3	4PS	5	6	7	8	9	10	11	12	13
GDP p.c.	.327***	.251***	.472***	.542***	.060***	.031***	-.001	.054***	.019	.004	.327***	.346***	.346***
	(.031)	(.032)	(.023)	(.020)	(.011)	(.008)	(.003)	(.013)	(.010)	(.004)	(.029)	(.028)	(.028)
Urban Pop.	.120**	-.038	.004	-.190***	.017	-.002	.005	.019*	-.010	.003	.069	.102	.102
(% of total)	(.043)	(.037)	(.042)	(.038)	(.015)	(.015)	(.004)	(.009)	(.009)	(.004)	(.098)	(.098)	(.098)
Pop.	1.655***	1.248***	.886***	1.176***	.184***	.107**	.086***	.286***	.190***	.055*	1.041***	1.096***	1.096***
(% 15-64)	(.169)	(.149)	(.180)	(.189)	(.040)	(.037)	(.024)	(.044)	(.041)	(.024)	(.236)	(.232)	(.232)
Military	-.021	-.010	.036*	.037**	-.007	.001	.006	-.014*	-.004	.012**	-.002	-.011	-.011
	(.014)	(.013)	(.015)	(.013)	(.008)	(.007)	(.003)	(.007)	(.005)	(.004)	(.013)	(.013)	(.013)
Country Dummies	Yes	Yes	No	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No
Year Dummies	Yes	No	No	No	Yes	No	No	Yes	No	No	Yes	No	No
AR(1)	0.847	0.863	0.949	0.949	0.888	0.91	0.986	0.86	0.879	0.98	--	--	--
R-Squared	0.903	0.883	0.626	0.766	0.998	0.998	0.998	0.996	0.996	0.995	0.095	0.07	0.07
Total Obs.	2520	2520	2520	2520	2520	2520	2520	2520	2520	2520	2520	2520	2520

Model 1 is identical to Model 6 in Table 4. Model 4 uses panel-specific AR1 estimation. For OLS models, AR1 refers to the coefficient for the lagged DV

In contrast to the two backward-series in the right column, the two forward-series in the left column have approximately the same shape, with upward and downward trends occurring across roughly the same periods. The balanced forward-series (top-right), moreover, exhibits the most volatility and sampling variability of all four series.

In the backward series for unbalanced panels (bottom-right), all military coefficients are positive across all regressions. The coefficient is largest for the 2004-2014 period, then declines as earlier data are added, and remains relatively stable once approximately 20 years of data have been included. In the forward series of regressions for unbalanced panels (bottom-left), the military coefficients are initially close to zero and even become negative for periods covering 1960 to 1971-1974 and again for periods covering 1960 to 1982-1987. The coefficients rise in periods covering 1960 to 1985-1995 and remain above zero after 1987. The two unbalanced panel series appear to converge for all regressions covering over 35 years of data.

The high coefficients in the balanced forward-series (top-left) for years 1960 to 1974-1979 are somewhat puzzling. Two of these regressions (1960-1976 and 1960-1977) reach statistical significance with p-values below .05 despite having much smaller sample sizes (N=44) compared their unbalanced counterparts (N>85) covering the same period and which do not achieve statistical significance. These results collectively suggest that the largest net linear effect of military spending on per capita CO2 emissions occur after 1990, but also that these estimates are highly sensitive to the set of countries included in the analysis.

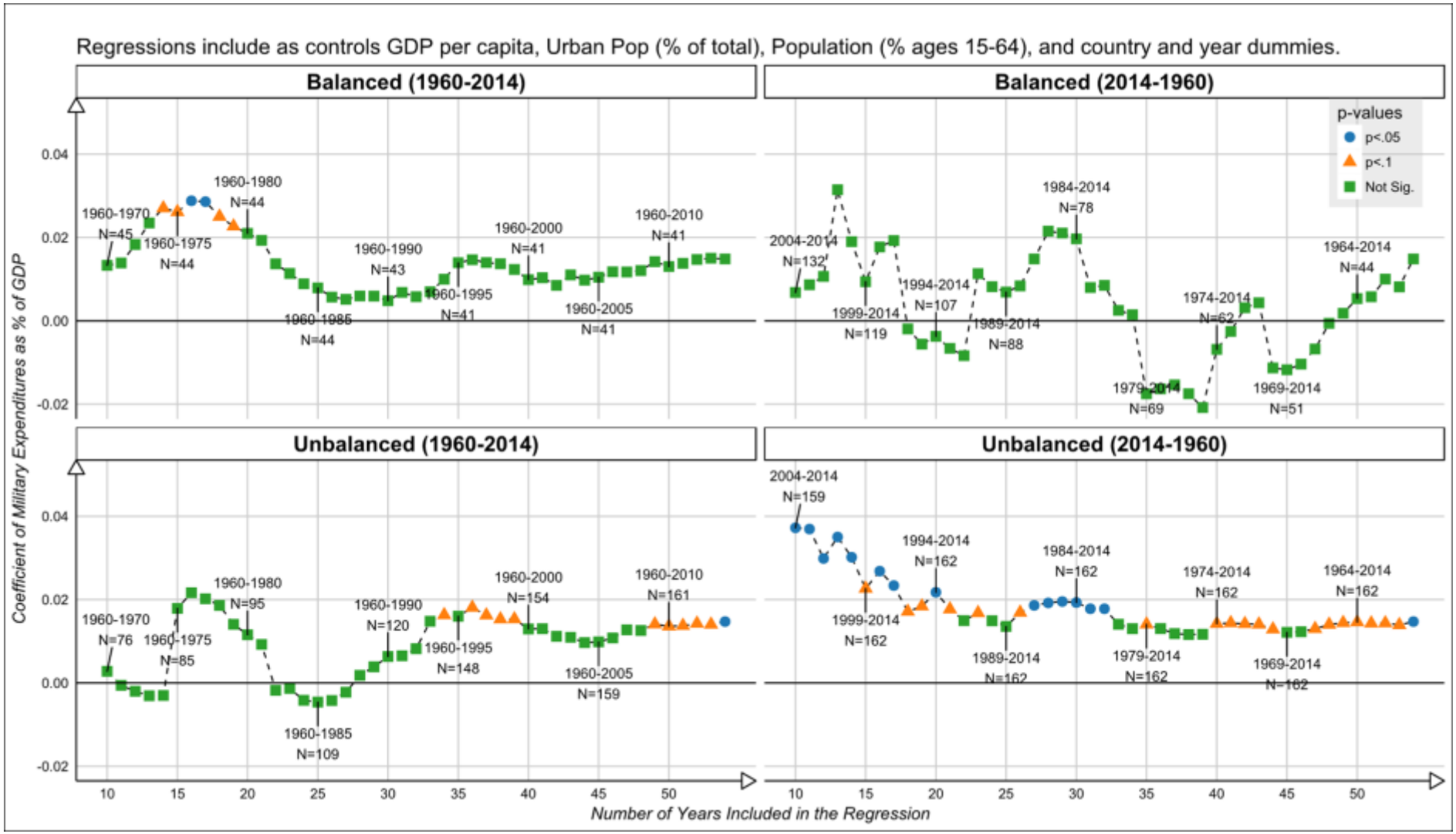
Comparison of Different Estimation Methods

To achieve a more comprehensive understanding of the relationship between military expenditures and carbon emissions, we report in Table 5 and Table 6 different estimations of the same set of variables using unbalanced and balanced panels, respectively. The models in Table 5 and Table 6 replicate models 1 and 6 from Table 4, varying both the AR1 correction and the use of fixed effects. Specifically, we compare four different corrections for first-order autoregressive correlation (AR1) in the residuals: (1) the Prais-Winsten (PW) correction assuming a common AR1 process across all panels (the method used for all models in Table 4); (2) the PW correction assuming panel-specific AR1 processes; (3) models incorporating as a regressor a one-year, panel-specific lagged dependent variable (DV)[1]; and (4) models that transform all variables into their first-difference

For each AR1 correction procedure, we compare the estimated coefficients and robust standard errors across three different models: two-way fixed effects models (including both country and year dummies), one-way fixed effects models (including only country dummies), and

[1] In other words, for each CO2 estimate for country *i* in year *t*, it's lagged value is $CO2_{i,t-1}$.

Figure 7. Coefficients of Military Expenditures from Regressions Including Different Years (Two-Way Fixed Effects with AR1 Correction)



models incorporating no fixed effects. Finally, for the lagged dependent variable approach, we also report estimates from three population-weighted regressions, yielding in total 36 unique panel regression models.[1] For the PW unbalanced panel regressions, removing country and time dummies increases the size of the military coefficient and decreases its p-value. The military coefficients in models 3 and 6, for example, have p-values smaller than .001 and are more than twice as large as their two-way fixed effects counterparts. Interestingly, among the OLS population-weighted models 7-9, the one-way fixed effects model 8 has the largest military coefficient size and smallest p-value. Among the FD models 13-15, the two-way fixed effects model has the largest military coefficient size.

The sign of the military coefficient across all models in Table 5 are positive. In contrast, the sign of the military coefficient is negative in 8 out of 13 regressions using balanced panels as reported in Table 6. The most striking change in the military coefficient occurs between OLS models 8 and 10. Specifically, the removal of both (time and unit) fixed effects changes the military coefficient from -.014 ($p<.05$) in model 8 to .012 ($p<.01$) in model 10.

Conclusion and Discussion

An important finding of this study is that the relationship between *changes* in military spending and *changes* in per capita carbon emissions within countries is less robust than the association between *levels* of military spending and per capita carbon emissions at any given time. The results of 54 separate robust MM regressions on cross-sectional data from 1960 to 2014 presented in Figure 4 unequivocally show an enduring relationship between militarism and carbon emissions: countries that allocate relatively higher percentages of their total GDP to the military have higher average per capita CO2 emissions, even after controlling for the size of the economy, urbanization, and adult population. The mutually reinforcing nature of military, political, and economic dominance could explain the cross-sectional associations between *levels* of military spending and carbon emissions. Providing a satisfactory answer to why countries with higher levels of military spending yield higher average carbon emissions levels *compared to countries with similar per capita GDPs*, however, requires further research and a more detailed examination of the data than we can provide here.

We remind the reader that standard errors are estimates of sampling variability based on the assumption that cases are selected at random, and a p-value value tells us the probability under the

[1] The number 36 is the sum of models in Table 4, 5, and 6 minus the first models in Table 5 and Table 6 that are identical to models 1 and 4 in Table 4, respectively. In unreported analyses, we also estimated a measure of per capita GDP adjusted by removing the military spending component of total GDP and then dividing by that adjusted GDP by population. The results were substantively identical.

null hypothesis that a sample statistic could be obtained due to sampling variability, that is, by chance. Our cases, however, are not selected randomly. Moreover, generalizing our empirical estimates to unobserved cases becomes less theoretically and substantively important as the proportion of cases that remain unobserved diminishes. By 2014, there are only 11 countries to which our results *could* be generalized.[2] Consequently, we are less concerned with reporting p-values than we are with explaining and interpreting our reported coefficients, whatever values they may be.[3] Moreover, to the extent that generalizing across *observed* countries is our goal, we give more weight to the unbalanced panel than to the balanced panel estimates.

In contrast to those reported in the cross-sectional regressions, the military coefficients for most of our fixed effects, panel regressions are much smaller. One reason for the smaller panel regression coefficients relative to their cross-sectional counterparts is that the former includes additional unit and period dummies (i.e. indicator variables). Even if military spending alone constituted the bulk of carbon emissions and varied *across* countries independently of economic growth and population, so long as the proportion of GDP allocated to the military did not vary *within* countries, its estimated coefficient in our fixed effects models would be zero. Most importantly, we regard the small size of the military coefficients and their variance across model specifications as evidence against the critical assumption underlying our regression models, namely that *the relationship between military spending and carbon emissions is characterized by a single equation for all countries across all time periods*. The differences between the coefficients from balanced and unbalanced panels and between regressions performed across different time periods both suggest heterogeneity in the extent to which military expenditures exert independent effects on carbon emissions.

We emphasize that militarism causes many forms of human and environmental harm. In this study, we attempt to assess the general importance of militaries across countries as independent contributors to just one type of harm, namely, carbon emissions. One important limitation inherent to our model design is that we are unable to assess the indirect effects that militarism, mediated through population and economic growth, have on carbon emissions. Moreover, contemporaneous covariance is not the only possible form that the relationship between militarism and environmental degradation can take. For instance, military strength has historically served as a precondition for economic power and vice-versa. It is significant to note that the so-called "golden

[2] This list consists of 11 countries: Andorra, Bhutan, North Korea, Kosovo, Liechtenstein, Myanmar, Somalia, Suriname, Syria, Tonga, and Vanuatu. It is not our intention to establish that our reported coefficients extend to this finite set of excluded cases.

[3] We remind the reader also that, according to classical null hypothesis testing, large p-values neither confirm nor confer a higher posterior probability upon the null hypothesis. On the contrary, even when statistically insignificant, the most likely coefficients given the available data are the small, but non-zero values we report.

age" of state-centric capitalism (1950-1973)— associated with unprecedented productivity growth in core countries and its impact on Earth system processes following WWII— was a continuation of the economic boom generated by the war effort (Hobsbawm 1994). During this period, economic growth was highest in the former white settler colonies (e.g. Australia, Canada, and the United States) and lowest in the Tropics where colonizers "established a narrow extractive exploitation that persisted after independence" (Mann 2013:22).

The crisis of state-centric capitalism (measured by a general decline in the rate of profit) during the mid-1970s incited a sweeping restructuring of capital that continues to this day. Changes associated with this restructuring include trends commonly associated with "neoliberal" capitalism: financialization, the shift toward monetary, supply side economics bolstered by the nation state, the transformation of business and labor, and the creation of an infrastructure conducive to the formation of a global economy. In recent decades, as multinational corporations have shifted most industrial production to export zones in the Global South, labor and raw materials appropriated from the periphery tend to realize their value in the consumption-based centers of wealthier nations which, in turn, export polluting technologies and hazardous waste back to the Global South (Frey 2015). Hence, the recent explosion of "green" technologies, including the "greening" of many cities in the Global North, is in part made possible by outsourcing dirty industry elsewhere (Parr 2013). Furthermore, as Bond (2016) has recently demonstrated regarding the convergence of the U.S. defense and military communities in the Arctic, the underlying logics of the Treadmill of Production and the Treadmill of Destruction interpenetrate and may, at times, reinforce one another.

Areas for future research include utilizing alternative model designs such as path analysis and instrumental variable regression to better capture both the direct and indirect effects of militarism on carbon emissions; and specifying the points of contact and divergence between state, society and the economic imperative of capital to better understand the environmental impact of particular manifestations of social power.

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Brewing Unequal Exchanges in Coffee:
A Qualitative Investigation into the Consequences of the Java Trade in Rural Uganda[1]

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Abstract

This study represents a qualitative case study examining the broad impacts of coffee cultivation from a rural region in Eastern Uganda, the Bududa District. Over 20 interviews with coffee cultivators provide insights into how the coffee economy impacts gender relations, physical health, deforestation, and economic conditions. While there are some material benefits from cultivating and selling coffee beans, a lack of long-term economic stability for households and the consequences for the status of women, the health of the community, and the local environment calls into question the efficacy of coffee production as a viable development scheme that significantly enhances overall community well-being. This research hopes to bring attention to the mechanisms that enable broader unequal exchange relationships by focusing on the perspectives and experiences of growers in Bududa, Uganda, where a considerable amount of world coffee is grown and supplied to consumers in core nations.

Keywords: Coffee exports, ecologically unequal exchange, Uganda

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Coffee represents one of the world's most important and heavily traded commodities. In fact, coffee is the world's second most valuable primary sector product, trailing only oil (ICO 2015). Coffee is the largest "food" import in the United States, as well as several Western European nations (ICO 2015). Although coffee often is described as a food product, it is important to emphasize that coffee does not contribute to caloric intake or have any significant nutritional value (e.g. Talbot 2004). It is purely a luxury commodity. The irony of coffee extends beyond this point, as coffee cannot be grown at the sites where it's consumed. While people in the United States drink on average just under three cups of coffee per day, the temperate climates of the global North prevent coffee cultivation. Instead, coffee is produced in more tropical African, Latin American, and Southeast Asian nations, often representing one of the largest and most lucrative exports from these countries (ICO 2015; Talbot 2004).

Coffee was initially grown and exported to core, developed regions during colonial times, and thus represents one of the oldest commodities of colonial exchange and exploitation (Talbot 2004, 2011). These patterns persist today, as coffee exporters send coffee most principally to their former colonial powers. For example, in Uganda, over 70 percent of coffee exports go to the European Union, followed by the U.S., Switzerland, Singapore, and Japan (Ojambo 2014). The coffee export profile of Uganda also illustrates another emerging trend—coffee consumption is growing most rapidly in developing regions of Asia, including China (ICO 2015).

Perspectives rooted in world-systems analysis on unequal exchange provide a theoretical lens through which to view global patterns in production and consumption (e.g. Emmanuel 1972; Hornborg 2009; Rice 2007, 2009). Since coffee is grown exclusively in poorer, less-developed nations, and consumed almost entirely in developed or rapidly developing nations, it represents an "ideal type" to consider as a product of unequal exchanges (e.g. Austin 2012). Although coffee is a lucrative crop, commodity chain analysis demonstrates that those at the bottom, but most foundational level, of the coffee commodity chain—the growers—on average earn less than 10 cents on every coffee dollar spent in Northern regions (Talbot 2004).

Although the concept of unequal exchange was initially developed to explore the differences in profitability across core and peripheral exports, and therefore the transfers in surplus value that accrue in the core relative to the periphery through trade (e.g. Amin 1976; Emmanuel 1972; Wallerstein 1974), more contemporary explorations also consider the unequal environmental impacts of the structure of international trade and specialization (e.g. Bunker 1985; Rice 2007, 2009). Even more recently, the social and health impacts of trading in primary commodities in poor nations are coming under scrutiny; in addition to relative profit and ecological material loss, periphery nations that specialize in key primary sector commodities also face increased social and health inequalities (e.g. Austin 2012, 2013; Dunaway and Macabuac 2007). While most studies in the world-systems tradition on unequal exchange represent quantitative, cross-national analyses,

here I undertake a qualitative "structural fieldwork" approach (e.g. Gellert and Shefner 2009) to explore how growers experience inequalities created through supplying the coffee commodity chain. Such an approach draws on macro-level dynamics to explore how real people in a specific location are affected by the coffee trade, illuminating key mechanisms and processes that enhance general understandings of unequal exchange that are often missed by country-level analyses (Gellert and Shefner 2009).

In Bududa, coffee represents the only crop that reaches the international market. Coffee is the sole product that links this remote region to the global economy, and in so doing, this study shows that coffee cultivation contributes to gender disparities, malaria vulnerabilities, and environmental degradation. Before I begin to articulate the relevance of Uganda in the global coffee trade, I start by considering developments in unequal exchange thinking rooted in world-systems analysis.

Unequal Exchanges in the World-System

As previously emphasized, global patterns in coffee production and consumption necessarily follow broader lines of international inequality, as coffee is roasted, packaged, marketed, distributed, and consumed almost entirely in core nations, after being cultivated, harvested, and exported from periphery nations (e.g. Talbot 2004, 2011). Critical perspectives of world-systems and dependency theory highlight the unequal international structure of trade and production, illustrating that the world-economy is stratified with the highest skill and profit-making industries concentrated in nations positioned at the top of the international hierarchy (Mahutga 2014; Wallerstein 1974). The concept of unequal exchange explicitly describes the systematic inequalities in international trade dynamics across core and periphery nations, enabled through broader asymmetrical political and economic relationships, which ultimately reproduce global inequalities (e.g. Bunker 1985; Emmanuel 1972; Hornborg 2009; Rice 2007, 2009). The phrase "unequal exchange" was originated by Arghiri Emmanuel (1972), to describe that the exchange of core products for peripheral products involves transfers in surplus value up the world-system from less-developed nations to more-developed nations, as core nations retain the most profitable phases of production, including the command, control, and coordination of commodity chains (e.g. Clelland 2014a; Gereffi and Korzeniewicz 1994).

In many ways, the concept of unequal exchange is foundational to world-systems analysis, as inequalities in trade are a chief mechanism for enabling and maintaining the unfair relations between core and peripheral countries. Indeed, emphasis on the global division of labor by prominent theorists such as Wallerstein (1974), Amin (1976), and Frank (1979), serves as a basis for this line of thinking. The global division of labor continues to characterize the organization of international production today, as the lowest-paying, most labor-intense, and environmentally-

damaging industries, including coffee, largely represent those located in less-developed nations (e.g. McMichael 2012).

Although initial thinking on unequal exchange dynamics focused on economic factors, based on Marxian conventions regarding surplus value transfers, assessments building on this line of thinking also emphasize that unequal exchange entails an ecological dimension (e.g. Hornborg 2009; Rice 2007, 2009). The ecological aspect to unequal exchange was spurred by Bunker's research (1985) in the later 20th century on the detrimental outcomes of extractive rubber industries in the Brazilian Amazon. Bunker (1985) built upon early unequal exchange theorization by demonstrating that the production and export profiles in peripheral regions increased the amount of relative harm to the environments and people of poor nations in comparison to the production impacts of the core. In particular, the use of extractive technologies (often provided by core investors and governments, or multilateral development institutions such as the World Bank and IMF) and changes to the local markets, structure of labor, transport and production capacity, and power and land ownership structures, greatly disrupts the environmental and social well-being of less-developed nations (Bunker 1985; Bunker and Ciccantell 2005; McMichael 2012).

Thus, many recent cross-national assessments of unequal exchange use Bunker's work to articulate patterns in "ecologically unequal exchange." These studies highlight that the global organization of production facilitates greater resource degradation in peripheral areas relative to core zones, especially for outcomes related to deforestation and biodiversity loss (e.g. Austin 2013; Jorgenson et al. 2010; Shandra et al. 2009). Even newer branches of research are also starting to consider what we might term "socially unequal exchange" to illustrate the negative well-being, health or gendered consequences of harnessing supposed comparative advantages in key primary or extractive products that are required for core consumption (e.g. Austin 2012, 2013; Dunaway and Macabuac 2007). Although this review of unequal exchange literature focuses on comprehensive global dynamics and international linkages that go beyond the scope of this specific study, the "structural qualitative fieldwork" approach taken here is deeply informed by the broad patterns exemplified in these macro-comparative perspectives (e.g. Gellert and Shefner 2009).

Of particular relevance to this study, a recent assessment by Austin (2012) finds unequal exchanges in coffee, or the relative flow of coffee exports from poor nations to core nations, leads to enhanced hunger, lower rates of educational enrollments, and heightened deforestation in coffee-producing nations cross-nationally. Austin's (2012) results corroborate case-study investigations indicating that increased pressure to produce coffee and the use of high-yield seeds results in less mixed cultivation with subsistence crops and higher rates of deforestation in some areas (e.g. Gillison et al. 2004).

In addition to hunger and forest loss, case studies conducted in a number of settings link coffee cultivation with lower rates of schooling among youth in rural households (e.g. Jaffee 2007;

Kruger 2007). This research points to the heightened labor requirements of coffee production, where children often are pulled from school to help with the coffee harvest. Indeed, this is particularly relevant in regions like Bududa that produce the Arabica variety of coffee, as the cherries must be picked at the peak of ripeness, requiring many passes through the same coffee cultivation site, thus greatly increasing the length of time overall needed for harvest.

Furthermore, other literatures examining the detrimental impacts of export agriculture in poor nations indicate links to infectious diseases like malaria (e.g. Austin 2013; Norris 2004; Pimentel et al. 2007). In particular, epidemiological research finds that expanding cultivation sites leads to ecological transformation in a variety of realms that spur mosquito habitats. For example, expansions in agriculture lead to the construction of roads and, therefore, ditches and puddles that serve as prime mosquito breeding grounds. Also, felling trees intensifies sunlight and temperatures, and water withdraws lead to declines in stream flow, potentially supporting additional mosquito proliferation (Norris 2004).

While ecological and health impacts are beginning to be considered in unequal exchange frameworks, discussions of gender remain scarce. However, ideas on gender and gender inequalities are emerging in the related branch of commodity chain analysis, and have been explored in depth by some world-systems scholars (e.g. Dunaway 2014; Feldman 2007; Smith 1993; York and Ergas 2011). However, these authors note that considering gender dynamics in world-systems research remains sparse and deserves more attention. Many political-economy examinations of gender focus on women's role in the household and contributions to unpaid labor, including non-wage subsistence work, and articulate this as central to the spread of economic activity and the functioning of the global economy (e.g. Feldman 2007; Smith 1993). Many women, in both developed and developing countries, are involved in non-remunerated work, simultaneously sustaining the individual household and the capitalist system.

In these ways, Dunaway (2014) articulates the centrality of women's labor in the production of global commodities and of gender's broad role in the dynamics of commodity chains. Women play an imperative but neglected role in producing commodities, and the devaluation of women's labor relative to men's allows for greater capital accumulation at the top of the commodity chain (Dunaway 2014). Of particular relevance to this study, Clelland (2014b) provides an analysis of coffee production, arguing that commodity chains are better understood not as networks for adding value, but instead as structures for extracting surplus. One important source of surplus is "dark value" (e.g. Clelland 2014a), defined as unpaid household and informal sector labor. Clelland (2014b) applies his concept of "dark value" to the production of Arabica coffee, contending that the primary beneficiary of this surplus are the consumers in core nations, who get to enjoy a low-priced cup of coffee because of the unpaid or underpaid work largely done by women in coffee-exporting countries in the periphery.

Existing research on coffee production documents the relative lack of power for women, as women represent those who grow and harvest the coffee, but rarely sell it or control the profits (e.g. Chiputwa and Qaim 2016; Clelland 2014b; Jaffee 2007). However, few studies have compared the views of women directly to men in this regard. Also, the unpaid labor that women put into coffee has not been overtly considered in contributing to unequal exchange relationships. Indeed, one likely reason that coffee is not valued at the same level as core exports or production processes is precisely because it is disadvantaged women who represent the main coffee cultivators in periphery nations. While women are often the key cultivators of other crops as well, including crops for household consumption, the comparatively intense time and physical demands required to grow and harvest coffee is likely to be key in intensifying the nature of unequal exchange relationships.[2]

As previously emphasized, coffee represents an exceptional case through which to engage unequal exchange perspectives. Recent research begins to not only look at the ecological impacts of coffee and other primary commodities, but also social or health impacts for producing nations. This study builds on these emerging applications of unequal exchange to more deeply investigate the consequences of cultivating coffee in a rural Ugandan district. By taking a qualitative approach, some of the mechanisms by which unequal exchanges in coffee occur may be illuminated. Although a myriad of quantitative, cross-national work documents the existence and adverse effects of unequal exchange relationships across nations, much less is known about how and why these consequences are produced at the local level (e.g. Gellert and Shefner 2009).

Coffee Production in Uganda

Uganda is Africa's second largest coffee exporter, following Ethiopia (ICO 2015; Ojambo 2014). Around 70% of the coffee beans grown in Uganda are of the Robusta variety and Uganda is Africa's leading Robusta exporter (Ahmed 2012; Ojambo 2014). However, this study is set in a high altitude, mountainous area where Arabica beans are grown. Robusta coffee is cultivated in the warmer, lower-lying regions in central Uganda, while Arabica is most common in the cooler and mountainous Eastern and Western regions of the country. Arabica beans are considered to be of higher quality in comparison to Robusta coffee, and fetch a slightly better price on the international market (e.g. ICO 2015; Talbot 2004). In Bududa, the coffee harvest is typically from July through October. However, harvest can extend beyond this, depending on the amount of rainfall, temperatures, and the ripeness of the coffee cherries.

[2] However, while the direct comparison between the effects of growing coffee versus other products is not a central focus in the current study, I will later elaborate on some of the specific characteristics of coffee, including the more labor-demanding nature of harvest, that likely intensify these dynamics in relation to other crops produced and exported in developing countries.

Less than 5 percent of Uganda's annual coffee crop is consumed in the country; over 95 percent of production is exported (Ahmed 2012; Ojambo 2014). Overall, coffee is Uganda's most important export commodity, accounting for nearly a quarter of all export revenues (Ojambo 2014). Uganda ranks fourth globally in terms of the contribution of coffee exports to overall export earnings, following Burundi, Ethiopia, and Honduras (Ahmed 2012; ICO 2015). In addition to coffee, key exports from Uganda include sugar, tea, corn, rice, cement, fish, and raw iron. The most prominent imports in Uganda include capital machinery, vehicles, medical equipment, and pharmaceuticals. The trade profile of Uganda, consisting of relatively low-value raw materials and agricultural exports and high-value technology imports, exemplifies this nation as a periphery nation in the world hierarchy, suffering from unequal exchanges.

The coffee industry in Uganda has undergone major reforms since the early 1990s. Under counsel and requirements from supra-national organizations such as the International Monetary Fund (IMF) and World Bank, whose doctrines are consistent with the need to liberalize trade policies in support of harnessing comparative advantages to spur economic growth (e.g. McMichael 2012), Uganda has undergone neoliberal reforms in their trade policies. The coffee market is completely liberalized; there are no coffee export taxes, charges, or levies except for a scant 1% fee on all coffee exports paid to the Uganda Coffee Development Authority (Ahmed 2012).

The coffee sub-sector in Uganda is dependent on about 500,000 smallholder farmers (Ahmed 2012). The average farm size ranges from less than 0.5 to 2.5 hectares. In the Bududa District, and in many other areas of Uganda, there are relatively few cooperatives and a lack of enforcement of quality control, causing the coffee to sell at an extremely low price on the international market compared to the labor needed to produce it and despite that the Arabica coffee grown in the region tends to be of very high quality (Ahmed 2012).

The Bududa District

The Bududa District is located in the eastern region of Uganda. This district lies at the foot of the slopes of the Mount Elgon volcano, one of the largest inactive volcanic mountains in the world. Bududa is bordered by Sironko District to the north, the Republic of Kenya to the east, Manafwa District to the south, and Mbale District to the west. This district consists of 15 sub-counties and one town council, with 90 parishes and 899 villages (Republic of Uganda: Ministry of the Local Government. N.d.).

The Bududa District has a population of 211,683 and the growth rate is about 3.8 percent, higher than the national population growth rate of 3.2 percent (Uganda Bureau of Statistics 2014). In Bududa, as in wider Uganda, there is an extreme youth bulge, with over half of the population under the age of 16 years (The Republic of Uganda: Ministry of the Local Government. N.d.).

Although it is a rural area, Bududa has a relatively high population density of about 952 persons per square kilometer in some areas, a statistic that has been linked to an increase in deforestation as well as landslides in the region.

The Bududa District has a unique set of natural resources, such as fertile soil from the volcanic dirt and regular and abundant rainfall (Watira 2011). These conditions help facilitate the intensive growth of coffee, as well as a host of subsistence crops such as bananas, beans, cassava, sweet potato, cabbage, and a variety of other fruits and vegetables. Over 93 percent of households in the district are considered subsistence farmers with many combining subsistence with some level of coffee cultivation (Watira 2011). Other economic activities include livestock rearing, small- to medium-scale business enterprises such as retail trading, mining, timber decking, local beer sales, food stands, and transportation services, and limited tourism in the Mount Elgon forest reserve (The Republic of Uganda: Ministry of the Local Government. N.d.; Watira 2011).

While the average GDP per capita of Uganda is around $1,700 USD (World Bank 2015), the average household in Bududa earns around $100 USD per year. The Bududa District has no formal water or sanitation systems, and the electricity supply is inconsistent as best. Most dwellings are not even wired for electricity. The roads within the district, and the main road that connects the Bududa District to the nearest urban center, Mbale, are unpaved and typically in very poor condition (The Republic of Uganda: Ministry of the Local Government. N.d.).

Most households in the Bududa District have an excess of 6-7 children, and polygamy is still commonly practiced, especially among older generations (The Republic of Uganda: Ministry of the Local Government. N.d.). The average age of first birth for women is around 14-16 years old. Most households include extended family members, such as grandparents, aunts or uncles, etc., and the large family size helps to contribute to farming and household labor. The culture in Bududa, like much of the country, is quite conservative, with traditional gender roles and norms rampant. Many women are confined to working in the home and gardens, while men dominate the other forms of more formal employment mentioned earlier.

Research Methods

Based on the literature on unequal exchange, as well as the characteristics of the coffee trade and production in Uganda, this study is exploratory in nature, and focuses on understanding the methods used to grow and harvest coffee in the region, how coffee growers perceive coffee and price fluctuations, and opinions on gender dynamics and potential negative health and environmental outcomes of coffee cultivation.

This research makes use of 21 semi-structured interviews (12 females and 9 males) with coffee farmers and 2 male coffee traders in the Bududa District. I also draw on over 11 months of participant observation during June - August from 2013-2016, including living with a local family

who grows coffee to supplement their income. The interviews were conducted over 2 periods; one from June - July in 2015, and secondly in early June of 2016. All interviews were audio-recorded and lasted between 30 minutes to 1 hour.

Conducting interviews with coffee growers in the Bududa District is vital in unearthing the processes, trends, and consequences of coffee cultivation in the region. By employing interviews, I was able to gain detailed information about participants' thoughts and behaviors. The interview sessions broadened my understanding of the factors that contribute to coffee cultivation and how it impacts rural livelihoods in Uganda (Boyce and Neale 2006; Weiss 2004).

During the interviews, I tried to provide a relaxed atmosphere, allowing participants to feel comfortable discussing their experiences and perceptions, by conducting the interviews in a conversational style on a secluded but open porch at the local family's house that I stayed with. Moreover, by maintaining an ongoing relationship with the Bududa community for over 5 years, I earned the trust of local community members and leaders. This was instrumental in allowing participants to feel at ease sharing their experiences with me, some of which touched on sensitive topics, such as spousal abuse. I probed participants about relevant topics that led to the exploration of themes important to this study that simultaneously demonstrated my interest in the participants' lived experiences (Strauss and Corbin 1990; Weiss 2004). Overall, my long-standing presence in the community and the use of open-ended interviews enabled me to collect data rich in information that goes far beyond what could be gleaned from survey data or other types of assessment (Strauss and Corbin 1990; Weiss 2004).

The interview instrument was designed to facilitate wide-ranging discussions about how coffee is cultivated, processed, traded, and the consequences of such. I used a local male translator for interview sessions so that I could conduct interviews in the local language, Ligisu, which enabled informants to provide fuller answers and feel more comfortable talking about their perceptions and experiences. The local interpreter/translator also helped design and refine the interview guide to phrase questions in a manner that were relevant to the community and that community members would understand easily.

To gather data, I employed convenience and snowball sampling in order to connect with community members who are involved in coffee cultivation in the Bududa District. I also loosely employed quota sampling to get a range of both female and male participants. This proved to be especially important, as the views of the women often diverged from the views of the men in the community.

To begin the analysis of my data, all interviews were transcribed using the transcription software Express Scribe. The transcriptions were imported into an electronic database, and coded systematically using the qualitative software ATLAS.ti. I wrote memos during my fieldwork in Bududa and when transcribing the audio files to identify and keep track of evolving themes and

ideas that influenced the first round of coding (Friese 2012; Miles and Huberman 1994; Saldana 2009; Strauss and Corbin 1990). This initial round of coding was focused on grouping together a variety of themes in a meaningful way based on how they elucidated my research questions. To avoid losing context when community members explained their knowledge about coffee cultivation and the effects, I coded references to each family of codes liberally, capturing as much of the surrounding texts as needed to understand the connections and conceptions members' make (Friese 2012).

I carried out a recursive process of coding where I "moved back and forth between noticing and collecting, for instance when developing subcategories" (Friese 2012: 101). Although many of the initial codes produced were based on themes and ideas from my memos, the majority of the codes emerged from the data and were refined over the multiple rounds of coding (Friese 2012; Miles and Huberman 1994; Saldana 2009). My memos and coding processes highlighted themes and direct quotes from the interviews necessary in providing the perceptions of community members on the consequences of coffee farming. Quotes were organized according to the sets of codes and themes with which they were associated. This list of quotes was investigated and specific quotes were chosen based on their ability to elucidate the research themes. The quotes presented are often in third person, due to use and phrasing of the local translator.[3]

The participants in the study were all between the ages of 30 and 76 years old. All of them had been involved in coffee cultivation for several years, with many of them learning to cultivate from childhood or adolescence, and therefore were involved in coffee farming for decades. The overall level of education was low, but did vary. Several participants had completed or at least started some level of secondary education; however, quite a few of the participants never attended any formal schooling or had levels of schooling that were below the basic primary level. All participants were married, or had been married in the past and were no longer married due to death of the spouse. Several of the interviewees were involved in polygamous marriages.

Findings

Deciphering why community members grow coffee is important as it sets the framework for their conception of the consequences of coffee cultivation, harvest, and selling. The semi-structured interviews conducted in the Bududa District of Uganda reveal that community members generally engage in coffee production because they know there is a market for selling coffee to the traders, even if the prices are low and true economic gains are minimal. In comparison, there may be only

[3] The translator provided direct translation from the local language, Ligisu, to English. However, the translator often translated responses in the third person as "he says…" or "she says…" during the interview session in order to make it clear when he was offering his own explanation. Although this was relatively rare, there were instances when the translator would clarify what was meant by a phrase or technique commonly understood by the local community upon my probing.

an extremely limited market for other agricultural products made in the region, such as bananas, as almost every other household in the district also produces these items for themselves. In other words, coffee growing is one of the few ways for rural households in the Bududa District to make any money. There are scarce formal sector jobs, and while many work informally, such as by working as a boda-boda (motorcycle taxi) driver or selling other crops for local consumption at road-side stands, coffee cultivation is considered to be a key form of money-making activity in the district. While all coffee cultivators also grow subsistence crops, money is still needed for other expenses, such as school fees for their children, clothes, and medicines when one falls ill. As one female coffee grower explicates,

> She thinks you can make more money from coffee than other crops… It is very marketable. Even if the price is low, you still get some money from it. Coffee has no risk.

Because of these basic factors of marketability and few other means to get cash in the district, all respondents ultimately conveyed that they think that growing and selling coffee is good for the community. Another cultivator responded,

> It is very good for the community. The people will feast, the bars will be packed with young men. Some will pay school fees.

The Process of Cultivating and Selling Coffee in Bududa

There was overwhelming consensus on the basics of growing, harvesting, processing, and selling the coffee; in other words, there was a common set of practices used in the community and respondents described these practices in similar ways. Many farmers grow their own seedlings from the coffee cherries harvested in the prior season. They start them in small, "nursery beds," then transplant them to the coffee garden when they are around 6 inches tall. Additionally, over three-fourths of the interviews revealed that the government and local counselors also provide coffee saplings to anyone that has land to grow it. In fact, most respondents thought that coffee cultivation in Bududa is currently expanding due to this direct support from the government. When asked why they think that the government is providing free plants to cultivators, one male respondent remarked, "*To help people who are backward to have a better life*."

The coffee saplings are planted about 18 inches to 2 feet apart, enough distance such that the branches from neighboring coffee trees don't crowd out one another when they become full grown. Most respondents said that it takes several months for the coffee plant to produce any harvestable cherries. For example, one cultivator explained, "*If you take good care of it, it takes one year and*

a half, that's when you get good beans from it." While the coffee trees are maturing, they require little labor beyond pruning, fertilizing, and keeping the ground around them wet by hauling water up into the hills (if the garden is far from the river) and digging trenches. Most cultivators fertilize their plants "organically" with only one male farmer stating that he used a commercial fertilizer. All of the other growers, if they mentioned fertilizing, did so using cow or chicken manure. Also, most cultivators mix their coffee plants with some subsistence crops, such as bananas or beans. Several growers commented that the beans also act as a fertilizer for the coffee plants and that the banana trees help to protect the coffee from the wind and provide some partial shade. However, the level of mixed cultivation varies considerably. Some gardens I visited appeared more like plantations, with just a few banana trees planted sparsely throughout.

While cultivating the plants does not seem to require much more work than other crops, every respondent commented that harvesting coffee took considerably more time and was very labor-intensive in comparison to other crops.

> When you go to pick the coffee you have to make sure you pick the ones that are red. You go through all the gardens many, many times.
>
> The coffee takes more time [than other crops]. You go at like 7 and come back after 3. At the end of the harvest, you have a lot of pains, using your arms to pull down coffee.

Indeed, almost every respondent talked of back, shoulder, and arm pains from harvesting the coffee. Many people used phrases like, "*It takes much energy*" or "*It is very labor intense*." Many cultivators rely on other family members to help them harvest the coffee, and many also "rent" their neighbors to assist with the harvest, paying them about 3,000 UGX (Ugandan shillings) or less than $1 per day.

> After picking the coffee, you have to hull it the same day. Then it stays pure white. If you wait, it will turn brown and traders do not want it. The coffee that is pure white is better.

Following the picking of the ripe coffee cherries, many people hull the coffee, removing the outer pulp from the coffee bean. Most of the growers take their coffee cherries to one of the few other growers who owns a hulling machine (a hand-crank device that separates the bean from the husk), giving up a small portion of the coffee beans as payment. The coffee is dried for 1-2 days, then washed again to remove any remaining pulp. The coffee is then dried for a longer period of

time on large mats that are raked regularly to prevent the beans from getting too much sun. The exact time it takes to dry the beans varies, depending on the weather and amount of direct sunlight, but usually it takes around 3 days to one week.

Some traders also buy the fresh picked coffee cherries directly from the farmers without any processing at a lower price. The interviews reveal that cultivators in Bududa very rarely sell their coffee to a cooperative, and are much more likely to sell their coffee directly to a trader. In fact, out of the 21 interviews with coffee cultivators, only 2 respondents commented that they sometimes take their coffee to a cooperative. Although the cooperatives can often get a better price for the coffee, there are a number of reasons why farmers do not use them. One key factor has to do with the amount of time it takes to get payment from the cooperative. The cooperatives do not pay farmers for their coffee until after it is sold at a higher level of aggregation in Mbale or Kampala, which can take several weeks or even months. Farmers are given a receipt that shows how much coffee was sold to the cooperative, but due to a lack of basic infrastructure, with most homes lacking even furniture, people often lose the receipts and have no way to validate for the money entitled to them. Several of the growers made comments like the ones below,

> Sometimes the cooperatives that buy the coffee take long, and there happens to be a lot of corruption which prevents him from selling to the cooperatives.

In addition to the long delay between selling the coffee and receiving payment, this comment also highlights that many growers feel there is corruption and that the cooperatives are not well managed. Also, to sell coffee to the cooperatives, you must be a member, including paying a membership fee before the coffee harvest season begins, which is not possible for most. Moreover, the cooperatives only take hulled coffee, and some growers do not have access to a machine. Thus, the overwhelming majority of growers instead sell their coffee to traders that are located at the trading centers. "*They sell it to the traders because the traders give you fast money*."

The explanations describing the issues with cooperatives begin to point to some of the mechanisms of unequal exchange, or the processes occurring at the local level that allow growers to earn only a very limited profit for the coffee they cultivate and process. I will elaborate on this point further in the conclusion section.

The Economic Gains from Coffee

As initially demonstrated, coffee does provide households in Bududa with access to cash money. However, several of the growers interviewed admit that in a bad coffee price year, they would have been better off growing other crops. A male grower says, "*In case the price is so bad, he can*

make more from maize, beans, potatoes." Another female grower said, "*Coffee sometimes helps you get some good money. But matoke [bananas] helps you get food throughout the year*." Thus, while there are some economic gains, if it happens to be a bad price year, the household would have perhaps benefitted more from growing more subsistence or locally-consumed crops.

Another key theme concerns the short-term benefits from coffee harvest, where selling coffee leads to monetary gains, but only for a few weeks or months of the year. As the population in Bududa is not used to making abundant money and does not have access to formal banking, there is a lack of a savings culture or infrastructure. Much of the money made from coffee is used or squandered in the immediate months or weeks after harvest. One female respondent noted,

> You can spend all the money by December or January, and then have nothing. February, March, April. These are the months of poverty. The money from coffee only pays for one term of [school] fees.

The total amount of money a household makes from coffee depends entirely on the size of their coffee gardens. Most people own between 1 and 3 coffee gardens, and the size of the gardens can range from 20 to over 100 plants. Many growers commented that the price for one kilo of coffee can range from 2,500 UGX (~ 75 cents) in a bad year, and has been up to 10,000 UGX (~$3) in strong years. During June of 2016, the traders I interviewed reported that the price for coffee in Bududa is selling at around 5,000 UGX (~$1.50) per kilo. The ICO (2015) estimates that one kilo of coffee yields at least 60 cups of brewed coffee. This means that coffee farmers in Bududa make about 2.5 cents on each cup of coffee sold in Northern markets. Certainly, these estimates convey that the bulk of profits made from coffee grown in Bududa are accrued by those at the top of the commodity chain. Such a devaluation of the actual coffee grown and later sold in Northern markets points to the underlying processes that allow unequal exchanges to occur.

Understanding and Consuming Coffee

The interviews in Bududa reveal that most coffee farmers in this region know little about coffee or the broader coffee market. Very few respondents have any idea where the coffee goes after they sell it to a trader, and even fewer had any conceptions on why the coffee prices may change so much from year to year. As a rare example, one grower had a fairly accurate understanding, commenting that, "*He has been told, in case Brazil produces more coffee in a year, the price will go down.*"

A much more common response was,

> She is not sure why the price fluctuates. She doesn't know what they [the traders] do. But she thinks that the coffee goes to a large cooperative in town, but she doesn't know what they do after that.

Additionally, only around half of the coffee growers I interviewed know that coffee is used most principally to make a drink. Growers often made comments like the one below,

> He doesn't know what they use the coffee for. For him, it is about growing it and selling it.

Interestingly, several of the respondents said that they thought coffee was used to make bread or medicine. Even more shocking, another common response was that coffee was used to make weapons. For example, a male grower remarked, "*They use the coffee for making gunfire or weapons and bullets*."

A very small proportion of the growers interviewed said that they have "taken" [drank] coffee in their home. However, they only drink coffee when they have the beans freely available to them during the harvest season. For the overall majority of the respondents who reported drinking coffee, the level of consumption was very low, perhaps only 3-4 times during the entire coffee harvest season and, therefore, only consuming coffee a few times per year. Most of these households roasted their coffee just using a pot over the fire, adding the crushed, roasted beans to hot water.

Gender Inequalities

A key research question concerns whether men and women benefit equally from coffee cultivation in Bududa. The results are glaring. All of the women interviewed believe that coffee benefits the men of Bududa much more than the women. About half of the males interviewed agreed, while half contended that men and women equally benefit. These men would comment that they worked equally to cultivate the coffee, share all the profits from selling coffee evenly with their wife or wives, and that the money gained was only used for things like their children's school fees. However, much more commonly, informants reported the opposite.

> The women work a lot in the garden. The men do nothing. Men marry mostly to have workers. Men take all the money and have the women

> remaining with nothing. They use the money to gamble and drink, and even take other women.

All of the women and several men reported that the women principally grow, water, harvest, and carry the coffee, but only the men are involved in the selling. "*It is not the same. Women can harvest the coffee, but the man comes and sells it off*." Even a male respondent commented, "*The reason the man holds the money is because the coffee is his. The man owns the coffee*."

Many women admitted to being victims of spousal abuse over disagreements about coffee. One woman showed me a large scar, saying that "*This is what the husband did when she quarreled with him about coffee*." Women being interviewed said,

> Yes, I am a victim myself. When the man sells the coffee, he might take it [the money] to a second wife, who does not cultivate the coffee. We would fight. I got hit.

> Many people fight because of coffee. Most times the men want to beat up their wives if they complain about him using the money to buy alcohol or cheat with other women.

The interviews with women reveal that they never know how much money is made when the coffee is sold. All women contend that their husbands keep money for themselves and never share the full amount. These accounts reflect prior research discussed earlier on "dark value" and how women's contribution to coffee cultivation is unpaid and unrecognized. These factors contribute to processes of unequal exchange, as the hidden value of women's labor allows for greater accumulation of surplus at the top of the coffee commodity chain.

> The men benefit more because the men use the money from coffee to drink [alcohol] or take other women to the lodges. Men are dishonest in how much they make from the coffee.

These accounts also reveal that the money gained by men from selling the coffee is often not used to benefit the household, as many of the men interviewed claim. The women are often coerced into laboring for their husbands in the coffee gardens due to a lack of other options. Just as coffee is viewed as the husband's property, so are wives.

> The reason she has kept working because she is at the husband's will. She cannot disobey. If she disobeys, he might divorce her and she will be stuck with the kids. She has no other option of surviving.

Child Labor and Missing School

In addition to female labor, the interviews in Bududa reveal that children are used to harvest coffee. While several interviewees contended that they never take their children out of school to help with the coffee harvest, using them "*only on the weekends*," the overall majority of respondents said that they notice children missing from school during the harvest months.

> There are many parents who use their kids to grow and harvest. Some parents tell their children not to go to school to help pick the coffee. Some kids who do not go to school [at all] sneak into the coffee gardens and steal the coffee. Then they use the money for gambling.

This quote reveals that not only are children pulled from school to harvest coffee,[4] but also that children who are not in school (usually due to a lack of the family's ability to pay school fees) also steal coffee from other farmers and use it in ways that does not benefit their social development. One grower who is also the head master at a primary school commented, "*When it is harvesting time, attendance goes down*." A key reason for the use of child labor concerns the nature of the coffee plant itself. One male grower reports,

> Harvesting coffee is very hard. There are small fruits. So they need the children to help them.

Connections to Malaria

Malaria represents the key health threat in this community, and the interviews reveal that there are keen connections between coffee cultivation and increased malaria vulnerabilities. Some of these vulnerabilities are created at the stage of cultivating young coffee saplings. Three of the coffee growers said that they use mosquito bed nets to protect and provide partial shade in the nursery bed. One interview with a male grower reveals, "*On the bed, you can put a small net to regulate the amount of water and sun…They use mosquito nets*."

[4] There were no discernable patterns regarding gender on which children tend to miss more schooling to help with the coffee harvest.

Coffee is the only product grown in the region that I have seen requiring shade cover as saplings. The fact that some families may prioritize the use of nets for young coffee plants over the protection of their children or other family members from malaria could easily contribute to increased vulnerabilities to the disease. Additionally, the overwhelming majority of the growers interviewed also said that they perceive that they get more mosquito bites in their coffee gardens in comparison to their other gardens.

> Yes, she gets a lot of mosquito bites. Most times, there are more mosquitoes in the coffee gardens. She is not sure why, she just knows she sees more mosquitoes there.

This quote illustrates that many do not know why there are more mosquitoes in the coffee gardens than in their subsistence gardens, however, many cultivators attributed the discrepancy to the nature of the coffee plant and needed growing conditions.

> There are very many mosquitoes. Like more mosquitoes in the coffee gardens. The plants make dark areas that breed the mosquitoes.

In addition to the shade of the bushy coffee plants, many also commented that the mosquitoes breed in the damp trenches of the coffee gardens. The deep trenching and greater requirements for water is something that is unique to the coffee plants in relation to other crops being grown in the region. I also notice that the coffee harvest season from July through October coincides exactly with the wet season, meaning that women and children are outside in mosquito breeding grounds at the time of the year when the exposure to mosquitoes and malaria parasites peak. Every respondent said they had acquired malaria, often multiple times, during the last coffee harvest season. Though direct causation cannot be made, it is common knowledge in the community that the mosquitoes endemic to this region prefer “bushy,” wet areas that are characteristic of coffee gardens and that the harvesting of coffee requires much more time spent outside in the garden, while other local crops (e.g. bananas, cabbage) do not share these qualities. In these ways, exposure to malaria-carrying mosquitoes is likely heightened for those working in coffee gardens in relation to gardens that only contain subsistence or local crops.

Environmental Costs

Lastly, the interviews reveal important environmental costs to coffee. Only about half of the cultivators made any comment regarding negative consequences to the environment. Many of them

did not perceive any negative environmental harms to growing coffee, and when pressed on potential issues of deforestation, for example, many explained that they inherited their coffee garden from their parents, or bought land where there were no trees.

However, other interviews did bring to light issues of deforestation and soil erosion. Some people that had more recently expanded into new areas, mainly up on the steep hillsides where there is unclaimed or uncultivated land remaining, did admit to felling large, native trees.

> So, the reason the people are cutting the trees, they claim that the trees spoil the coffee plantation. The trees compete with nutrients in the ground. That's why they cut them. When they cut the trees, the coffee gets enough sunshine.

While many large trees are cut to make way for coffee, some are left to provide semi-shade and protection to the coffee plants or soils. Though, this is usually only a few trees.

> You have to leave very few of them [trees]. If you leave many of them, they compete with the [coffee] plants for nutrients.

Landslides represent a key environmental threat in the region, and the connections to increased deforestation on the steep hillsides are clear. For example, when entering the Bududa District, there is a large sign or billboard warning of the dangers of felling trees in creating conditions that lead to landslides. Despite this, high levels of population growth and the desire to earn money pressure farmers to expand cultivation sites into unclaimed, forested areas. In fact, a landslide that claimed 5 lives just occurred in Bududa in 2016 during the time of the second wave of interviews.

> Planting up there, in the hills. It is causing soil erosion. Intensive soil erosion. Of course, they create landslides. They are very dangerous. So much pressure on the land.

Taken together, this research reveals that there are a number of social, health, and ecological costs to producing coffee in Bududa. Furthermore, the economic gains appear to be very limited, especially for women, both in the share of profits for growers, as well as the short-lived benefits from gaining cash at only one time of the year. The interviews also reveal several mechanisms that enable unequal exchange relationships to occur, such as issues with the cooperatives and the intense labor demands of coffee harvest. I elaborate on these points below.

Conclusion

The International Coffee Organization (2015) contends that demand for coffee will increase by nearly 25% over the coming five years. Consumption is increasing most prominently in developing societies such as China, India, and some Latin American countries. After several years of decline, world coffee prices are also on the rise, largely due to droughts in Brazil leading to elevated demand from other producing nations, like Uganda (ICO 2015). Climate change is leading to less rainfall in central Uganda where Robusta is produced, and in the most recent years, total Robusta exports have declined (Ahmed 2012). All of these factors signal potential increased demand for Arabica coffee in the wetter region of Bududa.

While rising demand can lead to an increase in coffee prices, and, therefore, better profits for growers in communities like Bududa, there is also a clear push to expand cultivation in the region. In two to three years, once the new trees provided by the government mature fully, the Arabica market in Bududa could be flooded. Similarly, yields in Brazil could recover, and other nations may also use the recent rise in global prices to start planting more coffee; this could lead to declines in global coffee prices in the years to come.

The interviews reveal that overall the growers in Bududa think that coffee is good for the community, as it provides an influx of cash not likely to be achieved with any other product or commodity. However, there are also clear economic, social, health, and ecological costs that contribute to community well-being declines or stagnation. Perspectives grounded in unequal exchange shed light on the harmful impacts of specializing in coffee, and the qualitative approach undertaken here helps to illustrate some of the key mechanisms that allow such inequalities to manifest. For example, one of the most consistent and emphasized findings from the interviews concerned the intense labor demands of coffee cultivation in relation to other crops. The physically-demanding nature of picking the coffee from tall bushes combined with the many passes required through the gardens to pick the cherries at the peak of ripeness means that coffee is much more labor-intensive than other products. As women represent some of the main harvesters, and also maintain demands in the home and with other crops during the coffee harvest season, there is a significant amount of unpaid labor and hidden value that likely attenuates unequal exchanges in coffee in relation to other crops.

Another key mechanism illuminated in this analysis concerns the limited profits made by growers or coffee owners in the region, which is in part due to the corrupt nature of the cooperatives. In addition to corruption, delays in payment and the membership structure of cooperatives also make participation in them unattractive or impossible for growers. A lack of participation in cooperatives limits possibilities for fair-trade initiatives and the enforcement of quality control at the local level would could, in theory, increase the profits that are realized by

local farmers. Internal factors like these point to local processes that interact with broader forces to allow unequal exchanges in coffee.

It must be emphasized that in the end, the average male coffee grower in Bududa will only make less than two and a half cents on every cup of coffee sold in Northern markets. This is a gross injustice. The average female coffee grower in Bududa will make nothing. If she's lucky, she might escape the coffee season with only aches and pains, and no permanent scars. By bringing gender into the discussion of unequal exchange, the hidden, unpaid labor of women becomes manifest in the systematic devaluation of primary sector and other labor-intensive products that women are disproportionately responsible for generating. Gender inequalities facilitate unequal exchanges at the global level, as well as more micro levels. The fact that women rarely, if ever, see any profits from their time growing and harvesting coffee is reflective of unequal exchanges between men and women within Bududa.

In addition to gender, this study also seeks to emphasize health inequalities in unequal exchange relationships. Just as the international division of labor sets up profit and ecological material appropriation from periphery nations, so too does unequal exchange involve relative losses or risks to health for nations at the bottom of the hierarchy. A growing literature makes links between export agriculture and malaria in epidemiological case studies and cross-national analysis (e.g. Austin 2013; Norris 2004), and the findings presented here add another dimension of evidence to this phenomenon using community-based qualitative research. As community members in Bududa engage intimately with their local environment to obtain food, water, and other resources, they notice patterns in mosquito populations that bring their most significant threat to health: malaria. The fact that growers observe more intense populations of mosquitoes in their coffee gardens than in other gardens should come as no surprise, given that mosquitos thrive in wet areas with the right mix of sun and shade. The time necessary to harvest coffee puts women and children outside in the mornings and through the evenings during the rainy season when malaria-carrying mosquitos are most active.

In addition to the social and gender contributions of this research, the findings presented also support conceptions of ecologically unequal exchange. While coffee has been considered as shade crop with minimal impacts to forests in the past, it is clear that many growers fell large, native trees and perceive native trees as competing with coffee plants for nutrients in Bududa. Deforesting and expanding cultivation sites on hillsides creates perfect conditions for landslides, with grave, lasting impacts for populations and the local ecology of the region.

Despite the fact that coffee growers make money selling coffee, the results show that the level of economic gain is not reflective of the true value of coffee to consumers in the global North and other rapidly developing regions. Ironically, many male growers contend that they use the little profit they make from coffee to pay school fees, yet children are pulled from school to help with

the harvest. While some school fees or basic needs may be met through coffee,[5] the profits don't last long since they are received just once a year and most families have no means of saving.[6] Layered with gender inequalities, much of the profits from coffee appear to be wasted quickly by men who "feast and party" following the harvest, buying alcohol, gambling, or engaging in other behaviors.

As a starting point in mitigating these patterns, village savings and loans associations (VSLAs) are growing in popularity and membership across the district; perhaps greater sensitization on savings and other incentives for VSLA membership during the time of coffee harvest should be created. Additionally, employing women as leaders in these groups may help to increase investment of coffee money into key household or community resources, as well as improve women's status and autonomy. On a more macro-scale, the coffee industry should be brought under regulation. Before the global coffee trade was liberalized in the late 20th century, producers were able to better regulate coffee prices, and a greater share of profits went to growers (e.g. Tablot 2004). However, such regulation is not likely to come to fruition, given the different interests of producing nations and coffee corporations in consuming nations, and current pervasive neoliberal approaches to development and trade.

It is important to acknowledge that conducting semi-structured interviews has some limitations. This study is established from data obtained by interacting with people. The research is therefore open to be influenced by my own personal and emotional dimensions as well as those of the community members with whom I interviewed. My results could have been affected due to the fact that I am a female "Mzungu," a term that refers to people who seem outwardly foreign. Being recognized as "Mzungu," and therefore a clear outsider, could have inhibited some people from providing honest answers. However, I made sure to mitigate this.

First, as emphasized, I have been working in the Bududa community over several years, and I am familiar with the local cultural norms and some of the local language. I always greeted my participants in Ligisu and behaved in line with local customs (e.g. wearing long skirts). Additionally, as noted, I employed a male interpreter who is native to Bududa in order to overcome remaining cultural, language, and gender norms that would have otherwise limited my interactions with male coffee growers. Moreover, I deferred to my translator about identifying participants or asking certain questions. I made sure to debrief with my interpreter after every interview so as to

[5] It is likely that some children are able to attend school because of the profits made from coffee. It is impossible to know for certain how much schooling would be viable without coffee profits, However, it is clear from the interviews that coffee profits typically only pay for one term of schooling, then are spent (there are 3 terms in the typical school year in Uganda).

[6] Given the lack of infrastructure and savings culture, any inflow of cash to Bududa could lead to these trends. However, because coffee is so seasonal, while most other crops (like bananas) are grown year-round, the sudden influx of money earned from coffee at only one time of the year could be attenuating these effects.

revise questions that needed improvement (such as to reduce social desirability bias) and to make sure that I was understanding responses appropriately. Furthermore, my status as a woman likely helped in many circumstances. I highly doubt that the female growers would have been as willing to share with me their stories of abuse and discrimination if I had been a male researcher.

Working with a translator also poses challenges that may have impacted the research. For example, there is no written dialect or dictionary for Ligisu, so some words or phrases may be imperfectly translated or lack a direct translation. At times, working with a translator can be "clunky" and disturb a truly conversational approach. Also, my translator was male, which may have caused some of the female informants to feel uncomfortable sharing their experiences. However, these weaknesses were also likely lessened as I have worked with this translator for over four years, and we have conducted countless interviews together on a variety of topics. Thus, our exchanges were relatively smooth, especially as I am becoming more versed in the local language. Additionally, the translator is relatively young (~25 years old) and comes from a distinctly well-educated and well-respected family in the region. His fluency in English is superb making him among the most qualified to provide Ligisu to English translation. His younger age and the fact that he comes from a family who runs a locally-based NGO focused on empowering women also likely eased concerns the female informants may have experienced.

Coffee is an obvious product of unequal exchanges. The coffee growers in Bududa are grossly underpaid for their coffee, and trading in green coffee will never accrue the profits gained in the global North from transporting, roasting, marketing, distributing, and selling the coffee in upscale coffee houses. The fundamental idea behind unequal exchange theorization is that periphery nations will not profit as much as the core for their exports. As coffee production happens to produce an ideal habitat for mosquitoes, reduces school participation among children, exacerbates the lower status of women, and, in some cases, leads to enhanced deforestation and erosion, there seems little possibility that the long-term negative well-being consequences might ever outpace any economic gains of cultivating coffee. Rather, unequal exchanges serve to reproduce the core-periphery hierarchy, undermining any potential for sustainable, successful development in underdeveloped regions like Bududa.

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Any conflicts of interest are reported in the acknowledge section of the article's text. Otherwise, author has indicated that she has no conflict of interests upon submission of the article to the journal.

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Humanitarianism and Unequal Exchange

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Abstract

This article examines the relationship between humanitarian aid and ecologically unequal exchange in the context of post-disaster reconstruction. I assess the manner in which humanitarian aid became a central part of the reconstruction process in India's Tamil Nadu state following the devastating 2004 Indian Ocean tsunami. This article focuses on how the humanitarian "gift" of housing became a central plank of the state's efforts to push fishers inland while opening up coastal lands for various economic development projects such as ports, infrastructure, industries, and tourism. As part of the state and multilateral agency financed reconstruction process, the humanitarian aid regime provided "free" houses as gifts to recipients while expecting in return the formal abandonment of all claims to the coast. The humanitarian "gift" therefore helped depoliticize critical issues of land and resources, location and livelihood, which prior to the tsunami were subjects of long-standing political conflicts between local fisher populations and the state. The gift economy in effect played into an ongoing conflict over land and resources and effectively sought to ease the alienation of fishers from their coastal commons and near shore marine resource base. I argue that humanitarian aid, despite its associations with benevolence and generosity, presents a troubling and disempowering set of options for political struggles over land, resources, and social entitlements such as housing, thereby intensifying existing ecological and economic inequalities.

Keywords: gift, humanitarianism, disaster, coastal fisheries, artisanal fishing, marine fisheries, NGO, disaster capitalism, neoliberalism, economic development, Nagapattinam, Tamil Nadu, reconstruction displacement, commons, neoliberalism

This paper is concerned with the relationship between post-disaster humanitarian aid and ecologically unequal exchange. It critically examines the role of humanitarianism in mobilizing and deploying affect, primarily through the act of gift giving, in order to facilitate state plans to rebuild a devastated region by relocating its inhabitants and opening up land for investment. The specific context I examine is the aftermath of the 2004 tsunami in southern India, specifically Nagapattinam district in Tamil Nadu state and adjacent Karaikal district (in Pondicherry state) on the Bay of Bengal coast. Prior to the tsunami two important domains of economic activity —the near-shore fishery and the coastal commons —were sought by the state for the expansion of export-led commercial fish and aquaculture production, both activities resulted in substantial ecological damage. Numerically dominant but economically marginal, artisanal fishers vigorously defended their coastal and marine resource claims, on the strength of customary laws regulating the use of coastal land and near shore waters. Drawing on ethnographic research conducted in the region between 2007-2008, I examine how the humanitarian gift of housing, while presenting a problematic choice for artisanal fishers, offered a unique opportunity for the state to expand ecologically destructive commercial capture fisheries.[1] In addition to ethnographic fieldwork among relocated households spread across several villages in Nagapattinam town, I also conducted household income/expenditure surveys among four relocated communities, and a coastal beach-use survey across forty coastal fisher villages spread across Nagapattinam and Karaikal districts (see Swamy 2011).

For decades the Indian state promoted growth-oriented economic development strategies to modernize marine capture fisheries and promote coastal aquaculture. Both strategies had deleterious ecological impacts provoking conflicts with the numerically dominant artisanal fisher population along the coast. While initially justified as a "food security" strategy (Planning Commission, Government of India 1951:23), the commercial fisheries sector and aquaculture primarily serve affluent export markets in the E.U., Japan, and the U.S., while despoiling coastal land and near-shore waters, including vital ecological assets like mangroves and dunes, and imposing a host of ecological costs on fisher and agricultural communities (Martinez-Alier 2001). Through the 1990s massive political resistance to the above state efforts resulted, combining ecological critiques of development alongside demands for the democratization of policy (Campaign Against Shrimp Industries 2004). Among significant victories for coastal fishers and agriculturalists was a landmark Supreme Court ruling against shrimp farms in 1996 (Environmental Law Alliance Worldwide (ELAW) 2008). Thus state led development policy —

1. This paper draws upon an NSF funded doctoral research project conducted in Nagapattinam between 2007-2008 by the author.

in both the "development decades" and the post-1991 neoliberal era faced significant resistance as artisanal fishers and small-scale agriculturalists mobilized politically in defense of their claims on the coastal and marine resource.

The tsunami of 2004 presented an opportunity for the state to aggressively pursue a host of economic development priorities including those noted above since the very population that resisted these goals was now devastated and vulnerable. Critical to the state-led reconstruction program was the role of the humanitarian sector, represented by a host of international and domestic NGOs. Through a public-private partnership with the state, NGOs were charged with building houses for affected communities, but on lands that were to be identified and procured by the state (Government of Tamil Nadu 2005a). This enabled the pursuit of a strategy that could make use of the funds and resources brought into the reconstruction process by an unprecedentedly large number of NGOs, while at the same time setting formal constraints on the locational choices afforded to recipients of housing (Government of Tamil Nadu 2005b). NGOs engaged in the reconstruction process but abstained from advocating on behalf of their recipients on the issue of location, instead choosing to focus on meeting deadlines and providing quantified evidence of deliverables to both the state and to their donors (Swamy 2013).

The paper begins by making a case for the study of post-tsunami humanitarianism in Nagapattinam through the framework of ecologically unequal exchange. I then present two key sites pertinent to ecologically unequal exchange in Nagapattinam—the near shore fishery and the coastal commons—and then examine how humanitarian aid empowered state efforts to alienate coastal lands and encourage capital-intensive (and ecologically destructive) production strategies at the expense of artisanal fishers. I refer to artisanal fishers as household-centered producers who deploy negligible amounts of capital and inputs, organize work around social and communal ties (as opposed to wage labor contracts), use small fishing craft, and capture fish close to shore (Food and Agriculture Organization of the United Nations 2014).

Why Ecologically Unequal Exchange?

On the face of it humanitarianism and unequal exchange seem to belong to completely different domains. If unequal exchange refers to the world of commodities, markets, exchange values, accumulation, and so on, humanitarianism is supposed to center on those domains explicitly excluded from that world of commodity exchange. Humanitarianism in other words views the giving and receiving of objects and services as activities that should occur necessarily outside the domain of the marketplace, shaped by the logic of the gift —conventionally understood to operate beyond the constraints and expectations of contractual exchange. Humanitarian gifts, however, are inextricably bound to structures and practices associated with the formal economy, and as such cannot be viewed in isolation from the domain of commodities, markets, exchange relationships,

and patterns of inequality that shape global, regional, and local relationships (Stirrat and Henkel 1997).

At the outset one might conceive of unequal exchange in terms of commodity production, exchange, and consumption. An ecologically focused approach to inequality in the world-system extends earlier concerns with the manner in which greater quantities of labor were embodied in commodities produced in the third world and exchanged with the global north at far below their real value, towards one that focuses attention on the resources and natural values embodied in these commodities (Foster and Holleman 2014; Hornborg 1998; Jorgenson 2016).

Jorgenson (2016:6) defines ecologically unequal exchange as the combined "obtaining of natural capital" and "usurpation of sink-capacity" at the expense of less-developed countries. The historical role of many developing countries as taps and sinks for the accumulation needs of western capital has continued to shape production, exchange, and consumption choices and strategies in developing countries. Furthermore the world-system's inequalities are shaped by historical patterns of extraction and production that advantage the global north, whose market demands disrupt and constrain production strategies across the world. Neoliberal states in the periphery of the world-system have had to aggressively adopt strategies that privilege export-oriented production and foreign direct investment as necessary conditions for development, leading developing countries like India to further entrench themselves within the world-system as taps and sinks for the accumulation needs of global capital, and in doing so intensifying assaults on local populations seen to stand in the way of a new market-oriented forms of development that prioritizes the needs of private capital (Chandrasekhar and Ghosh 2002:6).

The ecologically unequal exchange framework allows one to examine a broader set of socioeconomic phenomena such as the relationships people have with their natural environments, the conflicts shaping these relationships, the roles of powerful players such as the state, multilateral organizations, and nongovernmental organizations in advancing and shaping policies, priorities and outcomes, as well as the patterns of resistance and adaptation of local populations to these. As such it adds a much-needed framework for a consideration of how political ecological relations and conflicts at the local level relate with the political economy of production-consumption-accumulation on the scale of the world-system. For the purposes of this paper, EUE enables us to consider how local-level policies such as those pertaining to reconstruction reflect the needs and goals of wider world systemic entanglements, notably those tying coastal lands and near shore waters as sites of extraction, to affluent markets in the global north.

In Nagapattinam, two facets of ecologically unequal exchange are pertinent. One is the near-shore fishery where significant ecological damage has resulted from the proliferation of mechanized trawlers, leading to a decades-long conflict with artisanal fishers. Two, threats to the coastal commons, the beaches, dunes, vegetation, and resources (such as fresh water) posed by

state-encouraged shrimp farms, industries, tourism and infrastructure development such as commercial fishing harbors and ports. In both cases state-led policies resulted in ecological damage to coastal and near-shore waters, and also placed an unequal ecological burden on artisanal fishers, pitting artisanal fishers against mechanized boat owners on the one hand, and shrimp farm operators on the other.

Disasters and Humanitarianism

Scholars studying disasters from sociological and anthropological perspectives have expanded the scope of study to draw attention to the long-term patterns and effects of global unequal exchange associated with the emergence and global expansion of capitalism. Sociologists have, for instance, pointed to the need to take into account the world-system and its impacts on patterns and possibilities for social change (Letukas and Barnshaw 2008). Likewise, anthropologists have pointed to the need for more historical understandings of the role played by colonialism, racism, and imperialism in the constitution of disaster outcomes (Schuller 2016). In studies of disasters a shift away from treating disasters as singular events has accompanied a push towards more critical analyses that shed light on the ways in which vulnerabilities of populations are produced, and mobilized in specific ways following a disaster (Johnson 2011). More broadly, scholarship in recent years challenged the "event-centric" focus of disaster studies, which as Tierney notes, forecloses the question of how disasters themselves are related to the social order. Disasters, she argues, should be viewed as "episodic, foreseeable manifestations of the broader forces that shape societies" (2007: 509).

Letukas and Barnshaw (2008) extend the frame of analysis for the study of disasters to the long-term, posing the question of social change in terms of the long-term effects of capitalist development on a global scale over centuries. They contend that a world-systems approach might enable scholars to get a better sense of how perceptions of aid regimes are shaped by the specificities of how each nation-state has been integrated into capitalist accumulation strategies, that distinguish not only nation-states from one another but also place them within distinct economic zones in an unequal global order. While the uneven development of a world-system bound by a single market and the centrality of states in an (unequal) interstate system constrains the possibilities for cooperation and conflict between states, disasters offer a unique opportunity for change through macro-economic cooperation (a "neo-Marshall plan") that might both expand possibilities for international cooperation and improve public perceptions of American global power in host countries (Letukas and Barnshaw 2008:1072).

While this approach adds a necessary historical dimension to a consideration of disasters, its state-centric focus makes it difficult to assess the interplay of such forms of macro-economic cooperation with strategies of accumulation that pit states and global capital against populations.

The present era bears witness to semi-peripheral states engaged in violent efforts to wrest land and resources from populations, on behalf of capital. As such the extent of cooperation between core and semi-peripheral (as with peripheral states) also is an indicator of the effectiveness of the latter in facilitating accumulation through the "opening up" of resources and opportunities for investment. Nevertheless, the idea that disasters might offer openings for renewed international cooperation is also echoed in Fassin's (2012) "humanitarian government," which he describes as the "deployment of moral sentiments in contemporary politics " but also "as the response made by our societies to what is intolerable about the state of the contemporary world." Both formulations point optimistically to the power of affect in potentially reconstituting social relations, but do not address how these opportunities might translate into addressing structural inequalities of the world-system and the contradictions of humanitarianism.

The Humanitarian Gift

The increasingly important role of non-governmental organizations in disaster reconstruction raises questions as to how their activities facilitate the withdrawal of the state from social functions, but also regarding the substantial weakening of politics from below, as rights and entitlements are transformed into gifts from well-intentioned and resourced professional organizations. Scholars studying the phenomenon of the gift remind us that an object treated as a gift carries its own values that have to do with the social practice of giving and receiving gifts. A gift, for instance, carries with it the obligation to return a gift —and as Bourdieu (2010:5) reminds us, gift exchange involves a time lag between the original giving, and the return, and it also requires the selection of an object that is distinct from, in terms of objective qualities and embodied values than the original gift. Gift exchange is thus also about renewing social relations, including those that are founded on disparities of power, as for instance gift exchange between landlords and peasants. In fact, Mauss's (2002) pioneering early twentieth century study of the gift points out that giving between unequals is always about imposing obligations and thereby renewing socially recognized values such as loyalty and patronage (Mauss 2002). The gift, despite its explicit grounding outside the marketplace and its attendant inequalities, still presumes and thereby reproduces social inequalities, even when this occurs under the rubric of giving without expectation. Thus the gift exchange model can provide a useful framework for us to examine the relationship between humanitarianism and unequal exchange.

An immediate problem however presents itself: If a humanitarian organization provides a gift of a house, what is the obligation imposed on recipients as a result of receiving the gift of housing? Since many NGOs simply left the field after completing their housing projects, recipients were not necessarily bound to return a *counter gift* to their benefactors. Yet, there are two ways in which the humanitarian gift imposed itself as an obligation on recipients of disaster aid. For one, they

had to accept the terms governing the gift —specifically the choices made by the state with regard to the location of housing, the quality and dimensions of the received gift of housing, and the critical condition that accepting the gift of new housing signaled the formal abandonment of all claims to coastal homes and lands.

The gift was given by the NGO to the fisher recipient, but the counter gift was in turn expected to pass on from the recipient to the state. This transfer of livelihood resources includes not only lands, but also locational advantages, access to various coastal resources, and most importantly access to the near shore fishery. In short this is a form of enclosure facilitated by humanitarianism's "public private partnership" with the state. But it is at the same time a type of enclosure strategy that derives from a productive recalibration of politics, instead of a violent usurpation (as is common with so called "slum demolitions" or "evictions" of populations the world over). Since the house represents at the same time the single most important object required for everyday social reproduction, its transformation into a gift signals a radical diminution of democratic accountability —no longer an entitlement demanded of the state, which could be held accountable via politics, the house became an object of goodwill, given selflessly by well-meaning outsiders who expected nothing in return. Yet, one may also consider the ways in which the giver of the humanitarian gift obtained values from the act of giving —via the representation of the act of giving, and the circulation of such representations in ways that facilitate continued donor interest, the continuation of funding flows, maintenance of the institutional and monetary structures required for the functioning of an NGO and so on. Humanitarian gifts are powerful and transnational in their effects and values.

Framing the Terrain of Humanitarian Action

The terrain of humanitarian action was circumscribed by the ideological framing of existing inequalities advanced by multilateral agencies and state government officials. The World Bank characterized value production of the numerically dominant artisanal fisher communities as insignificant in relation to "the economy," since they contribute "a mere 0.6%" to the state's GDP (World Bank 2005). Thus the revival of artisanal fishing was seen to be a humanitarian consideration since fishing for hundreds of thousands of fisher households is a matter of subsistence. In contrast, the World Bank viewed commercial export-driven fisheries or shrimp farms as being properly integrated into "the economy" and therefore deserving to be revived as a matter of economic recovery. Assessment and implementation documents thus produced by the World Bank, the Asian Development Bank, and the United Nations Development Program, in partnership with the state government advanced a latent divide between economic development and humanitarian aid, with the latter passed on to the non-governmental sector. While conceptually separate in planning documents (see for example (Asian Development Bank, United Nations, and

World Bank 2005), the humanitarian aid component was closely linked with "economic development" agendas such as the multilaterally financed expansion of ports, dredging of new harbors for mechanized boats, and the construction of bridges to serve the seafood industry, as the following example illustrates.

Development and Demolition

Keechankuppam bridge was built by state authorities in the 1950s, in response to demands from local fisher communities living to the south of the Kaduvayar river, adjacent to Nagapattinam port. This bridge was needed because the only mode of transport available for fisher communities needing to access markets, educational, health, and governmental services in Nagapattinam town, was a *Toni,* a reed boat rowed slowly across the narrow waters of the Kaduvayar. The bridge changed the fortunes of Keechankuppam, Akkaraipettai, and Kallar by connecting fishers to town, market, schools, hospitals, and government services, but also with other fisher communities north of the river's mouth. Reflecting the heady optimism of the early 1950s when state policy centered on expanding and deepening the benefits of modernization and development as the pathway towards addressing endemic problems of rural distress, poverty, and food insecurity, the bridge also became etched in the memories of local fishers as a symbol of a lost era when the state was seen to be responsive to the economic needs of local communities. In striking contrast the expansion of commercial fishing as an economic developmental priority driven by the proliferation of mechanized boats in the 1990s, rested on recasting transportation as a need tied to the emerging commercial seafood industries requiring efficient transportation of fish to their export-oriented processing and packaging facilities further south.

Thus when the 2004 tsunami partially damaged the old 1950s era bridge which served the transport needs of fishers, officials were quick to push for the completion of a large and "modern" bridge (already begun prior to the tsunami) further upstream, but insisted at the behest of the World Bank that the old bridge needed to be demolished in order to make way for a Bank-funded fishing harbor. To local fishers this posed a major threat since the bigger bridge was not suitable for everyday pedestrian and small vehicular traffic, but was designed for trucks racing across the coast transporting fish to seafood industries located in Tuticorin further south. Despite efforts to resist the demolition, state officials destroyed the old bridge, late at night. Now with the bridge gone those fishers who had resolved to stay on in their coastal homes despite the tsunami, had to reconsider accepting inland relocation. An NGO-built housing complex was located significantly inland, and without the old bridge many southern fishers could no longer entertain the idea of continuing to live on the coast. Let's take a brief look at this episode: if the promotion of commercial fisheries was viewed as an economic development priority necessitating the construction of a new high-velocity/volume bridge, the destruction of the old bridge was

simultaneously viewed as necessary for the deepening of the harbor to facilitate an increase in the traffic, docking, and landing of mechanized boats. But this also served a second purpose, to discourage fishers from entertaining ideas about staying on their coastal lands, which technically they had by and large agreed to abandon once they accepted new housing, but desired to reclaim as did thousands of fishers across Nagapattinam. Moving inland posed various problems which made it unattractive despite the promise of legal recognition, and the hypothetical and largely partially fulfilled promise of structurally superior houses, utilities, and so on. Yet, instead of allowing fishers to decide how they wanted to pursue recovery, the state decided to add a little coercion to the mix: if they do not have a means of accessing markets and services, they will be forced to accept inland housing.

In effect, despite the tentative split between humanitarian aid and economic development, the two processes worked in conjunction with each other; the NGOs that took on housing construction had little interest in engaging with the political and social concerns of their housing recipients, and soon enough had left the field to pursue other disasters elsewhere. Meanwhile the meaning of humanitarianism became blurred as well —now it was about managing the outcomes of relocation due to economic development, and not the disaster. The split between economic development and humanitarian aid is therefore also strategically intended to blur the boundaries between addressing the effects of the disaster itself and the needs arising out of dislocations necessitated by economic development. Humanitarianism therefore ends up working as a damage control mechanism rather than as a means to address the recovery needs of its intended beneficiaries. Left to fend for themselves, many fishers of Keechankuppam village decided to reintroduce boat transport to enable residents access to Nagapattinam town. This was ironically a return to the status quo that prevailed until the 1950s —they were in effect underdeveloped by reconstruction, having lost their bridge, and access to the beaches as a result of relocation. Humanitarianism therefore enabled the reproduction of existing inequalities shaping the fishing economy —between artisanal fishing and commercial harbor based mechanized boat driven fishing, even as it sought to project itself as a critical agent engaged in "recovery."

The Artisanal Fishing Economy—Neither Premodern nor Unchanging

Since independence successive governments of India have pushed for the "modernization" of marine fishing. Development, with its focus on food security was to be pursued through large dams, massive infrastructure projects, the introduction of mechanized fishing boats, electricity generation, chemical inputs in agricultural production, and so on. The small farmer, like the artisanal fisher would come to be viewed as an archaic remnant of a bygone era of vulnerable subsistence, whose displacement was viewed as a necessary condition of modernization, and not as a contradiction of democracy. Frankel (2015) notes with surprise how Punjab Agricultural

University agricultural economists in the late 1960s viewed the displacement of small landholders and agricultural laborers as a necessary and even positive outcome of the mechanization of agriculture. To these elite modernizers of postcolonial India the displacement of large numbers of primary producers was coterminous with the transformation of nature into commodified value (Kothari 1989). For the second to become possible, the first was inevitable.

Thus from the 1950s official policy towards artisanal fishery was one devoted to modernizing the practice by encouraging increases in production via the introduction of mechanized boats. Policy-makers expected these boats to fish in deeper waters than those of the near shore where beach-landed craft of artisanal fishers typically did. Deploying the reasoning of 1950s modernization theory, the idea was that once mechanized boats proved their ability to raise productivity, artisanal fishers would be encouraged to move away from the "traditional" form of fishing and adopt mechanized boats and technologically improved fishing practices. Thus artisanal fishers were viewed as subjects of development who could, with persuasion, be encouraged to adapt to the demands of modernization themselves thereby improving productivity, the availability of an important source of protein, and thus contribute to national development. Two things happened that made things far more complicated as far as planner expectations were concerned: one, mechanized boat operators found it easier and cost effective to simply fish in the near shore, in direct competition with, and soon enough, in conflict with artisanal fishers. This set in motion a long-term struggle between artisanal fishers and mechanized boat operators, sometimes leading to violence and necessitating the arbitration of the state government's fisheries department which quickly became more effective in dispute resolution than in regulating the fisheries (Bavinck 1998). Contrary to planners' expectations artisanal fishers quickly began to adapt to their existing beach-landed craft a slew of secondary technological inputs—better nets imported from Scandinavia, outboard motor engines from Japan, which enabled them to increase the range of fishing expeditions. Ironically during the decades of "fisheries modernization," instead of declining, the number of artisanal fishers increased rapidly, making this the dominant type of fishing in South Asia (Kurien 1998b). Thus, there is something to be said about the resilience and autonomy of natural resource dependent small producer populations such as fishers (Kolding, Béné, & Bavinck, 2014). The dismissal of their ways of live as "premodern," "archaic," or "static" signals a political move rather than an analytical one; yet it is a powerful discursive and crucially dissimulating move which enables the pursuit of policies of enclosure and dispossession in the name of disaster recovery.

Histories of Ecologically Unequal Exchange in Two Coastal Areas

For Nagapattinam's artisanal fishers the primary conflict from a political ecological perspective is one over sharply clashing notions of property. To artisanal fishers the beaches, like the near shore

marine resource, are common property, where pluralistic notions of shared and mutually recognized access shape "traditional" conventions that emphasize sustainable long-term use (Kurien 1998a). Shrimp farms, or commercial fishing on the other hand tend to view the coastal ecology in terms of maximizing individual yield with scant regard for sustainable long-term uses of coastal or near shore marine resources. As Longo et al. (2015:32) point out, the profit-driven focus of commercial capture fisheries and aquaculture on the unceasing commodification of nature results in "unsustainable social and ecological consequences." Far from addressing the food security needs of poor countries, they primarily serve affluent markets in the global north (Longo et al. 2015:162). This divide is in a sense the primary contradiction driving the conflict between small producers on the one hand and neoliberal capitalist production strategies on the other. It informs the inherent biases driving state and multilateral economic development strategies that perceive natural resource dependent small producer populations as a barrier to be overcome, or a problem to be managed rather than as legitimate claimants to a shared resource.

To assess the implications of humanitarianism and reconstruction for ecologically unequal exchange, we examine two important areas where ongoing ecological conflicts between artisanal fisher communities and state-promoted commercial activities shaped the landscape prior to the entry of NGOs and their humanitarian agenda after the tsunami. A consideration of these two zones of conflict helps us identify the key ways in which humanitarian aid was predicated upon and contributive to ecologically unequal exchange in post-tsunami Nagapattinam.

The Near-Shore Fishery

Nagapattinam's fish economy illustrates the conflict between artisanal and mechanized fishing. While the former has a longer presence on the coast and is practiced by a significantly larger proportion of fishers, the latter has been encouraged over several decades by successive governments with the goal of modernizing the fisheries. Artisanal fishing relies primarily on beach-landed craft with teams of five fishers typically venturing out to sea for several hours at a time about twice every week (Bharathi 1999). Mechanized boats on the other hand are harbor-based, and require larger teams that venture out to sea often for several days. While mechanized fishing is more firmly integrated into commercial production, artisanal fishing also serves commercial buyers, predominantly by selling dried fish as feed for the poultry industry, in addition to serving the subsistence needs of fishers. Mechanized fishing and the broader commercial fisheries with which it is associated, have been actively promoted by state policy makers and in the contemporary era are still viewed by state and multilateral agencies as being central to the fishing economy's contribution to the GDP (Department of Fisheries 2006).

The key conflict between mechanized and artisanal fishing is over the near shore fishery**:** under pressure to reduce operational costs, mechanized boat operators found it easier to compete

with artisanal fishers in the near shore than to fish in deeper waters as originally intended. The introduction of trawling further exacerbated this conflict as trawl nets seriously depleted near-shore waters of fish (Bavinck 2003). By scraping the shallow seabed, trawlers could increase their overall catch, but at the cost of substantial destruction of the ecology. These "externalized costs" of mechanized fishing were subsequently borne by artisanal fishers who saw a precipitous decline in near shore fish catch, as well as increased conflict over customary claims over these waters.

The Embattled Coastal Commons

While mechanized fishing boats imposed externalized ecological costs of near-shore fishing on artisanal fishers, commercial shrimp farming, actively promoted by successive governments at the urging of the World Bank, also imposed ecological costs on fisher communities (Stonich and Bailey 2000). Shrimp farming relies on the construction of ponds that use brackishwater pumped in from the sea where with the generous addition of a host of nutrients and antibiotics shrimp are harvested and sold to distant markets. Effluents tend to leak out of ponds, and are routinely pumped out into the sea damaging the fragile coastal ecosystem, especially fresh water resources, but also near-shore fishing grounds (Hein 2002). In addition to the ecological damage shrimp farms are associated with, their basis in the principle of private property which demands exclusive spaces in areas typically governed by common property conventions, understandings and expectations, raised the stakes for fisher communities over the decades preceding the tsunami of 2004.

The construction of power plants, industrial enclaves, and ports along the coast have also seriously threatened both coastal lands and near shore waters with the result that fishers not only lose out but are forced to factor in the costs of such activities into their own efforts to sustain livelihoods. This includes for example having to expend more time and effort in order to access beaches and markets due to erected barriers and fences, enduring added financial burdens due to the loss of access to coastal resources such as brush for fuel, clean drinking water, health costs resulting from pollution, physical violence from security guards, and so on. In this sense, one might argue that unequal ecological exchange between mechanized fishing, shrimp farms, and power plants on the one hand, and coastal artisanal fisher communities on the other results in the disproportionate imposition of costs on the latter, despite the fact that fisher communities have continued to fight back and contest such outcomes (see Society for Nutrition, Education & Human Action 1998). A few of these costs can be considered here for illustrative purposes.

The erection of fences and barriers to free movement on beaches by shrimp farms, ports, industries, and power plants, impedes a host of critical economic activities on the beaches. Boats are launched, landed, parked, and repaired on the beaches. The loss of access to these spaces results in increased risk of losses and damage for fishers since one of the most commonly cited advantages of having boats and gear within sight of the village is security. In addition, fishers also risk physical

violence if they attempt to subvert erected barriers as was frequently the case with shrimp farms throughout Nagapattinam.

The Impacts of Post-Disaster Humanitarian Aid on Ecologically Unequal Exchange: The Gift of Boats

While fishers suffered extensive losses of boats and gear, the solution offered by NGOs, while well-intentioned, turned out to be deeply flawed. Partly driven by the need to avoid the complex process of ascertaining who actually lost boats, and partly by the felt obligation to provide boats for even those who did not own them prior to the tsunami, NGOs flooded the coast of Tamil Nadu with thousands of small Fiber Reinforced Plastic (FRP) boats. While this generosity was touted as a sign of NGO success, fisher communities were negatively affected in several important ways. The idea that every fisher should be given a boat did not take into account the manner in which boats are deployed in artisanal fishing —they are handled by teams of typically five fishers, often including the owner of the boat. Given the risks involved, artisanal fishing requires teamwork, trust and mutual solidarity, with teams built over time among fishers who feel confident in each others' capacities when out at sea. The emphasis on individualized boat ownership resulted in competitive tensions between former team members and helped contribute to overfishing. In addition, given the poor quality of many of these hastily produced and delivered boats, many fishers reported increased risk of accidents, as well as costs of repair and maintenance.

Thus the proliferation of boats as a result of tsunami humanitarian aid exacerbated the ongoing ecological crisis of the near-shore fishery associated with the conflict between artisanal and mechanized fishing. Recent reports suggest that in some areas of coastal Tamil Nadu overfishing has dangerously depleted several species of fish, with catch now increasingly dominated by fish from lower in the marine food chain (Ghosh and Lobo 2017). FRP boats ironically enabled fishers to re-establish their visible presence on coastal lands as now the bright colors of hundreds of boats dotted the landscape, joining the smaller numbers of FRP boats and large number of *Kattumarams* already used extensively prior to the tsunami.

The Costs of Relocation

While the proliferation of boats impacted already unequal exchange relations in the near shore fishery between artisanal fishers and mechanized boat operators, NGO housing construction on inland sites identified by the government radically intensified the threat of alienation from coastal lands for artisanal fisher communities. The state government's framework for housing construction strongly favored the mass relocation of entire villages. Government orders issued in early 2005 called for NGOs to enter into “public private partnerships” with the purpose of building housing complexes on inland sites identified and procured by the government. This effectively restricted NGOs to the role of providers of housing, precluding them from engaging with local communities

on the critical question of location. While the state government pursued this explicit depoliticization of NGO work on its own accord, NGO practices also lent themselves to a convergence of goals with the state government. For one, it was easier logistically to undertake construction of rows of houses on a single site rather than individual houses *in situ.* Secondly many NGOs involved in construction had little to no prior experience in construction, which in addition to their lack of local ties made it easier to simply employ local contractors who tended to favor larger clusters over individual *in situ* houses. The state government's rules for housing eligibility articulated in Government Order 172 curtailed options for repair and reconstruction *in situ,* making it virtually impossible for poorer households to consider retaining their coastal homes. Most importantly the government explicitly tied eligibility for new housing to the formal abandonment of all claims to the coast including previous habitations. This criterion was inserted into the legal titles provided to recipients of new houses, alongside a host of other restrictive conditions that proscribed the use of new houses as security for loans, rental properties or as alienable assets.

For fisher recipients of new housing the most serious implication of relocation was the loss of proximity to beaches and the coastal commons. This was more pronounced where relocation distances were substantial as in the case of some sites located at distances of more than a kilometer inland. For many poorer fishers finding alternatives to easily available fuel from Casuarina groves on the beaches proved to be a difficult prospect. Inland sites generally were on or near agricultural lands where local communities already claimed sparsely available fuel sources such as wild brush. Similarly, access to fresh water and sanitation in new sites proved to be a burden for fishers accustomed to relatively abundant fresh water on familiar coastal lands, and sanitation practices tied to beaches and groves. Alienation from coastal homes also imposed costs experienced in terms of increased preparation time for fishing trips, longer commutes to the beaches and markets, and schools and services. Women fish vendors were disproportionately affected by the increased distances imposed by relocation since they manage the vital circulatory side of the artisanal fish economy, as were those who were too poor to pay for transportation options. There were also major locational costs having to do with the inability of poorer fishers to maintain their new houses given the added cost of metered electric and water connections. Some costs borne by relocated fishers were ecological costs, including living next to shrimp farms, from which toxic effluents seeped into the soil, polluting the air and peeling away the plaster off newly constructed houses in at least one site. Many new sites were located on low lying land with poor drainage, rendering them extremely unsafe during seasonal rains. Water-borne illnesses that fisher communities rarely experienced before became a recurring feature as stagnant pools of water remained flooding new housing sites weeks after heavy rains (see (Swamy 2011:343–346).

Conclusion

The key goal of the humanitarian gift of housing was to help facilitate the transfer of coastal land from the hands of artisanal fishers to the state. In doing so, the NGOs that dutifully built housing complexes of questionable quality on sites far from the coast, enabled the state to lay claim to lands that it had previously failed to enclose for a host of activities tied to already existing ecologically unequal exchange —specifically commercial fishery. The gift in effect was intended to not only enable the enclosure of coastal land, but to also bypass a crucial dimension of politics at the local level. The latter effect speaks to the broader phenomenon of depoliticization associated with the transformation of politics under neoliberalism (Fisher 1997). The withdrawal of the state from its social functions represents one core characteristic of this transformation, though as scholars have pointed out this "withdrawal" is also about radically undermining public influence on policy by directly or indirectly assaulting democratic and popular processes, typically using the term "reform" to push through what are deeply unpopular initiatives (Brown 2015). Depoliticizing the terrain of entitlements and rights is therefore a characteristic feature of neoliberal states, as they seek to neutralize any barriers to capital posed by public participation. This transition is important for us to consider in the context of post-tsunami housing. The house—a structurally, locationally specific object that serves as the primary basis of social reproduction has been long viewed by many poorer populations as an entitlement demanded and sometimes received from the state.

By handing a house to fishers as a gift, an object imbued with selflessness and generosity, NGOs transformed the terms governing the meanings of the house by decentering it from the subject-state equation. As noted by fishers in Nagapattinam, the difference was that now the house was given by somebody who did not have to act for their benefit but did so on account of their selflessness and voluntarism, as opposed to the state, which acts whether eagerly or reluctantly because it has to, it is obligated to. Thus, when fisher recipients sought assistance when NGO delivered houses turned out to have serious structural defects, they were repeatedly given the run-around by officials and NGO staff, and chided for not taking responsibility for their "own" houses. Fishers tended to refrain from directly challenging NGO staff also because they viewed the latter as having helped them with no expectation of anything in return. The housing gift therefore did have the sort of affective force Foucault (2009) describes as neoliberal governmentality, whereby potential resistance to state cutbacks and austerity policies are forestalled by encouraging modes of self-regulation and discipline. Citizen-subjects become in effect individualized, atomized bearers of capacities rather than rights (Lemke 2001).

However, the Foucauldian formulation articulated by Lemke (2001), presumes a level of passivity and acquiescence among subjects that did not prove to be the case in post-tsunami Nagapattinam. Aside from the state, multilateral agencies and NGOs, fishers too brought a range

of dispositions to the process (Bavinck 2008). While the conditions governing housing eligibility tied acceptance of a new house to the formal relinquishment of all claims to the coast, most fishers retained their coastal homes, repairing homes, or rebuilding despite legal proscriptions. The post-tsunami humanitarian gift economy was therefore also about the goals and aspirations of recipients, which included calibrating the implications of their decisions vis-a-vis relocation. When the choice came to deciding between "legality" via relocation, and a return to the quasi-legal status of encroachers as the only means to sustain livelihoods, fishers preferred the latter. Such a form of refusal can in fact be read as a strategy of defending the status quo which prevails on most coastal lands throughout India where artisanal communities —some with histories stretching back in time far before the advent of the modern Indian nation state or even its colonial predecessor —live as "encroachers."[2]

For the large numbers of fishers who accepted new houses and were unable to return to reclaim coastal lands the gift of housing became a permanent cost. In that sense, for relocated fishers the permanent costs of relocation became the return gift paid to the state as a result of having accepted the gift of housing from the NGO. This "permanent" repayment is not reducible to the aggregate monetary costs of trying to survive and sustain artisanal fishing livelihoods while living in far away, structurally problematic houses, but also the loss of the coastal commons. However, these losses and long-term costs should be factored into an assessment of ecologically unequal exchange linking Nagapattinam's fish economy to domestic and global markets as part of the ecological debt owned.

About the Author

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Disclosure Statement

Any conflicts of interest are reported in the acknowledge section of the article's text. Otherwise, author has indicated that he has no conflict of interests upon submission of the article to the journal.

2. For example Nambiyarnagar, the head village of all of Nagapattinam's fisher villages, claims its origins in events described in the 10th century devotional poetry of Saiva saints (Peterson 1994)

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Splintering South: Ecologically Unequal Exchange Theory in a Fragmented Global Climate[1]

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Abstract

The article examines the changing nature of politics in the United Nations climate negotiations through the lens of ecologically unequal exchange theory, focusing on the lead up to and aftermath of the 2015 Paris negotiations. We identify and discuss three areas of tension that have emerged within the G-77 coalition: tensions within the global semi-periphery, tensions between the semi-periphery and periphery, and tensions within the periphery. Together, these tensions challenge the main link of solidarity in the G-77 coalition: the idea that all countries in the global South share a common predicament in the global system, with the North solely to blame. Drawing upon this case, we offer three related insights to develop ecologically unequal exchange theory. First, theory and empirical work must better consider the role of the semi-periphery, and divisions within the semi-periphery, in reproducing ecologically unequal societies. Second, theory should account for how fragmentation between the periphery and semi-periphery may produce distinct challenges for peripheral states to resist governance forms which intensify ecologically unequal exchange. Third, theory should better account for the ways in which ecologically unequal exchange as mobilized as a collective action frame reflects and diverges from the real-world distribution of environmental goods and bads in the world system.

Keywords: Ecologically Unequal Exchange, Climate change politics, United Nations climate negotiations, 2015 Paris climate negotiations

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> The Poor are not asking for charity [but] for the need for us to co-operate on an equitable basis. Now the rich claim a right to regulate the development of the poor countries. And yet any suggestion that the rich compensate the poor adequately is regarded as outrageous (Malaysian Prime Minister, Dr. Mohathir Mohamad, 1992, p. 232, cited in Okereke 2006).

Malaysian Prime Minister, Dr. Mohathir Mohamad's speech at the 1992 Rio Earth Summit captures the main axis upon which the negotiations on climate change hinged for nearly two decades. Developing countries, who embraced an identity of the 'global South', stood against proposals by those in the 'global North' that did not recognize their rights to manage their own economies, the structural forms of inequality that inhibited their development, and their right to compensation for costs from dealing with climate change. This reflected a structural worldview, with roots in dependency and world-systems theories (Roberts and Parks 2006), which had in part been carried over and adapted from other historic platforms of developing countries, such as the New International Economic Order of the early 1970s (e.g. Krasner 1985; Rothstein 2015).

Scholarship on climate change has often characterized the politics regarding rights and responsibilities on greenhouse gas emissions as a struggle between states in the global North and global South (e.g. Gupta 1997; Roberts and Parks 2006). However, we argue here that given recent shifts in the contemporary world order and within the United Nations Framework Convention on Climate Change (UNFCCC), such analysis presents a static and no-longer accurate view of global environmental inequality. Scholarship also fails to clarify the alliances and conditions that structure possibilities for resistance. What is missing, we contend, is a nuanced understanding of the global South as a complex and changing set of relations reflecting shifts in the historic world order, and dynamics specific to the contemporary climate regime.

This weakness extends beyond works on climate change to the field of ecologically unequal exchange, which is the application of world-systems analysis to ecological relations between states and peoples. Scholarship on ecologically unequal exchange has largely focused on documenting the unequal distribution of environmental bads and goods in the world system (Hornborg 2001; Rice 2007; Jorgenson and Clark 2009; Shandra et al. 2009). Far less attention has focused on the historically specific political dynamics that shape the global governance of environmental inequality, including the implications of a politically and economically fragmented global South.

In this article, we ask, what do contemporary developments between global South states within the UNFCCC process reveal for theory about the governance of ecologically unequal exchange, and avenues for resistance? We identify and discuss three areas of tension that have emerged within the G-77 coalition since the pivotal climate negotiations in Copenhagen in 2009,

and which were solidified as part of the Paris Agreements in 2015. These include tensions within the global semi-periphery, tensions between the semi-periphery and periphery, and tensions within the periphery.[2] Through analysis of these tensions, we offer three important areas for improvements of ecologically unequal exchange theory. First, theory must better consider the role of the semi-periphery, and divisions within the semi-periphery, in reproducing ecologically unequal relations between societies. Second, theory should account for how fragmentation between the periphery and semi-periphery may produce distinct challenges for peripheral states to resist governance forms which intensify ecologically unequal exchange. Third, theory should better account for the ways in which ecologically unequal exchange as mobilized as a collective action frame aligns with or diverges from the real-world distribution of environmental goods and bads in the world system.

This analysis is informed by our 20 years of participant-observation research at the UN climate negotiations.[3] The article is organized in five steps. First, we discuss the relevant literature concerning the political dimensions of ecologically unequal exchange in global governance, particularly related to international climate change politics. Second, we outline how international climate politics were historically structured around particular ideas of inequality in the world system between the global North and South, how and why the old North–South alignments shifted in the pivotal negotiations in Copenhagen in 2009, and the major tensions in the global South relevant to the politics of ecologically unequal exchange during the post-Paris period. We conclude with discussion of what insights this analysis contributes to ecologically unequal exchange theory.

Ecologically Unequal Exchange as a Political Lens

Ecologically unequal exchange builds upon the Prebisch-Singer hypothesis which asserts that deteriorating terms of trade exist for countries that export raw materials (Prebisch 1950; Singer 1950). As a result, wealthy nations become richer by concentrating the benefits of these resources, while poor nations become further impoverished as their societies are transformed to deliver these resources to the developed nations at lowest price (Cardoso and Faletto 1979; Bunker 1985). As developed by the dependency or structuralist school, the global "periphery" was seen in a losing

[2] We describe the development of the zones of world systems theory (periphery, semi-periphery and core) below, and acknowledge that sometimes countries move in and out of these categories as they move up and down through the hierarchy of nations. While these are functional groups of nations, we also see these as a continuum from the most powerful and wealthy to the least developed countries. We refer to certain nations in each zone but do not base these categorizations on current empirical data; rather we utilize earlier world-system theory conceptualizations such as that of Terlouw (1993) (see Roberts and Grimes 2002).

[3] This participant observation has included working directly with numerous policy NGOs and civil society networks and state delegations, particularly the Least Developed Countries negotiating group. Observational data was collected during network meetings, side events, press conferences, demonstrations, and policy interventions. The analysis is also informed by more than one hundred informal interviews and analysis of UNFCCC negotiations and related policy documents.

role in relation to the "centre" or "metropole," where wealthy countries drew resources and cheap labor from around the world to manufacture high-value products they could export back to the periphery.

The terms *core* and *periphery* were adopted and elaborated by North American sociologists in the world systems theory tradition (Wallerstein 2011; Chase-Dunn 1998). The terms speak to not only the international division of labor, but also the ways in which surplus value from the transnational production of goods and services is concentrated unequally across geographies. As Arrighi and Drangel (1985:12) argue, "Core activities are those that command a large share of the total surplus produced within a commodity chain and peripheral activities are those that command little or no such surplus." World system theorists then added a region to their conceptual apparatus that sat between the top and bottom countries: the semi-periphery, which represented the middle of the global division of labor, with both core and peripheral activities (Arrighi and Drangel 1985). The key characteristic of the semi-periphery was that it acted as a middleman between the core and the peripheral nations around it (Wallerstein 1979). These semi-periphery nations led the exploitation of the other countries in their regions to bring their resources to the world market, managing labor and investments there. In doing so, they developed decidedly bimodal or mixed economies, with extremely modern sectors and vast internal regions continuing to live in pre-modern conditions (Hecht et al. 1988).

World system theorists have long argued that while the structure of the world system has been relatively consistent over time, individual states can and do move up or down in the hierarchy (Arrighi and Drangel 1985:28). Arrighi and Drangel (1985) argue that semi-peripheral states seek to exploit distinct advantages of their position for gains in the world system. Specifically, they "resist peripheralization by exploiting their revenue advantage vis-à-vis peripheral states and their cost advantage vis-à-vis core states" (Arrighi and Drangel 1985:27). They point to domestic strategies related to managing their position in global commodity chains as the primary mechanisms through which they attempt to do this.

Notably absent from this discussion are strategies pursued by semi-peripheral states to maintain or enhance world system position through multilateral governance processes. That is, scholarly attention should be directed to how semi-peripheral states actively seek to change the rules of the global system through political action in multilateral fora.

Ecologically unequal exchange has built from understandings of structurally conditioned unequal exchange in commodities, pricing and labor, to unequal access by wealthy countries to natural resources, ecological well-being, and sink capacities in poor countries (Frey 2015; Hornborg 2001; Rice 2007; Jorgenson and Clark 2009; Shandra et al. 2009). For example, Rice (2007:43) defines ecologically unequal exchange as "the increasingly disproportionate utilization of ecological systems and externalization of negative environmental costs by core industrialized

countries and, consequentially, declining utilization opportunities and imposition of exogenous environmental burdens within the periphery." Counter to ideas of ecological modernization that posit a delinking of capitalist growth from environmental degradation in 'modernized' societies (e.g. Mol and Spaargaren 2000), ecologically unequal exchange scholars argue that ecological harm is externalized by wealthy countries onto poor ones, and ecological well-being is expropriated from them. Importantly, it is argued that these processes of inequality related to the environmental issues such as agriculture, mining and energy are sustained by global systems of governance and elite controlled networks, institutions, and organizations (Downey 2015).

Others have made the case that climate change is a case of ecologically unequal exchange, with peripheral countries not benefiting from the fossil-fuel intensive development of the core, while experiencing the ecological impacts first and worst. From this viewpoint, the disproportionate impacts and vulnerability in the periphery to climate change are understood as not merely a geographical anomaly, but as conditioned by a colonial history of unequal insertion into the world economy and uneven trade relations (Roberts and Parks 2006) as well as "double exposure" to climate vulnerability and the detriments of economic globalization (O'Brien and Leichenko 2000).

In terms of the role that the semi-periphery plays in ecologically unequal exchange theory, Burns et al. (2003:362) argues that a pattern may exist of "recursive exploitation", whereby a nation in the "semiperiphery is at a disadvantage to one in the core, yet is able to work exchanges in its favor when they involve the semiperiphery or periphery." In other words, due to their position within the world order, semi-peripheral states may be in a position to mediate some of their environmental burden by dumping it upon states with a less favorable position (Rice 2007). However, this capacity has not always been supported empirically; in the case of deforestation, semi-peripheral countries have experienced higher rates of deforestation than those at the periphery, likely attributed to a historical artifact, whereby peripheral countries were yet to experience similar levels of urbanization (Burns et al. 1997; Burns 2003 et al.; Jorgenson 2004). Studies have found that such relationships may vary by pollutant; for example, greenhouse gas emissions are linearly related to position in the world system hierarchy, whereas methane emissions tend to be heaviest in semi-peripheral countries (Burns et al. 1997; Jorgenson 2004). In terms of the impacts of climate changing emissions, the states that are most peripheral in the world system, such as the forty-nine Least Developed Countries, are far more vulnerable to climate-related disasters than the global average, despite contributing almost nothing to its cause (Ciplet et al. 2013a). We have not seen explicit comparisons of climate change vulnerability between peripheral and semi-peripheral states, but most categorizations place the poorest nations in the lists of the most vulnerable (see e.g. Roberts and Parks 2006). Still, limited attention has been devoted

to uncovering descriptive or causal relationships of ecologically unequal exchange between the semi-periphery and periphery, or even the core and semi-periphery.

Moreover, despite a growing literature discussing the empirical and theoretical dimensions of ecologically unequal exchange, there has been minimal attention to the contentious real-world political aspects of ecologically unequal exchange in practice, particularly as they take shape within changing global governance regimes. One recent exception is the work of Downey (2015), who analyzes the role of elite-controlled transnational networks in structuring global environmental inequality through governance institutions such as the World Bank, World Trade Organization, International Monetary Fund and corporate-controlled commodity chain networks. However, he gives limited consideration to divisions in the non-core, and to agency of elites outside the core.

As for resistance to global environmental inequality, numerous studies highlight forms of resistance by peripheral states and civil society actors to the disadvantageous rules in global governance regimes on issues such as forests (Schroeder 2010; Ciplet 2014), biodiversity (Escobar 1998; Shiva 1996), waste (Okereke 2006), and climate change (Pettit 2004; Terry 2009; Roberts and Parks 2009; Ciplet 2014, 2015; Ciplet et al. 2015). However, few studies have explicitly linked these politics of resistance and the forms that they take in particular historical periods to conceptions of ecologically unequal exchange. What focus does exist in the literature has identified ecologically unequal exchange politics as hinging largely on an axis between North and South. Notably, Roberts and Parks (2006) argued at length that the roots of the G77 coalition unity in the UNFCCC politics lay across many issues far beyond the climate talks: in these nations' lack of access to meaningful participation in the global order, the deep inequity in their well-being compared to the wealthy nations, and their agenda for Third World solidarity. Several scholars have also identified the emergence of the concepts of "ecological debt" and "climate debt", informed by world systems analysis and conceptions of ecologically unequal exchange, as frames of resistance adopted by peripheral states and civil society groups in the negotiations since 2000 (Bond 2010; 2012; Klein 2010; Roberts and Parks 2007, 2009; Ciplet 2015; Pickering and Barry 2012; Botzen et al. 2008; Chatterton et al. 2013). This perspective argues that the global North should remunerate the global South for a debt as the result of disproportionate polluting of the global atmosphere and its unequal consequences.

We have also pointed to changing dynamics within the world system relevant to the UNFCCC process, most notably, the hegemonic competition between the U.S. and China and its implications for international cooperation on climate change (Roberts 2011; Ciplet et al. 2015). While discussing the increasingly prominent role of emerging powers such as China, India, Brazil and South Africa in the negotiations in Copenhagen and Cancun, Hurrell and Sengupta (2012:463) caution that it is important not to "underplay the continued relevance of understanding climate

change within the North-South frame." We agree. This frame is still a major axis in the negotiations. However, it is far from the only one now of relevance. While scholars have brought attention to the shifting power between wealthy states and rising economic and "emissions powers" in the semi-periphery, much less attention has been directed to what this and other developments mean to unity in the global South and to the reproduction of inequality in global environmental governance.

The Old World Climate Order

The Group of 77 and China (G77) is a bloc of developing nations now numbering over 134 countries. As Vihma (2010:4) put it, the G77 is "a product of the North/South divide and the political economy of the late 20th Century. It is broadly based on a 'self-definition of exclusion' from world affairs." That is, the vast global South, consisting of all of Latin America, Africa, and nearly all of Asia, felt that they had been left behind over decades of efforts at economic development and globalization (Najam 2005; Roberts and Parks 2006). Brought into the world economy through colonial conquest and continuing to be dependent on the production and export of minerals and agricultural products whose prices fluctuated wildly or tended to go downward, they saw themselves as trapped in structurally disadvantaged positions. These are the underlying forces that held the coalition together until Copenhagen in 2009, despite their diverging material interests.

At the beginning of the climate negotiations in the early 1990s, the G-77 was a largely reactive coalition because of its suspicion of the environmental negotiations as an agenda of the industrial countries. Poorer nations expressed that green concerns were a ruse to keep them poor, a conscious or unconscious effort by the wealthy nations to keep the poor nations from usurping their place atop the global hierarchy (Roberts and Parks 2007; Gupta 1997). The G-77 shared interests in pressuring the historically wealthy or developed countries (what are called "Annex 1" countries in the negotiations) to act according to their historical responsibility for having created the problem and their capabilities to address it (their wealth). Developing countries also advocated to maintain their own sovereignty from outside intervention (especially from limits on their ability to pursue national economic development), and for the provision by wealthy countries of adequate funds and the most modern technologies to help them deal with climate change.

Addressing climate change means reducing consumption of cheap fossil fuels and switching to what have historically been more expensive sources of renewable energy like wind and solar; it also can mean not clearing rain forests to create farmland to expand the national economy, and so on. For this reason, the G-77's initial approach to this new agenda was wait and see, learn and react, or resist and reject (Najam 2005). If they were to address climate change and other environmental concerns, they needed to be compensated for lost economic gains and helped with

new green technologies. When it came time to draft the UN Framework Convention on Climate Change (UNFCCC) before the 1992 Rio Earth Summit and later as part of the 1997 the Kyoto Protocol, the G-77 and China succeeded in their goal of avoiding responsibility for making emission reductions.

To be clear, the G-77, which incorporates the periphery and semi-periphery nations, has never been a homogenous bloc, or one without conflict (see Vihma et al. 2011). A key tension in the group from the start has been between the Alliance of Small Island States (AOSIS) and the Organization of the Petroleum Exporting Countries (OPEC). At the first meeting of the COP in Berlin in 1995, when a majority of G-77 countries supported binding reductions of emissions, OPEC advocated against them, even for the industrial countries (fearing they might be next). The G-77 took stands against any taxes on carbon, insisting instead that they should be compensated for lost business since measures to respond to climate change would severely affect their economies by slashing their ability to sell oil. The idea of compensation of oil producers for lost revenue is enshrined in Article 4.8 of the Convention, which included special consideration for economic vulnerability to climate change response measures.

As for AOSIS, since the beginning of the climate negotiation process in 1989, this negotiating bloc was very active in attempting to insert binding commitments for greenhouse gas emissions reduction under the newly established Intergovernmental Negotiating Committee. AOSIS was particularly active in demanding ambitious, science-driven, legally binding emissions reductions targets and compensation funding for climate impacts. The group was the first to propose a draft text during the Kyoto Protocol negotiations calling for cuts in carbon dioxide emissions of 20 percent from 1990 levels by 2005 (Earth Negotiations Bulletin 1995). The group demanded the establishment of an international insurance pool for climate victims; it took ten years just to get loss and damage on the agenda in Cancun in 2010 and another 3 years just to begin a work programme to research the issue.

The compulsion of AOSIS was obvious. The group's forty-four members are spread across the South Pacific, Indian Ocean, and the Caribbean, Africa, the Mediterranean, and the South China Sea. AOSIS's unity comes from the fact that more than nearly any other countries, their physical survival as states is at stake due to steadily accelerating sea-level rise from climate change. The first report of the Intergovernmental Panel on Climate Change (IPCC), published in 1990, indicated an ominous development: sea-level rise due to climate change would condemn many low-lying areas to be submerged. In this effort, AOSIS found a willing partner in the EU, which, being influenced by public opinion and strong social movements, also showed great interest in controlling greenhouse gases from the beginning. Yet small island developing countries continued to stand behind G-77 statements and positions in the negotiations, which were generally for slowing the progress of aggressive climate treaties. Even those nations with quibbles about this

position did so because their voice was so easily ignored when they spoke alone: if they could get some of their positions into G-77 statements, they had some chance of influencing a treaty.

Later in Bali in 2007, with the end of the first commitment period of the Kyoto Protocol in sight, the G-77 stood strong in negotiating a successor treaty that maintained a structurally divided view of the world. Most central, the Bali text cemented different expectations for the developed and developing countries—"a Bali firewall" that would be defended for years by many developing countries (Smith 2010; Ciplet et al. 2015). Nowhere did the Bali action plan describe whether or how countries might move from one group to another, either up or down. Nor was there clarity on how a scientifically adequate solution might be met, or clear rules for compensation for countries losing revenue from reducing their emissions sharply.

The New World Climate Order in Copenhagen

It wasn't until the pivotal negotiations in Copenhagen in 2009 that the G-77 would dramatically splinter. Perhaps most devastating to the unity of the G-77 was the formation of the coalition of Brazil, South Africa, India, and China, known as BASIC, in October 2009, just before the Copenhagen conference. At the time of their collaboration, these countries were highly diverse in their interests. Their economic base, energy infrastructure, and emission levels all varied greatly, as did the nature of their states and their approaches to making and meeting greenhouse gas emissions reduction goals. Nevertheless, the key moment at Copenhagen was when President Barack Obama of the United States joined with leaders of the BASIC coalition to draft their own climate deal, which completely set aside the existing negotiating texts. The draft mentioned the goal of keeping global mean temperatures under 2 degrees' Celsius rise, but avoided any binding emissions reduction targets to achieve that and any mention of the time when perilously rising emissions must peak (Ciplet et al. 2015).

Most crucially, the Copenhagen Accord that they drafted entirely shifted the approach taken by the global community in the face of climate change. The earlier Kyoto Protocol approach was top down, with binding national commitments based on levels of emissions and capabilities of countries (usually understood to be roughly their level of income per capita). The Copenhagen approach that the United States and BASIC put forward was entirely voluntary and bottom up, with nations pledging and reviewing their own choice on what emissions reductions they would undertake.

China and the United States, a rising and a declining hegemon that together emitted about 40 percent of all greenhouse gases on Earth, consciously avoided a time frame for a midterm emissions reduction target (Roberts 2011). The bold move at Copenhagen showed the ascendant power of the BASIC group and its ability to work directly with the United States and to cut their G-77 colleagues and the EU out of the decision making. The way the Copenhagen Accord was

cobbled together was unprecedented, for heads of state and governments rarely get directly engaged in, let alone lead, international climate change negotiations. The Accord was quickly brought to a hand-picked group of twenty-eight countries to rubber-stamp, with almost no time to review it thoughtfully and no opportunity to revise it (Ciplet et al. 2015). In this group of twenty-eight were nearly all the wealthy OECD countries and just one representative from each of the developing world regions: Africa, Latin America, AOSIS, and Asia.

The new voluntary nationally-determined approach in the Copenhagen Accord faced strong resistance from numerous leaders of peripheral states on both procedural and content grounds. The final all-night plenaries at Copenhagen were fiery, with a few feisty speeches by the countries willing to risk upsetting the global order and the ire of major aid and investment players, the United States and China. This accord and work by Mexico to formalize them in the 2010 Cancun Agreements paved the way for a bottom-up, voluntary approach to international mitigation that was adopted as part of the Lima Agreements in 2014 and the Paris Agreements in 2015, in which countries all brought their "Intended Nationally Determined Contributions" (pledges), or INDCs. During this period the G-77 coalition further fractured along several lines. A series of new coalitions also emerged within the global periphery, some with competing identities and interests.

Splintering South: Three Fissures in the G-77

Tensions between the Periphery and Semi-Periphery

Since Copenhagen, the terms of what constitutes the 'global South' has been under contention. One emergent tension within the G-77 has been between state coalitions such as the Least Developed Countries and the Alliance of Small Island States (AOSIS) on the one hand and rising industrial powers in BASIC on the other, especially about who should be required to commit to emissions reductions within the new Nationally Determined Contribution (NDC) framework solidified in Paris. The moral force of a peripheral nation's extreme vulnerability to climate change is now often pitted against the need for development in emerging economies. For example, at one of the key informal meetings in the 2011 Durban negotiations, in response to the Indian environment minister's statement arguing for their right to development for meeting basic needs, the delegate Karl Hood from Grenada, representing AOSIS, reportedly retorted, "While they develop, we die; and why should we accept this?" (Roberts 2011).

Indeed, it is no longer possible to solely or primarily blame the global North for rising emissions. Developing countries now outpace developed countries in current carbon emissions (Center for Global Development 2015). The clear majority of projected emissions growth in the next two decades is expected in developing, not developed countries (Energy Information Administration 2013). In 2007, China surpassed the United States as the largest current global polluter, but remained far behind in terms of its cumulative historical emissions (Vidal and Adam

2007). But this is changing too. China surpassed the United States around 2015 or 2016 in terms of cumulative emissions (Doyle 2015), and has already overtaken the European Union in emissions per capita (McGrath 2014).

In response to this new reality, there has also been a notable shift in messaging among the poorest countries, which are now beginning to call for a more sophisticated and historically relevant differentiation of responsibility between states, including those in the South. In 2015, prior to the Paris Negotiations, the Least Developed Countries negotiating group's official submission written by Nepal argued that the new framework should take "full account of current socio-economic realities" and be a single regime "applicable to all" (Nepal 2015:1). They argued that over the past 20 years the economic conditions in the world had considerably evolved, leading to changes between countries, including the current annexes of the Convention (Nepal 2015:4). Specifically, they called for "allowing some differentiation for developed countries, emerging economies, middle-income countries, the most vulnerable and the least developed countries based on agreed criteria" (Nepal 2015:1). While this may sound like a common-sense proposal, it is a stark departure from supporting proposals that maintain a rigid "North-South" divide that was enshrined in the Bali Firewall in 2007.

A new negotiating group called the Independent Association of Latin American and Caribbean Countries (AILAC), which officially launched itself in 2012 at the Doha negotiations, has also taken positions that challenge earlier G-77 convention (Ciplet et al. 2015). AILAC is notable in that it largely embraced the new voluntary "pledge and review" approach to emissions reductions, while several coalitions such as the LDCs and the AOSIS were still demanding a second commitment period of the Kyoto Protocol. The coalition, made up of Colombia, Costa Rica, Chile, Peru, Guatemala, and Panama, with the support of the Dominican Republic, viewed itself as being a bridge between conflicting North-South interests in the negotiations, and sought to encourage a more ambitious agreement by committing to action themselves. Specifically, the AILAC countries decided to stop waiting for emissions reductions or financial support from wealthy countries like the United States, and launch an ambitious case for low-carbon development at home and abroad. This decision was a major break from G-77 solidarity.

AILAC has downplayed the class-based identity of global South which is embraced by many peripheral states in the negotiations as structurally disadvantaged and deserving of compensation. They have instead focused on how developing countries can take responsibility themselves. For example, Peru made the first formal pledge for emission reductions by a Latin American country in 2015. As former Costa Rican advisor Monica Araya told El País, "[The negotiations are] always told as a battle of North versus South … but each time this explains less and less of what's happening" (Méndes 2013). She continued, "There is an alliance of countries that want all nations to take on binding obligations, and that the negotiations process is adapting to a changing world"

(Friedman 2013a). Isabel Cavelier, a former negotiator for Colombia said in 2012, "We think we can show the world that we are developing countries, we have a lot of problems at home, but we are ready to act. If we can show that we can take the lead, and we're not waiting for the rest of the world, then we can [set] an example" (Friedman 2013b). AILAC negotiators are quick to point out that its positions do not undermine the core positions of the G-77 on equity, but they emphasize a more flexible interpretation of countries having to act according to their historical responsibility for climate change (CBDR+RC), to encourage all countries to commit to reducing their emissions.

A further fracture within the G-77 between the peripheral and semi-peripheral states occurred when, three days before the end of the Paris negotiations, a "high-ambition coalition" emerged in Paris, comprised of 79 African, Caribbean, AILAC and Pacific countries, along with the European Union and later the United States and Brazil, but without the other major global South powers, including China and India. The coalition formed in secrecy prior to the negotiations, and called for a legally binding agreement, a long-term goal on global warming commensurate with science, a review mechanism to assess emissions commitments, a unified system for tracking countries progress on meeting their goals, and eventually, a more ambitious emissions target of 1.5 Celsius temperature change (Mathiesen and Harvey 2015). Several of these demands contradicted the expressed interests of China and India. A previous "high ambition" coalition that crossed the North-South divide had come together in Durban in 2011 between members of the LDCs, AOSIS and the EU, at that point, to achieve a second commitment period of the Kyoto Protocol.

Tensions within the Semi-Periphery

In addition to rifts between the periphery and semi-periphery within the G-77 coalition, there are also many relevant tensions within the semi-periphery itself. The rising industrialized states are a very diverse group in terms of their emissions, economic activities, regional relations, and energy possibilities. For example, Turkey has the second-highest energy consumption growth after China and is dependent upon Russian and Iranian oil and gas and has plans to double its coal power capacity in the next four years (Friedman 2015). Brazil, for its part, depends far more on hydroelectricity and biofuels to power its growth. This makes Brazil far more efficient than many other states in its economic class in terms of carbon emissions per unit of GNP. From a climate perspective, Brazil's main concern is to definitively control deforestation, which has been its largest source of its carbon dioxide emissions since the late 1980s. However, its commitment to lower its carbon emissions appears to be weakening (Edwards and Roberts 2015). Clearly, one should not assume that these two countries, or other rising or middle-income economies, will share the same positions in the post-Paris period, in which all are responsible for taking mitigation action, but have discretion on what forms their own commitments should take. Their distinct

characteristics and interests uniquely shape their positions in regards to structures of ecologically unequal exchange in the world system.

While much could be written about fragmented interests between numerous countries that occupy this middle position in the global class structure and division of labor, here we focus on two of the major players, China and India. While they are often grouped together, China and India are in very different situations, and have taken decidedly different approaches in the contemporary negotiations, including in the Paris talks.

China has been more willing than India to take mitigation action commensurate with the demands of AOSIS and the LDCs, including providing financial assistance. China in the 1990s and early 2000s was very different from China today. Economically, its 7 to 10 percent annual growth and state-led capitalist transition has rocketed the nation to the highest levels of economic power. By some measures, China has just surpassed the United States and is now the world's largest economy, it is the workshop of the world in manufacturing, and it already is the holder of the world's greatest currency reserves and of other nations' debt (Katz 2014; Schiavenza 2014). China has increasingly seen climate negotiations as an important area of foreign policy to show that it is capable of addressing global problems and as an avenue for asserting leadership among developing countries (Chayes and Kim 1998). For this reason, China from the beginning worked for a united "G-77 and China" strategy (Economy 1997), perceiving its own role as speaker for the group (Heggelund 2007).

China is heavily investing in renewable and nonrenewable energy resources and infrastructure development in Asia, Africa, and Latin America. Unlike countries in the West, it is reported to have declined to make its investments conditional based on government reform, which makes it popular among a wide group of states (Alessi 2012). China is also a contributor of climate-related finance to many developing countries, particularly in Africa and Latin America. It seems likely that China's involvement as an investor and donor is responsible for some of the recipient countries' supportive responses to Chinese positions and leadership in climate change negotiations (Edwards and Roberts 2015).

Importantly, in November 2014, China agreed to a joint announcement with the United States to mitigate climate change, representing an important political breakthrough and for China a move beyond simplified notions of a North-South divide in responsibility. It also showed China's self-identification alongside a superpower, not making joint announcements with its BASIC or other G-77 partners. China also made major commitments to development assistance and investment (Hart et al. 2015; Khor 2015).

Thus, China went into the pivotal Paris negotiations, attempting to assume a position of global leadership, rather than that of merely an antagonist to the process. The Paris negotiations could have gone off the rails in the final minutes as the United States objected to key wording in the final

document; China was reported to have stuck by the United States and not the G-77. But rather than fully distancing itself from its supposed peer group in the South, in Paris, China's President Xi Jinping, continued to attempt to align with the interests of the weaker countries in the G-77, to call on wealthy states to scale up their climate finance and provide stronger support to developing countries (Mauldin 2015).

However, China's mitigation actions may fall far short of being adequate, due to its enormous net footprint and relatively high per capita emissions, and its hesitance in abandoning its fossil fuel infrastructure. In addition, China's climate assistance may take the shape more of colonialism, as it gathers up land and resources in Africa and Latin America for biofuels, and uses its own companies to construct massive infrastructure projects. China's investments do not likely match a vision of compensation for damages based on ideas commensurate with "climate justice." Overall, while many commended China's action in the recent negotiations, others have been critical of the country's scale of ambition, the mechanisms of transparency in the country to achieve its stated goals, the scale of recent investments in fossil fuel infrastructure, and its underreporting of previous emissions.

As for India, in recent years, the country has come under increased risk of becoming diplomatically isolated due to the size of its economy and its emissions (now the world's third largest emitter) (Guardian 2014), despite its very low emissions per capita (ranked 147th among all countries in the world) (Guardian 2013).[4] In fact, India's per capita emissions are less than a third of China's. India walks a very interesting line in the climate negotiations. On the one hand, it has attempted to bolster itself as a major world leader with aspirations for a seat on the UN Security Council and a greater role in international financial institutions like the World Bank and the International Monetary Fund. On the other hand, it is a very poor country ranked 143rd in the Human Development Index, with 300 million people without access to electricity, that must appease national interests for meeting basic development needs, which many argue would be compromised by any limits on its emissions.

In the lead-up to the Paris negotiations, India often fought against being subject to limits on its growth and strongly advocated for "differentiation" in terms of responsibility for action. Coming into Paris, India put forward a more ambitious INDC than some expected.[5] However, unlike China, India had been unwilling to promise to peak its emissions in the future. India's pledge

[4] Ranking in per capita emission assessed using 2010 data.

[5] India pledged to reduce its emissions intensity per unit of GDP 33 percent to 25 percent from 2005 levels by 2030, to receive about 40 percent of its power from non-fossil sources by 2030, and to enhance afforestation. It also announced a target to develop 100 GW of solar power capacity by 2022, launched a solar power alliance to increase solar production in the developing world, and has implemented a per ton tax on coal that is a direct subsidy to renewables.

also came with a price tag of $2.5 trillion and a call to the international community to support its clean energy program and to help it to adapt to climate change between 2015 and 2030, in addition to seeking finance from the private sector (Sinha 2015). While its target for solar power is ambitious, it simultaneously set a target for coal production of 1.5 billion metric tons by 2020. Thus, India seems largely unwilling to commit to not developing its huge coal reserves, unless it is compensated for its behavior. In this sense, India may find itself in direct competition for climate finance resources with much smaller peripheral nations.

Additionally, unlike the LDCs and AOSIS, despite its high vulnerability to climate impacts, India has been reluctant to commit to a 1.5 degree C limit on temperature change, playing a part in a group called the Like-Minded Developing Countries, and it has largely resisted movements toward reporting and transparency. In the Paris negotiations, in addition to continuing to demand differentiation between actor-groups in the agreement, India (like China) came under fire for standing against a rigorous five-year review of INDCs, supported by countries in the periphery. While India will increasingly represent a major global economy, political force and net polluter, it is still comparable in many ways in terms of overall poverty, vulnerability, and emissions per capita to many LDCs. Still, it opposed several key positions of the LDC group.

A core practical concern is India's extreme vulnerability to climate change impacts, such as its dependence on glacier-fed water supplies from the Himalayas, its vast populations on semiarid lands with scarce irrigation, and its dense population in the coastal belt vulnerable to sea-level rise and intensifying monsoons. In monetary terms, the issue is clearly salient: the Indian government claims that 3 percent of its GDP is already being spent on adaptation to climate change impacts, and it will need $206 billion to cover related costs for the period of 2015-2030 (India 2015).

Overall, in the post-Paris period there is no longer a unifying position between the semi-peripheral states in the G-77 of maintaining the North-South divide enshrined in the Bali Agreements. In this context, the often competing and complex identities of China and India, along with those of other countries that occupy the middle of the global division of labor, may lead to increasing tensions within the G-77. This will likely take the form of an inability within the coalition to agree on ideas of equity, responsibility, differentiation, and accountability for climate action within the global order in the coming years.

Tensions within the Periphery

Finally, there are important emerging tensions that may serve as wedges to solidarity within the global periphery in the negotiations and which make the ecologically unequal exchange discourse more difficult to maintain. First, there are potential tensions among peripheral states in the post-Paris context in terms of the extent to which actors maintain radical class-based demands concerning differentiation and compensation, or rather, embrace more fluid, pragmatic or reformist

ideas in UN climate politics (see, for example, discussion of the AILAC coalition above). Although the eighty nations in AOSIS and the LDCs are highly vulnerable to climate change, the postures and positions of the individual countries often differ substantially across the groups. The particular states take varying stances on whether to challenge the positions of OPEC and BASIC, for example, often depending on the particular areas of conflict and who is chairing the groups. For example, the island states Tuvalu and the Maldives have gained attention for being far more ambitious and aggressive in their stances than have Saint Lucia or Samoa. Like the economically more powerful states in BASIC and OPEC, many LDC countries also pursue both bilateral and minilateral diplomacy with single countries or smaller groups to promote their individual and group interests (Khan 2013).

One issue where there has been some contention among peripheral states has been on their approach to the issue of loss and damage, which includes some form of help for those climate impacts that cannot be readily adapted to. Having been raised since the early 1990s by AOSIS, this issue first found great unity in the 2012 and 2013 Doha and Warsaw negotiations when peripheral states came together in coalitions (including the LDCs, AOSIS, the African Group, and the Central American Integration System, as well as the broader G-77), arguing for the establishment of a distinct loss and damage mechanism in the Convention. However, the specifics of this mechanism have been more controversial. While some actors, and particularly some states in AOSIS, have continually demanded that compensation and liability be a cornerstone of demands related to the loss and damage framework, other states have viewed this demand as either polarizing or unrealistic, and instead have focused on other less radical aspects of the program such as data management, research, and climate refugee legality. For example, as a concession to developed states such as the United States, the LDCs agreed to language in the Paris decision text for loss and damage that explicitly excluded compensation or liability of developing countries (Vanhala and Hestbaek 2016). However, countries like Tuvalu which are particularly threatened by rising seas and other catastrophic climate disasters are unlikely to give up the fight for compensation. This difference may serve as a wedge between peripheral states in terms differential exposure to loss and damage events, and differing positions on the issue in future negotiations.

Second, competition over scarce adaptation and other climate finance resources has been a wedge between peripheral states in recent years (Ciplet et al. 2013b), and may intensify. The figures are stark: over ninety countries and their people have contributed an almost negligible amount to the problem of climate change, but they are already being hit first and hardest by the impacts, and they face these disasters with the least capacity to adapt to the changes (Kasperson and Kasperson 2001; Intergovernmental Panel on Climate Change 2007, 2013; Roberts and Parks 2006). As Desmond Tutu put it in 2008, a system of "adaptation apartheid" is already developing in the form of increasing investments in protections against climate-related disasters in industrial

countries, while efforts in the most vulnerable countries have always been grossly underfunded (Tutu 2008).

The $30 billion in finance that wealthy states promised in Copenhagen for developing countries during the 2010-2012 period were not delivered as promised. In addition, there is limited evidence that a scale-up to the promised $100 billion a year by 2020 is taking place (Ciplet et al. 2015). There are many measures and much debate on both the supply and demand for adaptation aid (e.g. Adaptation Watch 2015; Ciplet et al. 2011; Oxfam America 2012), but the United Nations Environment Program (2014) estimates that by 2025 or 2030 an estimated $150 billion of funding is needed to support adaptation to climate change in developing countries but current amounts of truly new public funds are still probably below $10 billion a year (Oxfam International 2016).

If such support is not dramatically scaled up, with new and substantial commitments during the next rounds of negotiations, states that are disproportionately vulnerable to climatic instability are likely to become more vocal in their demands for compensation, including for climate impacts that cannot be readily adapted to, such as rising seas. Importantly, the periphery may witness intensified infighting over designations of vulnerability in order to access the scarce existing public funds (Ciplet et al. 2015). This infighting could extend to the broader G-77 as conditions worsen and funds remain scarce.

While this may undermine efforts at collective organizing by peripheral states to address ecologically unequal exchange and remuneration for climate debt, this fragmentation is not inevitable. Notably, a coalition called the Climate Vulnerable Forum emerged as part of a conference in the Maldives in 2009. The Climate Vulnerable Forum was a key actor in Paris working to ensure that the 1.5 degree temperature target was included in relevant agreements. It is possible that the Climate Vulnerable Forum can be a vehicle for vulnerable states to maintain strong collective demands across diverse negotiating blocs for climate finance demands.

Conclusion: Insights for Ecologically Unequal Exchange Theory

Existing conceptions of ecologically unequal exchange have provided very limited understanding of the distinct and nuanced political dynamics which shape how environmental inequality is governed globally. This has major implications for our understanding of the reproduction of inequality at a global scale, suggesting that the distribution of goods and bads in the global system are not merely the result of trade relations or military domination, but also interactions in the political realm of multilateral institutions. The case of the contemporary UNFCCC points to three main insights for a theory of ecologically unequal exchange governance and resistance.

First, the analysis suggest that ecologically unequal exchange theory must better consider the role of the semi-periphery in reproducing ecologically unequal governance forms. Existing scholarship has almost completely neglected the strategies employed by semi-peripheral states to

maintain or enhance their relative ecological privilege in global environmental governance. The implicit underlying assumption has long been that the North is solely to blame for governance structures that support ecologically unequal exchange. However, in contemporary UNFCCC politics, semi-peripheral states have played a pivotal role in undermining robust mitigation efforts—particularly measures that would place limits on their own development aspirations. They have accomplished this by first dominating the G-77 bloc's positions and then later building alliances outside of the G-77 coalition to shirk their own responsibility to mitigate their emissions. By transporting carbon pollutants across national borders and becoming top-ranked nations in inflicting climate instability on the poorest and most vulnerable countries, these semi-peripheral actors are in effect creating a new ecologically unequal exchange. They have buffered themselves against resistance to their continued emissions by supporting the demands of peripheral states on issues such as climate finance, loss and damage against the global North, and (reluctantly) a target of 1.5 degrees Celsius for maximum global average temperature change. A common characteristic of the BASIC group is that each nation is a regional power at risk of alienating many neighbors as it attempts to reach the world stage as a global leader (on Brazil, see Edwards and Roberts 2015). One could argue that their actions in the area of climate politics suggest that each is diminishingly concerned about alienating their regional neighbors and the rest of the G-77.

However, we have shown that due to the highly diverse economic and environmental positions among semi-peripheral states, ecologically unequal exchange theory should also be cognizant of the ways in which the semi-periphery, and its defined interests in regime politics, are not monolithic. To be sure, thus far, developing states as a group have committed through their climate plans to more emissions reductions during the 2020-2030 period than that of wealthy states, despite their significantly lower historical responsibility and ability to respond to the problem (Oxfam International 2015). But there are actors that are doing considerably more and less of their 'fair share' to address the problem, as well as those that will be more or less vulnerable to the immediate consequences of warming climate.

Second, increasing fragmentation of defined interests between peripheral and semi-peripheral states may produce distinct challenges for peripheral states to resist governance forms which intensify ecologically unequal exchange. In this case, the changing landscape of major emitters in the global South—including countries like China, India, Brazil, Mexico, Turkey and South Korea—has made it increasingly difficult for peripheral states to simply go along with the conventional wisdom that the North is solely or primarily responsible for taking action on climate change. We have discussed how in contemporary UNFCCC politics, peripheral state coalitions such as AOSIS, AILAC, and the LDCs have called for proposals that challenge a North-South binary for mitigation responsibility. At times, they have also formed alliances that cut across the North-South divide,

such as "the Axis of Ambition" coalitions they formed with the European Union in the negotiations in 2011 and 2015.

There is the distinct possibility that the main discursive underpinnings of demands for remuneration of the "climate debt" owed by the global North to the global South will have to be adapted to the changing emissions context. The post-Paris institutional conjuncture requires that all states take mitigation and adaptation action. This change opens new discursive opportunities to pressure not only wealthy states on the adequacy of their actions, but also major rising polluters in the global South. It seems likely that as the poorest and most vulnerable states will experience increasingly intense climate disasters which are not of their own making, including the disappearance of whole territories under rising seas, that demands for compensation for climate debt will extend to other major polluters in the South, particularly if these states are unable or unwilling to commit to ambitious mitigation action or to fulfill their pledges within their INDCs. These tensions will also be amplified if there are not robust measures of accountability and transparency to ensure that actions outlined in INDCs are being fulfilled in practice – an issue upon which there is no agreement within the G-77.

However, such efforts of resistance from the global periphery come with major risks. There are also compelling reasons for why, even in this changing ecological and political context, peripheral states may be unwilling to take a stand against their larger and more economically developed allies within the G-77. Most notably, peripheral states would likely find less leverage in the negotiations against wealthy states on key issues such as climate finance and loss and damage without the support of their more economically, politically, and militarily strong semi-peripheral allies in the G-77 coalition. The increasingly strong financial aid and investment ties between China and states throughout Africa and Latin America also make public betrayal of conventional South-South ideals of solidarity potentially costly and presents structural obstacles to resistance (Ciplet et al. 2015).

A more complex reality of the perpetrators of ecologically unequal exchange also has the potential to create further divisions among peripheral states, weakening their collective leverage for unified demands. Competition for scarce adaptation, mitigation, and loss and damage resources in a warming world may also lead to increased infighting among those most in need of support. India's own call for international support of $2.5 trillion for its INDC may further intensify tension between this rising semi-peripheral state, and between coalitions such as the Like-Minded Developing Countries and BASIC on the one hand, and the LDCs and AOSIS on the other. Such tensions may be offset by efforts for collective demands to address vulnerability, in groups such as the Climate Vulnerable Forum.

Given these challenges facing peripheral states, we pose a third challenge for ecologically unequal exchange theory going forward: it is important to analyze the ways in which unequal

ecological exchange as mobilized as a collective action frame diverges from or conforms with the real-world distribution of environmental goods and bads in the world system. Specifically, in this context, even in a highly-fragmented and increasingly multi-polar world system in which the biggest growth in climate pollution is in the global South, a simple North-South axis of political organization and identity may maintain utility and dominance for many global South state actors and coalitions. In the immediate term, peripheral states, given their structural and political weaknesses, may continue to make calculated decisions to play nice with their big friends in the South. This stance may be taken despite the risks that inadequate mitigation action by semi-peripheral countries poses to climate vulnerability in the periphery.

It may be in the nature of capitalism to accelerate fragmentation in the conditions of nations and to create unequal costs and benefits through broad systems of unequal exchange, both economic and ecological. But it seems that geopolitically, there will be times when nations choose to simplify their solidarity groups along North-South lines, and other times when they do not. This alignment may be the only one that functions to allow effective struggles for redistribution of economic benefits from those at the top of the global hierarchy. However, in the case of the unequal distribution of impacts of carbon pollution, such alignments may be highly contrary to the interests of those at the very bottom of the distribution, the most vulnerable.

In sum, we have argued that tensions within the G-77 coalition in the UN climate negotiations will largely influence the forms that struggles against ecological inequality in the world system take in the post-Paris period. These tensions point to the need for ecologically unequal exchange scholarship to move beyond primarily documenting the problem of unequal global material flows, to nuanced empirical exploration of the shifting political dimensions within the world system and specific governance contexts that shape opportunities for transformation. Such analysis that does take the real-world politics of resistance to ecologically unequal exchange seriously, and the politics of global climate justice in particular, should carefully consider the complex relationships and points of fragmentation within the strategic organization and identity of the global South.

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Moving toward Theory for the 21st Century:
The Centrality of Nonwestern Semiperipheries to World Ethnic/Racial Inequality

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Abstract

While there has been much attention to the economic, political, and transformative potential of the semiperiphery, scholars have failed to explore the ways in which this zone of the world-system causes, contributes to, and exacerbates world ethnic/racial inequality. By 2015, a majority of the world's population is concentrated in 41 nonwestern semiperipheries that generate 40 percent of the world Gross Domestic Product. For those reasons, this essay decenters analysis of global ethnic/racial inequality by bringing the nonwestern semiperiphery to the foreground. Part I examines the ascent of nonwestern semiperipheries over the last half century, calling into question the popular "global apartheid model" which posits "white supremacy" as the singular cause of global ethnic/racial inequality. In Part II, we conceptualize, and present empirical data to support, ten conjunctures between the nonwestern semiperipheries and world ethnic/racial inequality. Part III offers a "theoretical retrenchment" in which we call for new approaches that bring the nonwestern semiperiphery to the foreground of theory and research about global ethnic/racial inequality. We argue that future theory building must pay particular attention to the rise of the Asian semiperiphery where two-fifths of world population is concentrated. Drawing upon previous world-systems research, we aggregate and update lists of countries in the core, semiperiphery and periphery in 1960, 1980 and 2015.

Keywords: semiperiphery, transnational capitalist class, nonwestern state, ethnicity, race, global apartheid, global inequality

> We must stand on the ground of what I shall call the unexcluded middle. . . if we are to arrive at a meaningful understanding of reality (Immanuel Wallerstein 2004b: 77).

> Something is different from what has existed over the last five centuries. Peoples peripheralized by capitalist world expansion, who seemed for a long time to accept their fate, have over the past 50 years not been accepting it any longer and will accept it less and less in the future (Samir Amin 1996: 12).

Despite ongoing debate about definition and operationalization of the concept (Peschard 2005), the *semiperiphery* remains central to world-systems analysis and to globalization studies. Many scholars (e.g., Chase-Dunn 1989, Terlouw 2002, Peschard 2005, Worth and Moore 2009, Radice 2009, Becker 2013) argue that the semiperiphery has had broader interdisciplinary impact on scholarship than any other world-systems concept. From the vantage point of the world-systems perspective in which this concept was born, the semiperiphery is a "permanent feature of the world-system that can be clearly marked out from core and peripheral positions" (Arrighi 1985: 245). From the standpoint of scholars of globalization, there is clearly a middle tier of countries that is challenging the core in what they perceive to be new directions in the early 21st century (Worth and Moore 2009). Recently, much attention has been directed toward refining the concept. Since 2000, fourteen books that focus on the semiperiphery have been published in English, and 45 others list "semiperiphery" as a keyword. One European press has created a new book series to focus on "globalization and the semiperiphery." The term semiperiphery appears in at least twelve academic specialty handbooks outside the world-system perspective (e.g., international relations, political science, development, migration). Since 2000, journal articles about the semiperiphery have been published at four times the level at which the concept was explored in the 1980s, soon after the concept was introduced.[1] The accumulated body of literature would grow exponentially if we included the relevant literature generated by international development agencies and activist organizations and those academic books and articles that embrace the idea but employ different terms (e.g. BRICS, emerging economies).

Despite increasing scholarly interest, there is a glaring gap in the literature about the semiperiphery. While there has been much attention to the economic, political, and transformative potential of this zone of the world-system, scholars have failed to explore the ways in which

[1] Between 1980-1989, there were seven journal articles, compared to 27 since 2000. We acquired this information through searches of the SocINDEX and the Social Science Citation Index in our university library database.

semiperipheries cause, contribute to, and exacerbate world ethnic/racial inequality.[2] At the turn of the 21st century, nonwestern semiperipheries host three-fifths of world population (see Table 1) and most of the world's diverse array of ethnic groups.[3] As a consequence, the numbers of peoples impacted by ethnic/racial inequality, exploitation and conflict in these semiperipheries far exceeds the incidence of ethnic/racial discrimination in either the core or the periphery. Moreover, there is a higher incidence of ethnic conflict and public protest in semiperipheries than in either of the other two zones of the world-system (Chase-Dunn 1990, Alfatooni and Allen 1991, Olzak 1998, Dunaway 2003). Despite the attention that investment firms and publications (e.g., Forbes, Hurun Research Institute) pay to the increasing ethnic diversity of the world's richest capitalists, scholars have not examined the degree to which nonwesterners have joined the transnational capitalist class since 1995.

For those reasons, we seek to *decenter* analysis of global ethnic/racial inequality by bringing the nonwestern semiperiphery to the foreground. By 2015, a majority of the world's population is concentrated in 41 nonwestern semiperipheries (see Table 5) that generate more than 40 percent of the world Gross Domestic Product. Part I examines the ascent of nonwestern semiperipheries over the last half century, calling into question the popular "global apartheid model" which posits "white supremacy" as the cause of global ethnic/racial inequality. In Part II, we conceptualize—and present empirical data to support— ten conjunctures between the nonwestern semiperipheries and world ethnic/racial inequality. Part III offers a "theoretical retrenchment" in which we call for new approaches that bring the nonwestern semiperiphery to the foreground of theory and research about global ethnic/racial inequality. We argue that future theory building must pay particular attention to the rise of the Asian semiperiphery where two-fifths of world population is concentrated. Throughout the essay, we employ the shortened term ethnic/racial to mean "ethnic and/or racial." We list "ethnic" first to reflect the reality that ethnic groups far outnumber racial identities in the world's societies (Wimmer 2013, Morning 2010, see also Table 10).[4] Drawing upon previous world-systems research, we aggregate and update lists of countries in the core, semiperiphery and periphery in 1960, 1980 and 2015.

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[2] For instance, analyses of the BRICS have multiplied (e.g., Becker 2013, Lo and Hiscock 2014, Bond and Garcia 2015, Kiely 2015, Struenkel 2015). With the exception of limited attention to China, those studies ignore ethnic/racial exploitation and conflict.

[3] Contrary to the claims of Lee (2009), world-systems analysts have been placing a majority of the world's population in the semiperiphery since 1980 (see Table 1).

[4] We agree with Bonilla-Silva (1999: 900-902) that "racial and ethnic categories as social constructions are remarkably similar. . . . Yet even though constructs exhibit similarities, one is not necessarily warranted in regarding them as being the same. . . or, more significantly, in assuming that they produce the same social effects. . . . Race and ethnicity are different in that they are produced by different histories."

Table 1. Ascent of the Semiperipheries, 1960-2015

World-System Zone/Geographical Area	1960 Countries	1960 % World Pop.	1980 Countries	1980 % World Pop.	2015 Countries	2015 % World Pop
CORE		**9.32**		**12.14**		**10.73**
WESTERN SEMIPERIPHERY	Australia, Austria, Belgium, Denmark, Finland, France, Greece, Ireland, Italy, Netherlands, New Zealand, Norway, Portugal, Spain	5.89	Greece, Ireland, New Zealand, Portugal	0.05	Cyprus, Greece, Iceland, Liechtenstein, Luxembourg, Malta, Portugal	**0.30**
NONWESTERN SEMIPERIPHERY		**22.80**		**57.46**		**60.43**
Asia (East, South & Southeast)	Hong Kong, Indonesia, Japan, Malaysia, South Korea, Taiwan	8.23	China, India, Indonesia, Malaysia, Singapore, South Korea, Thailand	41.03	China, India, Indonesia, South Korea, Malaysia, Philippines, Thailand, China SAR: Taiwan	43.48
Socialist/Post-Socialist Eastern Europe	Hungary, USSR, Yugoslavia	7.26	Hungary, Romania, USSR	6.76	Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Kazakstan, Latvia, Lithuania, Poland, Romania, Russian Federation, Slovakia, Slovenia	3.25
Latin America	Argentina, Brazil, Chile, Panama, Venezuela	3.31	Argentina, Brazil, Chile, Colombia, Mexico, Panama, Venezuela	5.74	Argentina, Brazil, Chile, Costa Rica, Mexico, Panama, Uruguay, Venezuela	6.57
Middle East & North Africa	Egypt, Israel, Morocco, Turkey	2.13	Israel, Kuwait, Libya, Morocco, Qatar, Saudi Arabia, Turkey, United Arab Emirates	1.66	Algeria, Israel, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, Turkey, United Arab Emirates	3.47
Subsaharan Africa	Nigeria, South Africa	1.80	Nigeria, South Africa	2.20	Nigeria, South Africa	3.65
Caribbean	Jamaica, Trinidad & Tobago	0.07	Jamaica, Trinidad & Tobago	0.07	Bahamas	0.01
PERIPHERY		**61.99**		**30.35**		**28.54**

Sources and Notes: 1960 and 1980 country lists from Arrighi and Drangel (1986) and Mahutga and Smith (2011). For 1980, we added a few high income oil exporters to the semiperiphery. For 2015 sources and methods, see Table 5. We employ the United Nations (2015) geographical delineations of European subregions.

Part I. Ascent of the Nonwestern Semiperipheries

World-systems thinkers emphasize the trimodal structure of the capitalist world-system (Wallerstein 1974a, 1980b, 1989, 1990, Arrighi 1985, 1990, Chase-Dunn 1989, Martin 1990), arguing that the semiperiphery is distinguished by "important structural differences" that set it apart from core and periphery (Wallerstein 1979: 179).[5] A semiperipheral country "looks in two different directions" (Worth and Moore 2009). "In part they act as a peripheral zone for core countries and in part they act as a core country for some peripheral areas" (Wallerstein 1976: 463). Historically, there has been "a cyclical rhythm marked by the rise and fall of hegemonic powers" and the rise and fall of nation-states (as well as regions within states) across the tiers of the world-system (Wallerstein 2000: 253-63).[6] For that reason, Chase-Dunn and Hall (1997: 79) contend that semiperipheral areas are likely to generate new institutional forms that transform system structures and modes of accumulation. These changes often lead to the upward mobility of these same semiperipheral actors in the core/periphery hierarchy. We will see that the semiperiphery is fertile ground for social, organizational, and technical innovation and has an advantageous location for the establishment of new centers of power. That is why the structural position of the semiperiphery has such evolutionary significance.

With respect to 21st century semiperipheries, Chase-Dunn (2013:6) contends that "the emerging powers are increasingly banding together and promulgating policies that challenge the hegemony of the United States and the institutions that have been produced by the European and Asian core." For that reason, he insists, these "semiperipheral challengers are not just reproducing the existing global hierarchy."

The Emergence of Nonwestern Semiperipheries, 1960-2015

In the last decade of the Cold War, twenty-two (22) high income countries accounted for about 15 percent of the world's population, and those countries exhibited 53 times the GDP per capita (hereafter GDPpc) of 40 low income countries where 30 percent of the world's population was situated. However, the inequitable distribution of world economic resources was far more complicated than this rich/poor dualism makes it appear, as shown in three trends that we can derive from Table 2. First, 15 of the richest countries were western while seven were in the Third World. The second trend involves the economic status of European countries, for they did not all

[5] In his early work, Wallerstein (1979: 23) insisted that the political role of the semiperiphery is far more important than the economic. His contention was that the semiperiphery functioned to sustain political stability between core and periphery. In the early 21st century, industrialization of the semiperiphery, semiperipheral economic growth rates that exceed the core, and the "globalization agendas" of several semiperipheries challenge Wallerstein's early thinking.

[6] In the second half of the 20th century, several peripheries rose to semiperipheral status while Portugal and Spain slid downward from the core to become semiperipheries (Terlouw 2002). Significantly, Japan rose to the core.

rank among the most affluent. Indeed, sixteen European countries ranked as middle-income, far less affluent than seven Third World high income countries. The GDPpc of the high income European countries was three times greater than that of seven European middle income countries (United Kingdom, Ireland, Italy, New Zealand, Portugal, Spain, Greece). Furthermore, seven Third World high income countries exhibited a GDPpc that was 2.8 times greater than that of these European countries. Surprisingly, those Third World countries had a GDPpc that was 2.3 times greater than that of the United Kingdom. Nine Socialist East European countries had a GDPpc that was less than one-quarter of the GDPpc of the high income countries. Third, the world-economy was undergoing significant restructuring in 1980, so the Third World was not unified around a "world pole of poverty" (Kohler 1978). Instead, nearly half of world population fell into the racially/ethnically diverse middle-income stratum that included seven Western, nine East European Socialist, and 47 Third World countries. Between 1960 and 1980, several Third World countries rose from the poorest stratum to the middle level, but they achieved only 11 percent of the GDPpc of the high income countries.

It was from the stratum of Third World economies that new *semiperipheries* emerged. In the 1970s and 1980s, scholars within and outside the world-systems perspective pointed presciently to emergent economic divisions within the Third World (cf. Frobel, Heinrichs and Kreye 1977, Bornschier et al. 1978, Evans 1979, Evans and Timberlake 1980, Balassa 1981, Barrett and Whyte 1982, Foxley 1983, Deyo 1987). Three changing trends were noted. First, growth in the share of world trade in manufactured goods from the Third World occurred at the expense of the western and Socialist economies. Second, the Southeast Asian NICs (Hong Kong, Singapore, South Korea, Taiwan) played the predominant role in this Third World industrial expansion (McMichael 1982). Third, there was improvement in Third World GDPpc relative to the high income countries between 1960 and 1980 (Arrighi and Drangel 1986). As Table 2 shows, middle-income Third World countries exhibited an average GDPpc that was six times greater than that of the low income stratum. "Even excluding China, the global South's share of world manufacturing value added rose from 10.7 percent in 1975 to 17.0 percent in 1978, and its share of world manufactured exports grew even faster, rising from 7.5 percent in 1975 to 23.3 percent in 1998" (Arrighi 2007: 132). The greatest change occurred in parts of Asia, including the ascent of China and India (Palat 2009: 40). While the western core and Japan experienced deindustrialization, the long downturn of 1973-93, and a declining share of world exports, China and the Asian NICs (Taiwan, Hong Kong, Singapore, South Korea) rose from the periphery in the two decades before 1980 (Arrighi 2007: 132-38). Suggesting that Asia may be the future "principal region of capitalist accumulation," Samir Amin (1996: 11-12) contends that "it is highly probable that the positions of these Asian countries in the world-system will be reinforced"— even though "the development of China threatens all global equilibria."

Table 2. The Three Worlds of the Cold War: Ranking of Countries by Income Level and GDP Per Capita, 1980

Part A. High Income Countries Ranked by GDP Per Capita		
Country Descriptions	**GDP Per Capita**	**% World Population**
7 Third World Countries 4 Richest Countries of the world: 3 Middle East/North Africa (Kuwait, United Arab Emigrates, Qatar) & 1 Asian (Brunei) 1 Asian: Japan 2 Middle East/North Africa (Saudi Arabia, Libya)	33,907 42,554 26,774 20,998	2.9
15 Western Countries Switzerland, Finland, Sweden, Luxembourg, Austria, Denmark, United States, Germany, Norway, Canada, Belgium, Netherlands, France, Australia, Iceland	37,779	12.2
22 Countries	35,843	15.1
Part B. Middle Income Countries Ranked by GDP Per Capita		
Country Descriptions	**GDP Per Capita**	**% World Population**
7 Western Countries United Kingdom, Ireland, Italy, New Zealand, Greece, Portugal, Spain	12,225	15.3
9 Second World Socialist Eastern Europe USSR, Albania, Bulgaria, Czechoslovakia, Germany West, Hungary, Hungary, Poland, Romania, Yugoslavia	8,621	8.8
47 Third World Countries 11 Asian (including China, Singapore) 21 Latin America & Caribbean 12 Middle East & North Africa 2 Subsaharan Africa	3,912 4,001 3,987 3,889 2,994	25.1
63 Countries	7,346	49.2
Part C. Low Income Countries Ranked by GDP Per Capita		
Country Descriptions	**GDP Per Capita**	**% World Population**
40 Third World Countries 1 Caribbean 27 Subsaharan Africa 12 Asia ((including India)	676 624 547 748	30.4

Sources and Notes: Analysis of World Bank databases. For comparability over time, $US GDP per capita have been converted to 2015 values. For a more detailed country list, see Appendix B.

In 2015, fifty-three (53) countries that account for 16 percent of world population rank as high-income in 2015. Their GDPpc is 23 times greater than that of the 79 countries (nearly half of

world population) that the World Bank ranked as lower-middle or low income (see Appendix 1, Table 3A). While "command over economic resources" (Arrighi and Drangel 1986) is disproportionately concentrated in affluent societies, the world's richest countries are not all European. Instead, the high income countries now include 31 European countries (23 "western" and 8 former Socialist), 22 nonwestern countries, and 3 nonwestern autonomous zones.

Table 3. Ranking of Countries by Income Level and GDP Per Capita, 2015

Part A. High Income Countries Ranked by GDP Per Capita		
Country Descriptions	**GDP Per Capita**	**% World Population**
23 Western Countries: Western/Northern/Southern Europe, US, Canada, Australia, New Zealand	42,228	11.1
8 Post-Socialist Eastern European Countries (former "Second World")	26,300	2.1
22 Nonwestern Countries: & 3 Autonomous Zones	38,189	3.0
16 Countries: with GNI per capita above $30,000: 3 Asia (Japan, Singapore, South Korea); 5 Caribbean, 8 Middle East/North Africa	51,898	
3 Autonomous Zones with GNI per capita above $30,000 (Bermuda, China SARs–Hong Kong, Macau	74,356	
3 Countries: with GNI per capita of $12,475 to $29,999: 2 South America (Chile, Uruguay) and 1 Subsaharan Africa (Seychelles)	23,111	
53 Countries	39,987	16.2
Part B. Upper Middle Income Countries Ranked by GDP Per Capita		
Country Descriptions	**GDP Per Capita**	**% World Population**
38 Former Third World Countries: 11 South America, 6 Middle East/North Africa, 4 Asia, 8 Subsaharan Africa, 5 Caribbean, 4 Oceania [includes Brazil, China, South Africa]	9,376	
13 Post-Socialist Eastern European Countries [includes Russia]	6,314	
51 Countries	7,833	35.3
Part C. Lower Middle & Low Income Countries Ranked by GDP Per Capita		
51 Lower Middle Income Countries	1,988	39.8
7 Post-Socialist Eastern European Countries	2,151	
44 Former Third World Countries: 3 South America, 4 Middle East/North Africa, 14 Asia, 12 Subsaharan Africa, 4 Central America, 7 Oceania	1,827	
28 Low Income Countries 25 Subsaharan Africa, 2 Asia (Nepal, Afghanistan), 1 Caribbean (Haiti)	616	8.7

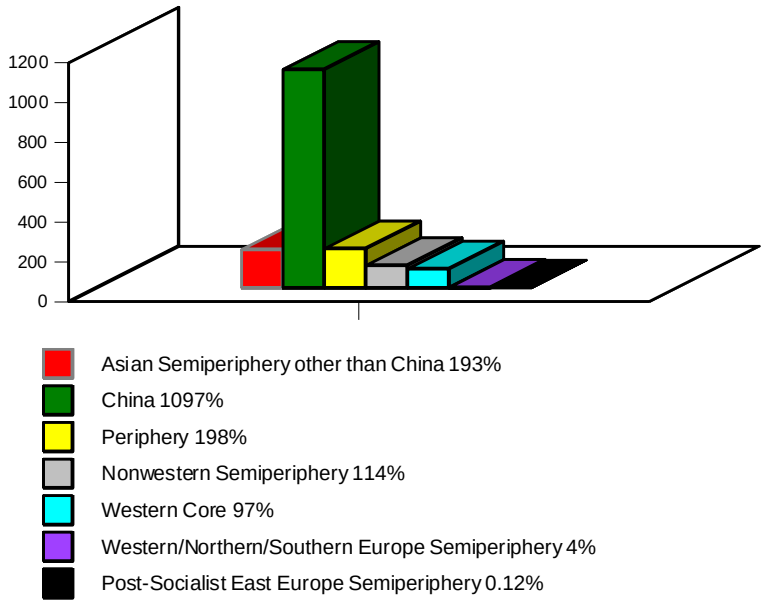
Sources: The list of countries by income group and GDP per capita rankings were acquired from World Bankdatabases. We employ the United Nations (2015) geographical delineations of European subregions.

Moreover, the richest countries are not western. Hong Kong, Macao, and Bermuda (autonomous territories of China and the United Kingdom) exhibit the highest GDPpc in the world, at 1.8 times that of the high income western countries and 1.4 times that of the United States. The GDPpc of sixteen countries of Asia, the Caribbean and the Middle East/North Africa is 1.2 times greater than that of the western countries and 95 percent of that of the United States.

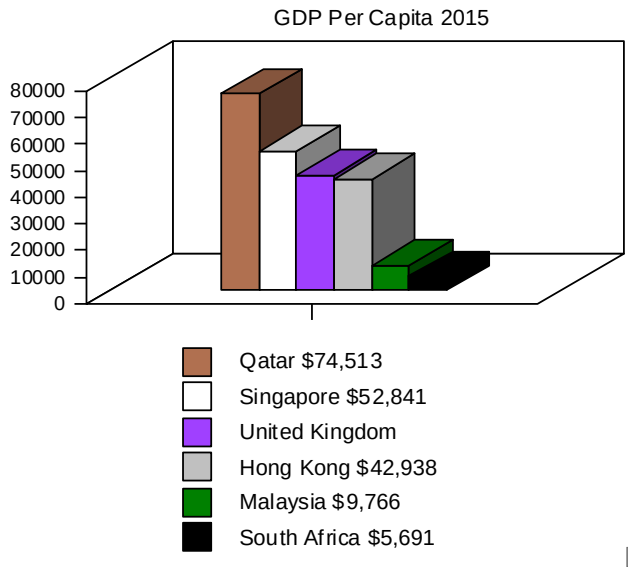
During the last decade of the Cold War, East European Socialist countries had a GDPpc that was less than one-quarter of that of the high income countries (see Appendix 1, Table 2A), so it was economically and politically more similar to middle-income "Third World" countries than to the "white West." By 2015, sixty (60) former Third World countries had surpassed the 21 Post-Socialist East European countries in GDPpc (seeTable 3, Appendix 1, Table 3A). While eight of these East European countries rose from their 1980 middle income status to join the high income countries in 2015, thirteen (including Russia) stagnated at their 1980 upper middle income ranks while seven declined to lower-middle income status, attaining a GDPpc that was only slightly better than 44 former Third World countries. As Figure 1 shows, post-Socialist Eastern Europe exhibited the lowest growth in GDPpc (0.1 percent) in the world. The growth rate for the periphery was 1,980 times higher, China nearly 11,000 time greater than the GDPpc attained by post-Socialist Europe.

Figure 1. Semiperipheral Challenges to the Core, 1980-2015

Part A: Percentage Growth in GDP Per Capita, 1980-2015



Part B. United Kingdom Compared to Seven Former Colonies that Are in the 21st Century Nonwestern Semiperiphery



Sources and Notes for Parts A and B: For 1980 country lists, see Table 1. Analysis of GDP per capita using World Bank databases. For comparability over time, GDP per capita $US have been converted to 2015 values. We employ the United Nations (2015) geographical delineations of European subregions.

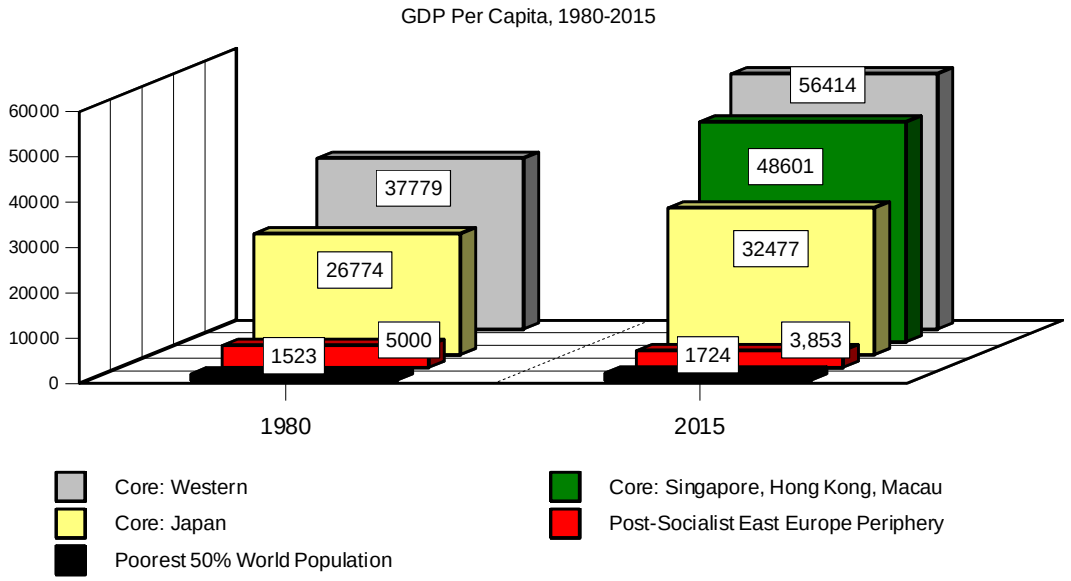
What, then, happened to the former "Third World" between 1980 and the early 21st century? In 2015, three-quarters of the world's people resided in middle-income countries, reflecting a shift of a majority of former Third World population away from the "world pole of poverty" (Kohler 1978). The ascent of China to upper-middle-income status and of India to lower-middle-income ranking accounts for a majority of the population that shifted out of the poorest stratum. While the GDPpc growth rates of the rich western countries stagnated or grew very little, these rates have expanded for many nonwestern countries. Between 1980 and 2015, the western core and European semiperipheries exhibited much lower GDPpc growth rates than nonwestern zones (see Figure 1). In world-systems terms, more of the share of the world wealth that once accumulated in the core and in the European semiperiphery is now being appropriated by nonwestern semiperipheries, as is evidenced by the growing number of nonwestern billionaires and corporations outside the richest white western countries (see Tables 6 and 7).

Since the size of the population in the lowest income countries shrunk from 62 percent in 1960 to less than 29 percent in 2015 (see Table 1), the World Bank argues that this is evidence that the low income countries are "catching up" (Burkett and Hart-Landsberg 2003). World-systems analysts disagree. According to Wallerstein (2003a: 72, 124), "the endless accumulation of capitalism meant the incessant widening of the real gap" over the history of the modern world-system. In the early 21st century, "the real gap between the bottom and the top is not merely

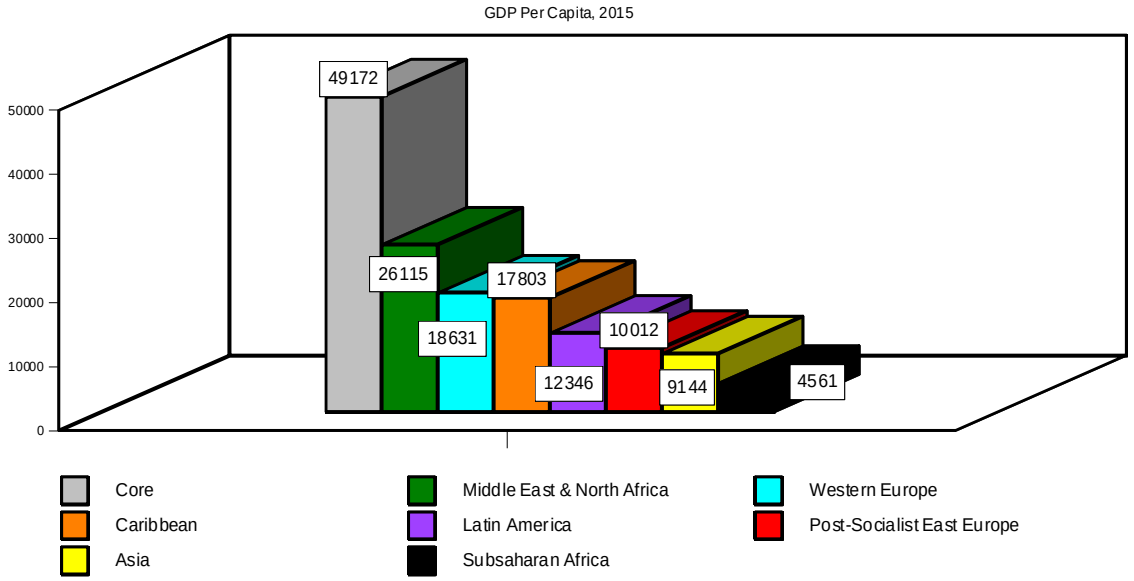
immense but growing." Figure 2 (Part A) shows that this economic gap expanded significantly between 1980 and 2015. By 2015, the western core GDP per capita was nearly 33 times greater than that of the poorest half of world population. Over this time period, GDPpc grew 97 percent in the core, but only 13 percent in the poorest tier of countries.

Figure 2. Inequality between Core, Semiperiphery and Periphery, 2015

Part A. The Widening Gap between Core & Countries at the Economic Bottom, 1980 to 2015



Part B. Inequality between Core and Semiperipheral Regions



Challenging the Global Apartheid Model

At the 1900 annual meeting of the Negro Academy, W. E. B du Bois (2015) identified "the world problem of the 20th century" to be a global color line dividing "advanced white nations" from "the undeveloped or half-developed nations of mankind who happen to be yellow, brown or black." Half a century later, pioneering British race scholar Anthony Richmond (1955: 11) echoed this theme. "The so-called 'colour problem' in the world today," he argued, "resolves itself into one fundamental question: How will the economically and politically dominant 700 million people who call themselves 'white' respond to the pressing demands. . . from the 1700 millions who are called 'coloured?" Polar binaries have routinely been coined to analyze the intersections of global capitalism and ethnic/racial inequality, including the West versus the Rest (Said 1994), the North/South divide (Therien 2010), European colonizer versus non-European colonized (e.g., Memmi 1965, Spivak 1988, Grosfoguel 2006), or centeredness versus alterity (e.g., Grillo 2007). Narrow *dualisms with color inferences* are commonly applied, such as "European modernity versus dark coloniality" (Mignolo 2011, Hall 1992).

To call attention to world inequality in the 1970s, Gernot Kohler (1978: 264-66, 1995) argued that the world-system is organized as *global apartheid*, a "structure of world society" in which "a minority of whites occupies the pole of affluence while a majority composed of other races occupies the pole of poverty." Since that time, these ideas have achieved the status of conventional wisdom through widespread usage among academics, textbook writers, activists, politicians and international development organizations.[7] Two world-systems foundational fathers have employed global apartheid (Amin 2004) or global color line (Wallerstein 2003a) arguments.[8] Indeed, many of our world-systems colleagues have told us that they were taught these notions in college and/or have taught them to their students. This worldwide division is posited as "the racial categorization of some people as 'white' and superior, while others are categorized as 'not white' and as eminently different and inferior'" (Vera and Feagin 2007: 1, 5). Grosfoguel (2008: 6-7, 9) conceptualizes this global divide as "the 'colonial' axis between Europeans/Euro-Americans and non-Europeans." Howard Winant (1997) describes global capitalism as a "modern world racial system" that is grounded in a "centuries old pattern of white supremacy" which both "denigrates the other and elevates whiteness." By relegating most of the world's population to inferior statuses, white westerners "appropriated racial difference in the service of inequality." Thus, he contends, "the global hierarchy of Europe and its others became a *racial fact*" (Winant 2001: 297-98).[9]

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[7] For a survey of the *global apartheid* and *global color line* literature, see Appendix A, available under "Supplementary Files."

[8] Wallerstein has used the notion of *global color line* throughout his writing career; see Wallerstein (1972, 1979: 179-81, 184-200, 1983: 79, 2011: 58) and Balibar and Wallerstein (1991: 80).

[9] Other race scholars who employ similar notions include da Silva (2007) and Emirbayer and Desmond (2015).

The global apartheid model predicts a *fixed racial axis for the world-economy* that is not supported by 1980 and 2015 economic statistics (see Tables 2, 2A and 3, 3A). There are three explanations for the conceptual failure of the global racial dualism. First, this thesis essentializes and reduces the world's diverse people into two lumps that conceal massive ethnic/racial complexity. Howard Winant (2001: 4) explains that

> From the standpoint of racial theory, the categorization. . . of Europe and its modern 'others' has decided limitations. In its fundamental bipolarity it neglects the highly divergent patterns of historical encounter among various peoples and indeed continents. . . . How inadequate these classifications seem in world-historical perspective!. . . . Indeed, there were many European identities as well as the myriad of "others." There were many localized racial systems too. . . . All these peoples, all these concepts, would ultimately be employed in the complex project of knitting together the modern world; all would be inescapably involved in fracturing world society.

In order to construct two homogeneous categories for analysis, scholars must ignore serious "anomalies" that do not fit neatly into their artificial color boundaries. When he posited the global apartheid thesis, Kohler (1978) arbitrarily colored Socialist East Europe, Japan and all the nonwestern high income countries "white," in order to equate "affluence" with "whiteness." At the origin of the global apartheid/color line models during the Cold War, Japan was reduced to "white" status, simply because it was politically aligned with "the West" (Kohler 1978). This extreme degree of race essentialism was a demeaning and insulting misrepresentation of the high-income Muslim countries that were politically *nonaligned* and of the Socialist Europeans who stood in opposition to "the West." In 2015, the ethnic and political divisions between the affluent nonwestern countries (see Table 3) and the western countries are even sharper. Because of these kinds of forced reductions, the global racial dualism is itself a racialized sociopolitical construct. When knowledge production "den[ies] all autonomy to those so named and imagined," David Goldberg (1994: 12, 32) warns, the affected people are denied "power, control, authority and domination" over the ideas that supposedly explain the inequalities they experience. In this way, externally-dominated "social science of the Other" determines "the limits of knowledge about the Other," for "the Other" is only known and understood in terms constructed by "the racialised social science."

The second error lies in making quantum leap generalizations from limited statistical data. The global apartheid model forces "racial colors" onto an argument about world wealth concentration and poverty. Despite its anti-racist rhetoric, the GDPpc data employed by the global

apartheid model (Kohler 1978, 1995) offer no basis for analyzing the *causes* of ethnic/racial inequality. The model seems to suggest that, if wealth were equitably distributed, ethnic/racial inequality would disappear. This is a spurious connection between two forms of inequality. Obviously, greater wealth accumulation has not been accompanied by an end to ethnic/racial oppression in the core, nor has ascent to semiperipheral status led to less ethnic/racial exploitation in nonwestern societies. For instance, the transition in South Africa from a white supremacist government to a Black African government has not led to a dismantling of exploitation and segregation of the nonwhite majority. Rather than whites, a Black elite now actively oppressing Black South Africans (Bond 2014b). Alongside the ascent of the semiperipheries, wealth/income inequality *within all countries* worsened to a greater degree than the gap between the core and the poorest half of the world's population (Palat 2009), expanding to a level in many countries— including the United States— that is equal to or greater than the global gap.

In 1980 when the global apartheid thesis was becoming popular with scholars and activists, there was no simple world dichotomy between "white affluence" and "colored poverty/stagnation" (see Table 2, 2A). Instead, the richest countries in the world were nonwestern, and Japan had risen to core status. If "the relative socio-economic standing of ethno-racial groups is determined by the will of the dominant white group" (Wimmer 2015: 2196), as global apartheid posits, why did "white supremacy" not operate to prevent "nonwhite" interlopers from accumulating wealth between 1980 and 2015 that this racial dualism reserves to "western" countries? (see Tables 2, 2A and 3, 3A). Clearly, "white" skin color did not ensure Socialist Europe a degree of control over world economic resources that was equivalent to the high income countries in 1980 or in 2015 (see Tables 2, 2A and 3, 3A), nor did "whiteness" guarantee that their GDPpc would grow to the same degree as "nonwhite" sectors of the world (see Figure 1). Why did "coloredness" not prevent seven Third World countries from achieving GDPpc that was 2.3 times greater than that of the United Kingdom in 1980? (see Table 2A).

If the global apartheid thesis were accurate, the historical trends presented in Table 4 would never have occurred. In both 1980 and 2015, all eighteen "white" western countries were outranked in GDPpc by countries that fell South of the global color line. In stark contrast to the racial polarization thesis, the World Bank ranked sixteen of the "white western" countries lower in 2015 than in 1980. These shifts in rankings are grounded in the differential economic growth rates of the white and nonwhite countries. While white countries stagnated or had minimal growth in GDPpc between 2000 and 2010, many nonwhite countries, even among the low-income countries, exceeded the growth rates of the white countries (see Figure 1). Between 1980 and 2015, Germany fell from 6th to 24th, the United Kingdom from 18th to 27th, and Italy from 20th to 35th. Ranked number five in 1980, the United States dropped to number fourteen in 2015, outranked by five countries that are supposed to be constrained by their "lack of whiteness." Indeed, the very

European countries that once colonized so much of the world are being challenged by some of their former colonies in ways that defy racial dualistic contentions. If the global apartheid thesis were correct, the United Kingdom should not have ranked 27th in 2015 while its former colony, Singapore, ranked 8th in GDPpc.

Table 4. Semiperipheral Challenges to the Western Core between 1980 and 2015

Western Core Country in 2000	Country Rank by GDP per capita in 1980	Country Rank by GDP per capita in 2015	No. Nonwestern Non-Core Countries Ranked Higher in 1980	No. Western Non- Core Countries Ranked Higher in 2015
Switzerland	2	7	2	3
Sweden	3	13	3	5
Denmark	4	12	3	5
United States	5	14	3	5
Germany	6	24	6	7
Norway	7	4	1	2
Canada	8	20	6	6
Belgium	9	25	6	7
Netherlands	10	18	5	6
France	11	31	9	7
Australia	12	11	3	5
Austria	15	21	6	6
Finland	17	23	6	6
United Kingdom	18	27	6	7
New Zealand	19	32	9	7
Italy	20	35	10	7
Ireland	21	22	6	5
Spain	23	36	10	7
Portugal	30	43	15	8

Sources: The list of core countries is derived from (Chase-Dunn, Kawano and Brewer (2000). 2015 Country rankings by GDP per capita were acquired by analyzing country data at World Bank databases, http://data.worldbank.org/indicator/NY.GDP.PCAP.CDGDP per capita rankings for countries are from World Bank (1981) and databases.

Exploitation and Inequality across the Trimodal Structure of the World-System

Table 5 allows us to examine worldwide inequality with greater complexity. We are quite aware that one could narrowly apply these statistics to support the global apartheid thesis. Indeed, the GDPpc of the western core is thirty (3) times greater than that of the periphery. In order to rank this dualism as the only fact of significance, however, one must close her/his eyes to the multiple layers of diversity and inequality across the trimodal structure of the world-system. The first indicator that leaps out is the ethnic/racial diversity that is characteristic of each major tier of the world-system. There is no worldwide dualism like the global apartheid thesis claims, for each tier includes countries that the global apartheid thesis labels "whites" and "nonwhites." Second, "whites" are not all aggregated around Kohler's (1978, 1995) "pole of affluence." In contrast to Winant's thesis about capitalism as the pursuit of "white supremacy," there is wide inequality between the Euroamerican core and "white" countries of semiperiphery and periphery.

The European semiperiphery—which includes Portugal, a former colonizing power—has a GDPpc that is only one-third of that of the western core and two-fifths of that of the Asian core. Second, the western core has a GDPpc that is 5.6 times greater than that of the Post-Socialist Eastern European semiperiphery. Now look again at Figure 2. Note that the periphery in 2015 includes thirteen Post-Socialist countries. The GDPpc of the "white" western core is nearly five times greater than that of this subregion which the global apartheid model reduces into its homogeneous group of "white" dominators. Look a little closer, and compare this subregion to the rest of the periphery. In comparison to the nonwestern peripheries, the Post-Socialist peripheries lost far more economic ground between 1980 and 2015. While the GDPpc of the poorest half of the world's population experienced a 13 percent increase in GDPpc, the Post-Socialist GDPpc declined 23 percent. There are also sharp gaps between these "white" European subregions and the Asian core. It is important to note that predominantly "white" countries have routinely populated the periphery over the history of the modern world-system.

Indeed, most of the countries of the core—including the current world hegemon—were once in the periphery, as were the countries of Eastern Europe (Braudel 1972, Wallerstein 1974a, 1980b). Table 5 also reveals multiple levels of inequality. Clearly, there are wide gaps between the western core (as well as the Asian core) and the semiperipheral regions—both "white" and "nonwhite" (see Table 5 and Figure 2). However, regional inequalities are now greater than the gaps between core and semiperipheral regions. Within these regions, inequality between the richest country and peripheries is greater than the inequality between the world core and semiperipheral regions (see Figure 3A). In Asia, for example, South Korea, the richest semiperiphery, has a GDPpc that is 18 times greater than India, the region's poorest semiperiphery, and 37 times greater than Nepal, the poorest periphery—economic divides that are far wider than the gap between the

Table 5. The Economic Divides across the Three Tiers of the Modern World-System, 2015

World-System Zone & Geographical Zone	Countries	GDP Per Capita $US
CORE		49,172
Western	Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Ireland, Italy, Monaco, Netherlands, New Zealand, Norway, Spain, Sweden, Switzerland, United Kingdom, United States	56,414
Asian Countries & Zones	Japan, Singapore, China SARs: Hong Kong, Macao	42,572
SEMIPERIPHERY, WESTERN/NORTHERN/SOUTHERN EUROPE	Cyprus, Greece, Iceland, Liechtenstein, Luxembourg, Malta, Portugal	18,631
SEMIPERIPHERY, NONWESTERN		10,506
Post-Socialist Eastern Europe	Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Kazakstan, Latvia, Lithuania, Poland, Romania, Russian Federation, Slovakia, Slovenia	10,012
Latin America	Argentina, Brazil, Chile, Costa Rica, Mexico, Panama, Uruguay, Venezuela	12,346
Asia (East, South & Southeast)	China, India, Indonesia, Korea, Rep. of, Malaysia, Philippines, Thailand, Chinese SAR: Taiwan	9,144
Middle East & North Africa	Algeria, Israel, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, Turkey, United Arab Emirates	26,115
Subsaharan Africa	Nigeria, South Africa	4,561
Caribbean	Bahamas	22,897
PERIPHERY		1,683
Subsaharan Africa	Angola, Benin, Botswana, Burkina Faso, Burundi, Cape Verde, Cameroon, Central African Republic, Chad, Comoros, Congo, Demo. Repub. of, Congo, Rep. of, Cote d'Ivoire, Djibouti, Equatorial Guinea, Eritrea, Ethiopia, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Kenya, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mauritius, Mozambique, Namibia, Niger, Rwanda, Sao Tome & Principe, Senegal, Seychelles, Sierra Leone, Somalia, South Sudan, Sudan, Swaziland, Tanzania, Togo, Uganda, Zambia, Zimbabwe	1,251
Asia (East, South & Southeast)	Afghanistan, Bangladesh, Bhutan, Cambodia, North Korea, Lao PDR, Mongolia, Myanmar, Nepal, Pakistan, Sri Lanka, Timor-Leste, Vietnam	1,691
Middle East/North Africa	Bahrain, Brunei, Egypt, Iran, Iraq, Jordan, Morocco, Libya, Syrian Arab Republic, Tunisia, Yemen	3,429
Post-Socialist Eastern Europe	Albania, Armenia, Azerbaijan, Belarus, Bosnia and Herzegovina, Georgia, Kyrgyz Republic, Macedonia, Moldova, Montenegro, Serbia, Tajikistan, Turkmenistan, Ukraine	3,853
Latin America	Belize, Bolivia, Colombia, Ecuador, El Salvador, Guatemala, Guyana, Honduras, Nicaragua, Paraguay, Peru, Suriname	3,681
Caribbean	Antigua & Barbuda, Barbados, Cuba, Dominica, Dominican Republic, Grenada, Haiti, St. Kitts & Nevis, St. Lucia, St. Vincent & the Grenadines, Trinidad & Tobago	6,369
Oceania	Kiribati, Marshall Islands, Micronesia, Palau, Papua New Guinea, Samoa, Solomon Islands, Tonga, Tuvalu, Vanuatu	3,025

Table 5 Sources and notes [10]

western core and the Asian semiperipheral region (see Figure 2, 2A and Table 5[10]). Tiny Nepal is exploited by neighboring semiperipheries for its raw materials, including rolled iron, tin, wool, cotton, leather and fur skins. It has a large trade imbalance with India, China and South Korea from which it imports petroleum, machinery and manufactured goods. The pattern or regional inequality is similar for all the other semiperipheral regions.

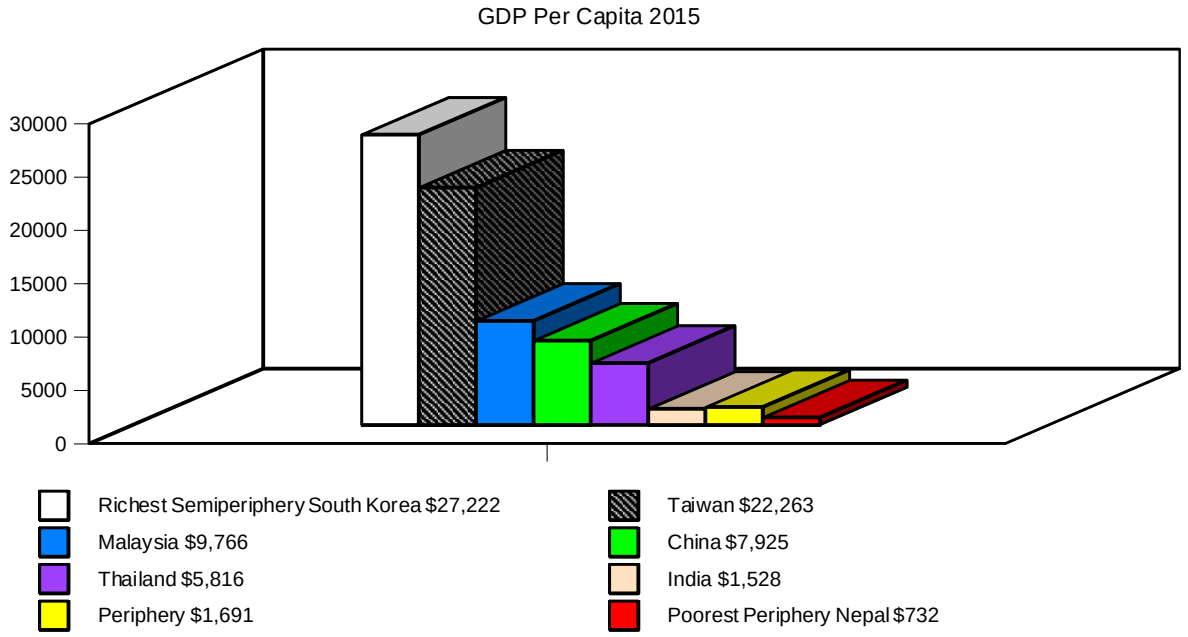
While we cannot hypothesize from these statistics about ethnic/racial *causation*, we can see a clear pattern that globalized "white supremacy" does not account for all these inequalities. From a world-systems perspective, there is multi-directional surplus drain and economic exploitation. Indeed, the periphery struggles against two massive levels of exploitation. While there is core appropriation of surplus from the whole world-economy, "the middle stratum is both *exploited* and *exploiter*," allowing "the new semiperipheral areas to enjoy a larger share of the world surplus." Thus, the economic gaps widen between core and periphery and between semiperiphery and periphery (see Table 5 and Figure 2). "Both the continued expansion of the core. . . and the new strength of the semiperiphery has led to a further weakening of the political and economic positions of the peripheral areas" (Wallerstein 1974b: 402, 407, 411).

One way to measure semiperipheral status is in terms of the "relative appropriation of the total surplus generated in the commodity chains that constitute the material basis of the capitalist world-economy. . . . At the global level, there is a division of labour between activities that generate high shares of the value-chain surplus. . . and those left with low shares" (Radice 2009: 29, 34). The wealth accumulated from commodity production and export does not accumulate solely in the core of the world-system, for the semiperiphery collects a share. The worldwide process of "expropriation of surplus value" is a structural relationship in which "the *middle tier* both participates in the exploitation of the *lower tier* and is exploited by the *upper tier"* (Geschwender

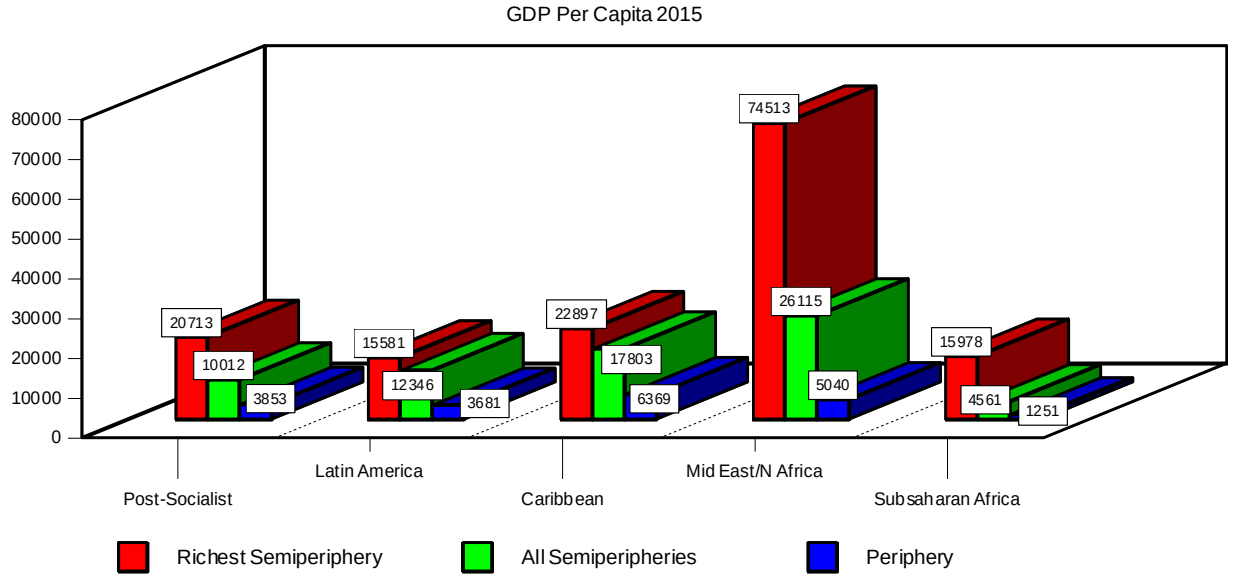
[10] **Table 5 Sources and Notes**: For 2015 country assignments, we started with existing lists of Mahutga and Smith (1985), Arrighi & Drangel (1986), Babones & Zhang (2008), Kentor (2008), Chase-Dunn, Kawano and Brewer (2000), and Mahutga (2014). We resolved discrepancies and omissions across those lists by conducting our own research into post-2000 World Bank and IMF databases, trade databases, as well as recent scholarly works about specific countries. Based on post-2000 data and research (especially world ranking of country GDP per capita, corporations, billionaires, and exports), we made a few changes to the previous lists. We also added countries that were omitted in previous lists. Over the last decade or so, Egypt, Iran, Iraq, and Morocco have declined from semiperipheral status while several other countries have ascended. We calculated GDP per capita by aggregating the Gross Domestic Product of countries in each geographical region, then dividing by the aggregated regional populations. We employ the United Nations (2015) geographical delineations of European subregions. We categorize *Israel* as "nonwestern" in a way that reflects the concerns of the citizens of this country. According to Israel's 2015 Census, more than 90 percent of its Jews identify themselves as originating from Russia, Eastern Europe, Asia and Africa; less than 5 percent are from Western/Northern/Southern Europe and the United States. In other words, Israeli Jews identify themselves as being "ethnically other" from Western/Northern/Southern European. Moreover, there is current opposition from Israeli and Palestinian intellectuals about the use of white/nonwhite labels to analyze their conflict. For the controversy over labeling Israel "white," see http://www.thecrimson.com/column/dining-on-sacred-cow/article/2012/11/16/Lispon-Israel-race/.

Figure 3. Inequality between Tiers of the World-System, 2015

Part A. Inequality within the Asian Subregion



Part B. Inequality within Nonwestern Regional Tiers of the World-System



Sources and Notes: For sources and country lists, see Table 5.

and Levine 1994: 80). Indeed, semiperipheries construct unequal exchanges with peripheral areas (and with weaker semiperipheries) which supply extractive and agricultural exports produced by very cheap labor (Marini 1972, Worth and Moore 2009: 122).

We are certainly not arguing that there is no ethnicization or racism structured into the dynamics of the world-system (cf. Wallerstein 2003a). What we are arguing is that there are multiple levels of ethnic/racial exploitation across the trimodal structure of the world-system, not just the unidirectional "white versus colored" inequality depicted by the global apartheid model. Moreover, analysis of GDPpc cannot reveal ethnic/racial *causes* of economic inequality; it simply demonstrates that. We must look elsewhere to formulate that knowledge. In the next section, we will examine the prominent role of the nonwestern semiperipheries in structuring ethnic/racial exploitation and inequality.

Part II. Centrality of the Nonwestern Semiperiphery to World Ethnic/Racial Inequality

At the end of the 20th century, the eighteenth annual Political Economy of the World-System conference focused on the worldwide economic restructuring that would require conceptual rethinking in the 21st century. Conference coordinators József Böröcz and David Smith observed that:

The unchallenged hegemony of the United States has given way to a multicentric world-economy in which both economic and geo-political leadership appear to be up for grabs. Meanwhile, a new international division of labor has emerged in the last two decades in which an increasing proportion of global manufacturing is done in the semiperiphery (Smith and Böröcz 1995: 1).

Scholars outside the world-system perspective now focus on "unprecedented characteristics" of semiperipheral economic growth and political challenges to the core (Worth and Moore 2009). While they emphasize the centrality of the semiperiphery in world hegemonic rivalry and in the struggle for world-systemic change, scholars have ignored the determinative roles that semiperipheries play in the structuring and maintenance of ethnic/racial inequality in the 21st century world-system. In that conceptual void, scholarship has not moved beyond the global racial dualism that pinpoints "whites" as the only perpetrators of ethnic/racial inequality. In the following sections, we will push beyond the Eurocentrism of the global apartheid thesis to delineate ten ways in which nonwestern semiperipheries will increasingly cause and/or exacerbate most of the world's ethnic/racial inequality in the 21st century.

Semipheripeeralization of the Transnational Capitalist Class

From its beginning, the modern world-system has been dominated by multi-ethnic capitalist classes that included compradors and managerial cadres drawn from every ethnic/racial group in all its exploited territories (Wallerstein 2000: 88-89). Despite western economic predominance in the early 21st century, there are now "multiple poles of intensive accumulation" outside the West, and transnational capitalists represent every ethnic/racial group in the world (Robinson 2014: 64). Despite that global shift, most analyses of the transnational capitalist class continue to focus on Western Europe and the United States.[11] On the one hand, a majority of those analyses examine core capitalists and their ties to other core capitalists (e.g., Sklair 2000, Carroll 2010, Pijl 2012), with minimal attention to the cadres of lower level capitalists and compradors who actually implement capitalist projects. On the other hand, previous publications do not examine racial and ethnic diversity in the transnational capitalist class.

When describing early 21st century multinational corporations, The Economist (2008) points out that "global business investment now flows increasingly from South to North and South to South, as emerging economies invest in the rich world and in less developed countries." Indeed, nonwestern firms now account for one-third of world FDI flows (The Economist 2011). Clearly, these nonwestern capitalists share the economic interests of core capitalists. Indeed, nonwestern capitalists "are as much committed to control and repression of the global working class [in all its ethnic/racial diversity] as are their Northern counterparts" (Robinson 2015: 18). Even though their interests are a function of the operations of the world-economy," transnational capitalists "seek to enhance their interests" by controlling or influencing their national governments. Thus, they "utilize state machineries to strengthen their position in the market vis-a-vis competitors and to protect them vis-a-vis the working classes." Moreover, states often grant them "monopoly privileges" (Wallerstein 1980a: 33-35). Compradors are those capitalists and state elites who do the frontline ethnic/racial exploitation within their own societies for their transnational class. One task of these cadres is to make production possible by draining both visible and hidden economic surpluses from ethnic communities (Clelland 2014). Through support from state elites, nonwestern capitalists super-exploit ethnic minorities in order to cement their positions in transnational capitalism (Clelland 2015).

[11] Our search for journal articles in two library databases identified 79 articles about the transnational capitalist class. Among those articles, 14 writers offered empirical case studies in nonwestern contexts. In addition, we reviewed the books of the four major theorists: William Robinson (e.g., 2003, 2014), Kees van der Pilj (e.g., 2012), William Carroll (e.g., 2010), and Leslie Sklair (e.g., 2000). The works of Pilj, Sklair and Carroll are primarily developed from the standpoint of the western core while Robinson's work offers more details about nonwestern contexts. It is striking that there has not been any analysis of Japanese capitalists (except Carroll's claims that they have not been integrated into the Atlantic transnational capitalist class).

Table 6. The World's Largest 2,000 Corporations, 2014 to 2016

Part A. Western Corporations

Region of the World-System	2014 No. Corporations	2014 % Total	2016 No. Corporations	2016 % Total	Increase or (Decline)
Core: United States, Western/Northern/Southern Europe, Canada, Australia	1,085	54.2	1,049	52.5	(36)
Semiperiphery: Western/Northern/Southern Europe	16	0.8	11	0.5	(5)
	1,101	55.0	1,060	53.0	(41)

Part B. Nonwestern Corporations

Region of the World-System	2014 No. Corporations	2014 % Total	2016 No. Corporations	2016 % Total	Increase or (Decline)
Core: Japan & Singapore	230	11.5	236	11.8	6
Semiperiphery	669	33.5	704	35.2	35
China	232	11.6	296	14.8	64
Asia other than China	222	11.1	209	10.4	(13)
Latin America	84	4.2	61	3.1	(24)
Middle East/North Africa	69	3.5	80	4.0	11
Post-Socialist Eastern Europe	44	2.2	40	2.0	(4)
Subsaharan Africa	18	0.9	18	0.9	0
Total	899	45.0	940	47.0	41

Part C. The World's Fifty Richest Corporations, 2016

Region of the World-System	No. Corporations	Total Revenue in $Billions	% Revenue of 50 Richest
Core: United States	21	3,624	41.3
Core: Western other than USA	11	1,822	20.7
Core: Japan & Singapore	3	478	5.5
Nonwestern Semiperiphery: China	11	1,934	22.1
Nonwestern Semiperiphery: South Korea	3	601	6.9
Nonwestern Semiperiphery: Saudi Arabia	1	311	3.5
Totals	50	8,770	100.0

Source: Analysis of Forbes (2014, 2016). We employ the United Nations (2015) geographical delineations of European subregions.

One indicator of the emerging role of semiperipheries is the change over time in the ethnic/racial composition of the transnational capitalist class. Between the 1950s and 1980, decline in American economic hegemony was evidenced by a sharp drop in the number of U.S. corporations that were ranked among the world's 500 largest transnational corporations. In 1956, U.S. corporations accounted for 84 percent of the Global 500 list. By 1980, more than half the list consisted of nonwestern corporations (Bergesen and Sahoo 1985: 597). By 1998, there were almost as many large transnational corporations in Japan and twelve nonwestern semiperipheries as there were in the United States (Bergesen and Sonnett 2001). Over the last two decades, the number of nonwestern semiperipheries with large corporations increased 150 percent, indicating that the ethnic diversity of corporate ownership is widening globally. Table 6 shows the growing semiperipheral presence in the world's transnational capitalist class in the early 21st century, as evidenced in the list of the largest 2,000 transnational corporations in the world. By 2016, nearly half the world's largest corporations were based outside the western core countries, 35 percent of them in semiperipheries. Over the last two years, 41 western corporations were displaced from the "Global 2000" by 41 nonwestern firms, most of them based in China. Furthermore, eighteen of the world's fifty richest corporations were based in nonwestern semiperipheries in 2016.

There is another empirical indicator of the growing ethnic/racial diversity of the world's transnational capitalist class. Since 2000, the number of wealthy billionaires has expanded faster in semiperipheries than in the core (Morison et al. 2013). The Hurun Research Institute identifies all the world's billionaires by country and pinpoints their wealth, industrial or business category, and corporate ties. Table 7 aggregates the 2016 "Hurun Global Rich List" by the world-system status and region of the world's countries, showing that 53 percent of the world's wealthiest capitalists are now nonwesterners. Indeed, there were slightly more billionaires in nonwestern semiperipheries than in the western core. For the first time, semiperipheral China (568) surpassed the United States (535) in number of billionaires. Brazil had more billionaires than France, Canada or Australia while South Korea and Turkey had more billionaires than Australia or Italy. Furthermore, 41 percent of world billionaire wealth is in the hands of nonwestern capitalists, the majority situated in semiperipheries. More than one-quarter of this wealth is concentrated in seven Asian semiperipheral countries. Nearly one-third of billionaire wealth is held by 113 capitalists who have accumulated more than $10 billion. While 75 of the world's most wealthy are in the western core, 38 reside in fifteen nonwestern semiperipheries. Among these double-digit billionaires, a nonwestern capitalist has accumulated 36 cents to every dollar held by a western capitalist (see Appendix D).

There are five empirical indicators that nonwestern semiperipheral capitalists are key actors in the globalized economic processes that are likely to lead to global ethnic/racial inequality. In 2015, the number of semiperipheral capitalists in *Forbes* list of the world's seventy "most

powerful" billionaires (defined as a combination of economic wealth and significant political influence) exceeded the number of U.S. capitalists who made that ranking. There were 31 nonwestern semiperipheral elites compared to 27 in the US, ten in Europe and four in Japan.[12] Oxfam (2016) reports that, in 2015, the accumulated wealth of the world's 62 richest billionaires was equal to the total income for the poorer 3.6 billion (49.9 percent) of the global population. What Oxfam did not report is that *eighteen (29 percent) of these wealthiest 62 transnational capitalists were citizens of nonwestern semiperipheries*.[13] Second, nonwestern semiperipheral capitalists are more transnationalized than western core capitalists. In 2015, Asian semiperipheral capitalists were 1.3 times more likely than western core capitalists to invest financially or to operate businesses *outside* their home countries. Similarly, Latin American, African and Middle Eastern capitalists were 1.2 times more likely than their western equivalents to invest or conduct business transnationally. Third, the concentration of world wealth into the hands of the wealthiest capitalists doubled between 2009 and 2015, and most of that growth occurred in nonwestern semiperipheries. Between 1996 and 2015, the numbers and assets of the wealthiest western core capitalists slowed, but Asian semiperipheries expanded their share of wealth concentration 8.8 percent annually. By 2015, 34 percent of the world's wealthiest capitalists are situated in Asian, Latin American, Middle Eastern and African semiperipheries.[14]

Fourth, semiperipheral transnational corporations "work with their states to set rules of the game in trade, investment, and finance. . . . At the heart of the process are the concepts monopoly power and state power" (Radice 2009: 34). Often with state support, these semiperipheral billionaires have accrued their economic and political power through super-exploitation of ethnic minorities. Within their own countries, these semiperipheral transnational capitalists have benefitted greatly from economic deregulation by states (Palat 2009), from state-sanctioned *accumulation by dispossession* (Harvey 2004) or from *accumulation through encroachment* (Patnaik 2005) into the territories of ethnic minorities within their own societies. Fifth, nonwestern corporations, billionaires, and state elites form the fractions of the transnational capitalist classes in their own countries. Because they service other transnational capitalists, they are complicit in creating and sustaining the inequalities of the world-system (Amin 2011). Since the prosperity of these elites is tied closely to exports to high-income markets, they have no motivation to challenge the current processes of the world-system that structure both their wealth accumulation and global ethnic/racial exploitation (Palat 2009).

[12] Analysis of Forbes (2015).

[13] Analysis of Hurun Research Institute (2015).

[14] Analysis of "World Wealth Report 2016," www.worldwealthreport.com.

Table 7. Wealth Concentration into the Hands of Billionaires, 2016

Part A. Western Billionaires

Sector of the World-System	No. Billionaires	$US Billions	% World Billionaire Wealth
Western Core (USA, Canada, Western/Northern/Southern Europe, Australia, New Zealand)	981	4,092.0	58.88
Western/Northern/Southern Europe Semiperiphery (Cyprus, Greece, Portugal)	6	10.7	0.15
Totals	987	4,102.7	59.03

Part B. Nonwestern Billionaires

Sector of the World-System	No. Billionaires	$US Billions	% World Billionaire Wealth
Asian Core: Japan & Singapore	72	168.9	2.43
Semiperiphery Asia (China, India, Indonesia, Malaysia, Philippines, South Korea, Thailand)	689	1,784.8	25.68
Semiperiphery Middle East & North Africa (Algeria, Israel, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, Turkey, United Arab Emirates)	90	165.1	2.38
Semiperiphery Post-Socialist Eastern Europe (Czech Republic, Kazakstan, Poland, Romania, Russia)	109	244.5	3.52
Semiperiphery Latin America (Argentina, Brazil, Chile, Mexico, Venezuela)	86	340.6	4.90
Semiperiphery Subsaharan Africa (Nigeria, South Africa)	11	34.3	0.49
Semiperiphery Caribbean (Bahamas)	2	3.6	0.05
Total Nonwestern Semiperiphery	987	2,572.9	37.02
Periphery Asia (Nepal, Vietnam)	3	1.6	0.02
Periphery Middle East & North Africa (Brunei, Egypt, Morocco)	14	44.1	0.63
Periphery Post-Socialist Eastern Europe (Geogia, Ukraine)	9	27.4	0.40
Periphery Latin America (Colombia, Peru)	11	20.1	0.29
Periphery Subsaharan Africa (Angola, Kenya, Swaziland, Tanzania, Uganda)	5	12.3	0.18
Total Nonwestern Periphery	42	105.5	1.52
Nonwestern Totals	1,101	2,847.3	41.0
World Totals	2,088	6,950.0	100.00

Source and Notes: Analysis of Hurun Institute (2016). The Chinese SARs (Hong Kong, Macao, Taiwan) are counted with China. We employ the United Nations (2015) geographical delineations of European subregions.

Semiperipheral Exploitation through Global Commodity Chains

We are convinced that the greatest degree of ethnic/racial inequality now lies within semiperipheral countries where there are extreme schisms of economic, political, and lifestyle inequality among the ethnic groups represented among the elites, the middle classes, and the poor. While scholars do not typically think this way, we have previously conceived global commodity chains to be *chains of exploitation*, grounded in stratified inequalities along racial, ethnic, class and gender lines (Clelland 2014, 2015; Dunaway 2012, 2014). In short, these are the significant mechanisms through which capitalists structure and maintain ethnic/racial inequalities around the world, and they consist of thousands of sites at which battles against inequality must be waged if we are to effect worldwide change. Within every semiperiphery, capitalists, their compradors, and the expanding middle classes benefit dramatically while ethnic/racial minorities are exploited to provide cheap ecological resources and low paid/unpaid labor while being excluded from the benefits (Harvey 2004, Clelland 2015). While global commodity chains provide privileges (e.g., cheap goods, health technology) to many households in all three tiers of the world-system, the greatest expansion of middle class consumption is occurring in nonwestern semiperipheries.[15] Within those semiperipheries, the more affluent lifestyle of urban elites and middles classes are sustained off the lands and labors of marginalized rural ethnic/racial groups and the cheap goods and services of minorities trapped in the urban informal sector.

Semiperipheral exploitation of ethno-territories. As we enter the 21st century, nonwestern semiperiperhies are engaging in contradictory nation-building and globalization agendas. In order to recruit FDI, build new development infrastructure and reorient their economies toward export, semiperipheries engage in practices toward ethnic minorities and communities that work against stable nation-states. Behaving like the western core, semiperipheries treat ethnic communities as "internal peripheries" in order to exploit their lands and natural resources (e.g., Sturgeon et al. 2006). The strategies of marginalization, oppression and exploitation employed by semiperipheral states stimulate resistance, ensuring the persistence of and greater solidarity within ethnic groups, generating more cross-ethnic coalition building, and drawing international attention to their human rights violations (Dunaway 2003). Several semiperipheries have exhibited higher growth rates than the core since the 1980s (Korzeniewicz and Moran 2009: 64-68; Appendix C), and they have sustained that growth through displacement of vulnerable ethnic communities (Harvey 2004) in order to grab lands for new capitalist enterprises or to extract ecological resources (Bryceson, Kay and Mooj 2000; Pearce 2012). Many U.S. scholars emphasize *racial exclusion* from opportunity structures (e.g., Goldberg 1994), but

[15] While the core middle class is contracting, semiperipheral middle classes are ballooning in size and wealth accumulation.

semiperipheries force *inclusion* of ethnic groups. In many nonwestern societies, much of the damage of ethnic policies is not in keeping minorities *out* but in forcing them *in* (through strategies such as land grabbing), even when they resist being incorporated into national development agendas as providers of natural resources. Of the 409 ethnic conflicts studied by the Heidelberg Institute for International Conflict Research (2016), nearly three-quarters were related to ethnic group control over lands. Struggles to secede from nation-states accounted for 108, another 87 were conflicts to gain local autonomy from state plans, and 98 were group actions to reclaim control over natural resources.

Two preferred development strategies of semiperipheries are state marketing of ecological resources (most lying within ethnic communities) and the creation of Special Economic Zones with tax incentives for foreign investors to redevelop ethnic territories (Worth and Moore 2009: 109). On the one hand, semiperipheries (e.g., China, Israel, Russia) often attempt to fractionalize ethnic communities by sponsoring settler enclaves within their territories (e.g., Falah 2005; Human Rights Watch 2007). On the other hand, forced displacements have been concentrated in the world's semiperipheries since 2000, as states have reallocated the lands of ethnic minorities for export production or public infrastructure.[16] Between 2010 and 2015, most of the ethnic conflict in semiperipheries centered around encroachments on and ecological degradation of ethnic lands and communities (e.g., Obi 2010).[17] In China alone, two-thirds of the 205,000 public protests in 2014 were centered around resistance against displacement from ethnic lands (Gobel and Ong 2015).

Semiperipheral exploitation of minority laborers. The "new international division of labor" that resulted from the transfer of core manufacturing to the semiperiphery was an historical shift in the structure of the world-system (Robinson 2004). According to Gerard Strange (2015: 48-49), the 21st century semiperiphery is most accurately defined by "the emergence of a significant and growing manufacturing capacity aimed primarily at export" in contexts in which there is a "massive reserve army and highly authoritarian labour regimes in which free labour organisation is not tolerated." While the majority of the world working class now lies within the semiperiphery, the emergence and expansion of the industrialized export-oriented semiperiphery has been accompanied by the *semi*-proletarianization of ethnic/racial communities.[18] Semiperipheries have achieved their economic development through national agendas that target and exploit their own ethnic/racial minorities (e.g., Boele, Fabig and Wheeler 2001) and those

[16] Analysis of UNHCR (2012, map, p. 2), UNHCR (2013: Table 1), the Minorities at Risk Project database, and Walker (2013).

[17] Analysis of UNHCR (2012, map, p. 2), UNHCR (2013: Table 1), and and Walker (2013).

[18] For a fuller explication of the concept of semiproletarianization, see Dunaway (2012).

within peripheries (e.g., Yates 2012). However, most of those workers have been marginalized from *waged* labor. Despite the industrialization of the semiperipheries, there are still far fewer workers in factories than in the unstable, informal sector and/or embedded in precarious subcontracting arrangements (Charmes 2012, Dunaway 2014). Bonded labor and labor trafficking are not uncommon in the semiperiperhies (Charmes 2012, Kara 2012), and women, especially minority and indigenous females, are concentrated in the most precarious, lowest-paying jobs (Dunaway 2014).

Moreover, most semiperipheries still have large rural populations that face higher rates of unemployment and poverty (Bryceson, Kay and Mooj 2000). Semiperipheral agriculture and industrialization are grounded in intense exploitation of rural ethnic minorities and urban transnational migrants through segmented labor markets that structure differential access to job opportunities and inequitable wage scales or subcontracting fees (e.g., Dedeoglu 2014). Much like the western core, semiperipheral states construct legal definitions of ethnic minorities in order to target them for marginalization and exploitation by both domestic and foreign-controlled industries and extractive development agendas (e.g., Li 2010). Worldwide, "people's livelihoods have become more volatile and precarious," (Krishna 2009: 67), but the risk of impoverishment has increased most in semiperipheries with large concentrations of ethnic minorities in rural communities (Bryceson, Kay and Mooj 2000).

Hidden exploitation of ethnic households. To maximize profits and remain globally competitive, semiperipheral capitalists must exploit as many "costless" social and natural conditions as possible. These *externalized costs* are unseen and unpaid bills that are embedded in every commodity chain. Through their domestic development projects and their FDI in other countries, semiperipheries intervene in ethnic communities and households in ways that minimize production costs by allowing extensive use of conditions external to the production process (Dunaway 2012, Clelland 2014, 2015). Thus, capitalists shift to those groups, their ecosystems, their cultures, and their human laborers most of the real costs of commodity production, such as community and cultural displacement, land grabbing, ecological degradation, threats to livelihoods and health, debt bondage, and extreme forms of labor exploitation, (e.g., Kara 2012, Ferolin 2014). In many contexts, local ethnic groups are dispossessed and excluded from participation in economic development while distant communities and elites accrue the bulk of wealth accumulation (Harvey 2004). We are convinced that it is not possible to battle ethnic/racial inequality by attacking only the oppression that is highly visible, the level at which most theories are constructed and most analyses are conducted. For affected ethnic communities, the externalized, hidden costs are likely to be more significant in perpetuating inequality than the indicators that lie on the visible surface. Indeed, these hidden costs impact these groups well into

the future (a) by removing the ecological resources and wealth surpluses that are needed to sustain healthy communities, and (b) by laying the bases for cross-generational impoverishment.

Transnationalized Semiperipheral States and Ethnic/Racial Conflict

Over the last three decades, scholars have called for "bringing in the agency of the state" in analyses of nonwestern countries (Evans, Rueschemeyer and Skocpol 1985, Bayart 1993) and for moving beyond the tendency of western academics, activists and international development agencies to paint nonwestern states as powerless victims (Brown and Harman 2013, Corkin 2013, Mohan and Lampert 2013, Gadzala 2015). With few exceptions (e.g., Martin 1990), however, those analyses ignore the roles of those states in generating and complicating ethnic/racial inequalities. With respect to the semiperiphery, this oversight is glaring for two reasons. First, analysis of ethnic groups in every country of the world between 1946 and 2010 demonstrates that there is "an unequivocal relationship between the degree of access to state power and the likelihood of armed rebellion" (Cederman, Wimmer and Min 2010: 114).[19] Second, semiperipheral states play more prominent roles in development than do states in the core or periphery (Worth and Moore 2009: 122). For that reason, semiperipheral states are more highly *transnationalized* than either core or peripheral states:

> As transnational capitalists operate in numerous countries they turn to local (national) states of the countries in which they operate. Just as in previous epochs, they require that these local (national) states provide the conditions for accumulation within their respective territories, including disciplining labor. Reciprocally, local managers of the national capitalist state are compelled, just as they were in the past, by the structural power of the capitalist system. The legitimacy of these states and the reproduction of the status of state elites as privileged strata depend on their ability to attract and retain now-globalized accumulation to the territories over which they exercise political authority. Competition among national states to attract transnationally mobile capital becomes functional to global capital and to its ability to exercise a structural power over the direct power of states (Robinson 2014: 8).

Accumulated research points to four conjunctures between transnationalized semiperipheral states and ethnic/racial inequality. First, semiperipheral states that are dependent on FDI are most likely to be authoritarian and to engage in political exclusion of ethnic minorities (Timberlake and

[19] See the Ethnic Power Relations data set, www.epr.ucla.edu/.

Williams 1984). Second, new development agendas in semiperipheries trigger fierce competition over control of the state between urban middle classes and disenfranchised rural minorities (Chase-Dunn 1989: 124-25). "Excluded groups across all income levels are three times more likely to initiate conflict against the state as compared with included groups that enjoy representation at the center" (Cederman, Wimmer and Min 2010: 106). Third, semiperipheral states (and their auxiliary elites) engineer and manipulate much of the ethnic/racial oppression within their own societies, and they engage in conflicts with adjacent countries. Finally, many— if not most— of the actors who codify and structure marginalization of ethnic/racial minorities are now semiperipheral states that employ military force to exploit and dispossess ethnic minorities.[20]

We cannot understand global ethnic/racial inequality if we fail to examine the contradictions between semiperipheral *nationalism* and ethnic/racial diversity. Like all national governments, every semiperipheral state is constructed as a "fictive ethnicity" grounded in "a historical system of complementary exclusions and dominations" (Balibar and Wallerstein 1991: 37, 49, 62). An uneasy homogeneity is constructed through the equation of the dominant ethnic identity with the core of the nation and the location of subordinated ethnic identities at its peripheries (Hall 2001). Struggles for national identity and control are negotiated by the state through domination over ethnicized subjects. Amin (1982: 176-77) describes the conflict between ethnic fragmentation and nation-building as a "national movement without a nation." Indeed, nation-building and its development nationalism trigger *ethnogenesis* in opposition to dominant state elites (McNeill 1986). Consequently, states structure within their bounds "territorialized ethnic communities" that are likely to be continually in conflict with nationalism (Alonso 1994: 395).

Though required for hegemony over a population, "national interests" and ethnic/racial dominance are never fully paramount (Lawson 1990). Juxtaposed against the possibility of the hegemonic and homogeneous nation are "recurring revivals" of ethnic identity and struggles over territory (Gurr 1994, Chee-beng 1997). Moreover, indigenous groups often struggle for autonomy from states that seek to dispossess them in order to exploit their lands and natural resources for capitalist development agendas (Hall and Fenelon 2009). Indeed, the "cannibalizing dialectic" between tendencies toward national hegemony and ethnic heterogeneity forms the dilemma of the semiperipheral state (Appadurrai 1990: 2).[21]

The Minorities at Risk Project identifies 283 groups that face threats of ethnic conflict. A majority of these peoples are at risk from their own states, and most of these groups fall within

[20] Analysis of Minority Rights Group International (2016)

[21] For a more extensive discussion of the conflicts between nation-building and ethnic diversity, see Dunaway (2003) and Jalata (2004).

semiperipheries or the semiperipheralized areas of peripheries.[22] Nonwestern semiperipheries now engage in transnational development projects, investments, loans, extractive exploitation, and land grabbing (Martin 2008, Bond 2012, Misoczky and Imasato 2014). Subordination and domination are quite often legally constructed to separate those who advocate national agendas of "civilization," "progress" and "development" from those who are stigmatized as "backward" and "lacking in modernity." Moreover, states codify definitions of ethnic groups and territories, and they generate a "mythical nationalism" to justify oppression and exploitation of those minorities (Abdel-Malek 1982: vol. 1). More often than not, there is an economic basis for this political and cultural oppression. In many countries, dominant elites treat ethnic communities as external peripheries or colonies in order to incorporate into global value chains their ecological resources and cheap labor (Bryceson, Kay and Mooj 2000, Pearce 2000; Clelland 2014). Semiperipheries are often criticized for exhibiting neo-colonialism (Bond 2012) and for replicating the worst patterns of past European exploitation of nonwestern ethnic groups (Wallerstein 2015: 272).

In 2015, every nonwestern semiperipheral state displaced ethnic populations from lands and communities to implement FDI-driven development or infrastructure projects (for examples, see Table 8). Most of these states routinely targeted ethnic communities for displacement and redevelopment, including evictions for the creation of Special Economic Zones to attract foreign enterprises. While extractive industries and infrastructure projects (especially dams and railroads) displaced more ethnic communities than any other development agenda, Asian and Latin American states removed thousands of ethnic peasants to make way for large FDI-backed plantations or ranches. Furthermore, every nonwestern semiperipheral state has laws or public policies that legitimate discriminatory practices toward ethnic minorities (for examples, see Appendix, Table 8A). Most semiperipheral states implement policies to constrain transnational and internal migration, often using inflammatory public propaganda, military police roundups and tight border policing. For example, China pressured ethnic minorities to assimilate into the rural-to-urban labor migration to its industrial centers, and the state took action to forcibly repatriate minority group members who migrated outside the country. Most significantly, two-thirds of these states engaged in ongoing armed conflict with ethnic communities that protested publicly for autonomous control of their lands that were threatened by state-backed redevelopment. As Table 8A (Appendix) shows, with few exceptions, these states criminalized ethnic activists, and military or police killings of resistance movement leaders occurred in about half these states.

[22] Analysis of Minorities at Risk Project database. The Minorities at Risk Project defines "ethnic conflict" as (a) groups that are politically and/or collectively resisting state policies, (b) groups at risk of or that have been victimized by serious state repression, (d) groups that engage in activism to be autonomous from states, and (d) violent or nonviolent collective conflict between groups, and (d) groups that engage in separatist movements.

Table 8. State Actions against Ethnic Minorities in Selected Semiperipheries, 2015

Semiperiphery	State's reaction to ethnic protest for autonomous communities	Targeting Mechanisms Employed by States or State Elites
Brazil	ignored by Executive Branch & Congress	threats to indigenous lands & communities from state-supported large ranch projects, extractive industries, & infrastructure projects; criminalization of indigenous leaders; extremely inadequate public services & roads
China	ongoing armed conflict	land displacement & destruction of ethnic communities through development projects; imprisonment of ethnic activists; religious repression; pressures on ethnic groups to assimilate into labor migration for industrial centers; threats to ethnic languages; loss of grazing lands to state-led urbanization; replacement of traditional housing & villages with state facilities
India	ongoing armed conflict	extensive land displacement for development projects & extractive industries; destruction of ethnic communities, farms & fisheries
Indonesia	contained armed conflict	religious persecution; killing of ethnic & human rights activists; restrictions on freedom of speech & assembly; forcible conversion of minority children to Islam; forced labor migration to less populous areas of the country; land grabbing for palm oil plantations & extractive industries (timber, minerals, oil); forced evictions from indigenous communities
Russian Federation	ongoing armed conflict	state restrictions on freedom of religion & speech; marginalization of indigenous peoples; imprisonment of minority activists; land displacement for resource extraction; infrastructure construction on religious sites
South Africa	failure to legally protect & reinstate lands to indigenous groups	targeting & deportation of African transnational migrants; deportation of 2,000 refugees; infringements on land rights of indigenous groups; land displacement for development projects & infrastructure; Muslim marriages not legally protected; uncertain land rights of Muslim women
Thailand	ongoing armed conflict	Thai language requirements in schools; pressures for adoption of state religion (Buddhism); state violence toward Muslims, including torture, harassment & killings by soldiers; land displacement for palm oil plantations; destruction of ethnic communities, farms, housing & livelihoods; imprisonment of minority activists; state camps traffic Burmese Muslims to other countries
Turkey	ongoing armed conflict	ethnic communities targeted for redevelopment; forced displacement of ethnic shops; evictions & resettlement for dam construction; minority exclusion from public services; raids on settlements; imprisonment of minority activists; segmented labor market with lower wages for minorities

Source: Analysis of Minority Rights Group International (2016).

Large-scale involuntary migration *within* societies has been identified by the World Economic Forum (2016) to be the global risk that impacts the greatest number of people worldwide. For every refugee who gains the attention of the world by crossing a national boundary, there are three to ten uncounted *invisible* victims within their own countries (see Table 9). In 2015,

one of every 89 citizens in nonwestern semiperipheries was internally displaced when more than 40 million people were impacted by domestic repression or exploitation of ethnic groups. Nearly 13 million—or one of every 194—was displaced by ethnic violence (e.g., 6.3 million Colombians, 2.1 million Nigerians, 612,000 Indians).[23] Another 15 million were displaced from their ethnic communities by development projects. On average, fewer than one-fifth of these uprooted people are resettled in situations parallel to their pre-displacement lives, so a majority face deepening poverty and ethnic marginalization (Internal Displacement Monitoring Centre 2016: 60-62). Every year since 1990, the incidence of ethnic/indigenous displacement has risen as semiperipheries seek out cheap natural resources and build large infrastructure projects to support national agendas of economic growth and competition for global status (Stanley 2002, Terminski 2015). Ethnic groups and indigenous peoples account for a majority of those displaced by development projects, and thousands of entire indigenous/ethnic communities have been eliminated (Stanley 2002).[24] These are not brief historical anomalies that are likely to disappear any time soon, and the national and international costs are monumental (Heidelberg Institute for International Conflict Research 2016).

The Global Migration Crisis

In the early 21st century, one of the worst ethnic/racial inequalities of the world-system lies in how the core countries manage the crisis-level flows of refugees. While western and Japanese media and politicians fuel public fears that their countries are being inundated by these foreigners, the core externalizes this human burden to countries with fewer economic resources to bear the costs. In 2014, low-income peripheries hosted 48 percent of the world's refugees while the western core granted asylum to only 9 percent. Peripheral countries that averaged 3.4 percent of the GDPpc of the core (see Table 5) approved 5.2 times more asylum claims than the 21 core countries. More significantly, 25 percent of the refugees were accepted by least-developed countries. With a GDPpc of less than 2 percent of that of the core, these poorest countries granted asylum to 2.7 persons to every refugee hosted by the world's richest countries. Nonwestern semiperipheries accepted 43 percent, and refugees were most heavily concentrated in the Middle East/North African semiperipheries where states acted affirmatively to accept Muslims who have been less welcome in the western core. Indeed, these semiperipheries granted asylum to 5.5 refugees to every

[23] Analysis of Internal Displacement Monitoring Centre (2016: 96-98). We cross-matched the semiperiphery list in Table 2 with the list of countries in which citizens were displaced (International Displacement Monitoring Centre 2016).

[24] For example, Argentina, Brazil, China, India and Russia displaced 4,287,100 for dam projects since 1990, and ethnic minorities accounted for more than 60 percent of the displacees (Terminski 2015). More than 1,200 entire indigenous/ethnic communities were eliminated in those countries (Stanley 2002).

Table 9. Refugee and Transnational Migration Trends, 2014-2015

Part A. Inequality in the Management of the World Refugee Crisis, 2014

Countries of:	No. Refugees Granted Asylum	% World Total	Ratio of Refugees to GDPpc
Western & Asian Core	1,600,270	9.1	32.5
Western/Northern/Southern Europe Semiperiphery	22,323	0.1	1.2
Nonwestern Semiperipheries of:	7,554,526	43.1	
Middle East & North Africa	6,742,887	38.5	258.2
Asia	379,904	2.2	41.6
Post-Socialist Eastern Europe	274,279	1.6	27.4
Subsaharan Africa	112,192	0.6	246.0
Latin America & Caribbean	45,264	0.2	3.7
Nonwestern Periphery	8,354,491	47.7	4,964.1
Least-developed, lowest-income countries	4,400,477	25.1	6,377.5
World Total	17,531,780	100.0	

Part B. Transnational Migration Flows into Nonwestern Semiperipheries, 2015

Nonwestern Semiperiphery	Millions of In-Migrants	% All Migrants to Nonwestern Countries	Nonwestern Semiperiphery	Millions of In-Migrants	% All Migrants to Nonwestern Countries
Russia	11.64	11.3	Malaysia	2.51	2.4
Saudi Arabia	10.19	9.9	Argentina	2.09	2.0
United Arab Emirates	8.09	7.8	Israel	2.01	1.9
India	5.24	5.1	Lebanon	1.99	1.9
Thailand	3.91	3.8	Oman	1.85	1.8
Kazakstan	3.55	3.4	Qatar	1.69	1.6
South Africa	3.14	3.0	Venezuela	1.41	1.4
Jordan	3.11	3.0	South Korea	1.33	1.3
Turkey	2.97	2.9	Mexico	1.19	1.1
Kuwait	2.87	2.8	China	0.98	0.9
Iran	2.73	2.6	Brazil	0.71	0.7

Sources and Notes: Part A is derived from analysis of http://data.worldbank.org/indicator/SM.POP.REFG. We followed United Nations methodology (see UNHCR 2015) to calculate ratios of refugees to GDPpc. We employ the United Nations (2015) geographical delineations of European subregions.

one accepted by the western core. At less than half the GDPpc of the western core, Turkey, Lebanon, Iran and Jordan granted asylum to 1.4 refugees to every one accepted by 19 countries of the western core.[25]

To assess the degree to which the world refugee crisis is being handled with economic equity, the United Nations (2016), calculates the ratio of refugees to the GDPpc of receiving countries. To explore the ethnic/racial inequality in the management of the world refugee crisis by the world "interstate system" (Wallerstein 1980a: 80-81), we employed that recommended methodology in Table 9, Part A. Just as the semiperiphery and periphery are exploited economically, the core also drains them of resources to resolve a refugee crisis exacerbated by its military imperialism. In 2014, more than half of the world's refugees were stateless due to instability that has resulted from the long-term effects of core military actions in the Middle East and Afghanistan.[26] In effect, the western core externalizes to the world's semiperipheries and peripheries the majority of the cost of the refugee crisis that its imperialism has generated. Thus, the ratio of refugees to GDPpc in Middle Eastern semiperipheries is 7.9 times greater than the economic share of the western core (see Table 9). Similarly, Subsaharan African semiperipheries bear 7.6 times the economic pressure that the western core absorbs from the refugee crisis. However, the world's peripheries grant asylum to 4,964 refugees to every dollar of their GDPpc. Shockingly, however, the worst inequity falls on the world's poorest countries where the ratio of refugees to GDPpc is 6,377, that is nearly 200 times the economic share born by the western core. On the one hand, a majority of the world's refugees are being welcomed by countries with unemployment rates that are three to eight times worse than in the western core countries. On the other hand, at least half the world's refugees are being hosted by countries in which a majority of the population lives on less than $2 per day.

Nonwestern semiperiperhies also host a large proportion of the world's *voluntary transnational migrants*.[27] Figure 4 pinpoints four trends between 1990 and 2015 that call into question the "unidirectional South to western core flow" that is typically emphasized by western media, politicians and scholarly accounts.

First, in raw numbers, the destinations for 58 percent of transnational migrants were western core countries in 2015 (United Nations 2016: 1). However, a quite different trend emerges when migration patterns are disaggregated. When we isolate those who moved *between* western

[25] Analysis of World Bank, "Refugee Population by Country or Territory of Asylum, 2014," http://data.worldbank.org/indicator/SM.POP.REFG. For more statistical detail about refugees, see Appendix B.

[26] Analysis of top ten countries of origin of refugees, 2014, http://www.refugeecouncil.org.au/getfacts/statistics/intl/countries-origin-refugees-unhcrs-mandate-top-ten-2014/. Also www.unrwa.org/sites/default/files/unrwa in_figures_2015.pdf.

[27] We follow the United Nations legal distinction between refugee and migrant. See www.unhcr.org/en-us/news/latest/2016/7/55df0e556/unhcr-viewpoint-refugee-migrant-right.html

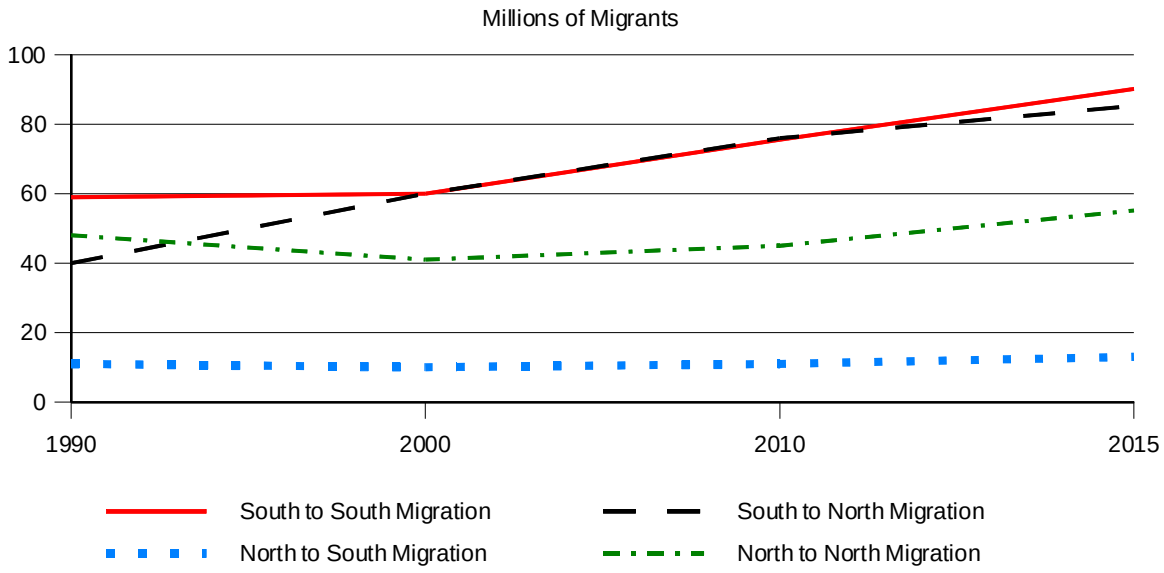
countries, we discover that those migrants accounted for one-third to one-half of the foreigners in western countries between 1990 and 2015. Second, between 1990 and 2015, the flow of migrants *into* nonwestern countries was equivalent to or greater than the flows of nonwestern migrants into western destinations. In 1990 and 2015, the flows of migrants between nonwestern countries actually exceeded the flow of nonwesterners into western countries. Third, if we combine western migrants with nonwestern migrants, we see that the flow of migrants *into* nonwestern destinations consistently exceeded the South to North flows between 1990 and 2015. Fourth, while 87 percent of the foreigners who arrived in nonwestern locations originated from other nonwestern countries, 13 percent of them were westerners.

More than 85 million nonwesterners moved to the western core in 2015, but 103.2 million migrants were destined for nonwestern countries. In other words, there were 1.2 migrants to a nonwestern destination for every one who left a nonwestern society for the western core. Of those headed to nonwestern destinations, 49 percent preferred the Middle East, nearly a quarter arrived in Post-Socialist Europe, nearly 9 percent went to Latin America, and 4 percent arrived in Subsaharan Africa (see Figure 4, Part B). As Table 9, Part B shows, nearly three-quarters of these transnational migrants were concentrated into 22 nonwestern semiperipheries. Reflecting the centrality of transnational *labor* migration, 29 percent of the migrants targeted six Middle Eastern semiperipheries that are heavily dependent on foreign workers. More than 15 percent moved to two Post-Socialist semiperipheries, Russia and Kazakstan, primarily to seek work. About 3 percent went to Subsaharan Africa primarily destined for South Africa, a majority from peripheries within this region.

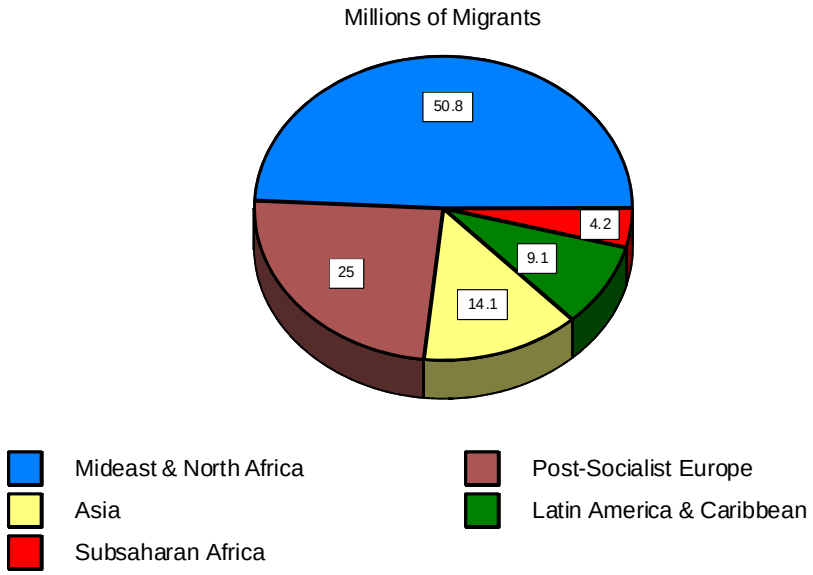
Four categories of economic migrants account for a majority of those who relocate to nonwestern semiperipheries. Peripheral males transnationalize themselves to become low-paid "contract laborers" for semiperipheral industries, plantations, ocean transport vessels and mobile ocean canning factories (Migration Policy Institute 2013, International Organization for Migration 2014). Second, the "international division of reproductive labor" operates to transfer female domestic servants from low income countries to nonwestern semiperipheries like Malaysia and Saudi Arabia (Yeates 2013). Some nonwestern semiperipheries are heavily dependent on foreign laborers (e.g., Malaysia, Oman, Qatar, Saudi Arabia, United Arab Emigrates). In the Czech Republic, companies recruit foreign workers despite domestic unemployment of more than 390,000. Other nonwestern semiperipheries are regional magnets for foreign workers. For example, there are 10 to 12 million foreign workers in Russia, a majority of them illegally. Similarly, Argentina, Chile, Mexico, China, India, Kazakstan, South Korea, Taiwan, Thailand, Turkey, and Venezuela attract hundreds of thousands of foreign contract laborers, as well as illegal migrants. The third category consists of "entrepreneurial migrants" while the fourth category

Figure 4. Transnational Migration Flows in the 21st Century World-System

Part A. Transnational Migration Flows, 1990 to 2015



Part B. The Nonwestern Destinations of Transnational Migrants, 2015



Source: Analysis of United Nations (2016)

derives from semiperipheral "brain drain" of doctors, educators, nurses, engineers and other professionals from peripheries and poorer semiperipheries. For example, Brazil has drained more than 5,000 doctors from Cuba while South Africa and Nigeria have attracted thousands of Chinese small businesses.[28] Despite the importance of worker remittances to the GDP of sending countries, those exporting countries do little to screen labor conditions or to protect the human rights of workers.[29] Nearly three hundred foreign workers are on death rows in nonwestern semiperipheries, some of them convicted of crimes such as witchcraft or self-defense against employer rape (*The Guardian*, 1 January 2013, *Time*, 12 May 2016, Amnesty International website, 9 November 2015). In 2016, Saudi Arabia laid off thousands of foreign workers after oil prices dropped, stranding them without sufficient assets to return home (*New York Times*, August 1, 2016).

Many scholars (e.g., Richmond 1995, Sharma 2007) accuse western countries of structuring anti-immigration policies and point to white backlash against "racial minorities and immigrants of color" (Bonilla-Silva 2015: 202-203). However, semiperipheries are as enmeshed in as much conflict over transnational migrants as western states. Western scholars are so preoccupied with how the European Union and the United States are "closing borders" that they ignore actions by semiperipheral states (e.g., Mexico, South Africa, India, Brazil) to prevent the influx of transnational laborers from adjacent peripheries. Enclaves of foreign workers are highly visible in nonwestern semiperipheries, many of which have high unemployment rates and rising levels of small business closings. In reaction to public pressure about these problems, several countries have established strict quotas on the number of foreign workers (e.g., Gabon, Kazakstan, Malaysia, South Africa), some putting in place strong punishment for employers (e.g., public whippings in Malaysia) who exceed the limits. Indeed, semiperipheral states are just as involved in regulating migration flows and restricting citizenship rights as western core countries. Reactionary politics and human rights violations toward "foreign aliens" are routinely documented in nonwestern semiperipheries.[30] Moreover, the United Nations World Value Survey (1981-2014) indicates that there is even greater ethnic/racial intolerance of immigrants in some of these nonwestern semiperipheries than in the western core.[31] For example, the European Court of Human Rights found Russia guilty in 2014 of arresting, detaining and expelling Georgia nationals (Scott 2016). In reaction to public opposition to transnational migrants, South Africa instituted Operation Fiela

[28] Analysis of United Nations (2016).

[29] For remittances as share of GDP, see http://data.worldbank.org/indicator/BX.TRF.PWKR.DT.GD.ZS. See, for example, www.hrw.org/reports/2004/saudi0704/1.htm regarding treatment of transnational workers in Saudi Arabia.

[30] For information about ethnic tensions around migrant flows across national borders, see case studies at the websites of the Migration Policy Institute (www.migrationpolicy.org) and Citizenship Rights in Africa Initiative (http://citizenshiprightsinafrica.org).

[31] Analysis of World Value Survey databases, http://www.worldvaluessurvey.org/wvs.jsp. For a map of the world's most and least tolerant countries, see Fisher (2013).

to deport thousands of illegal migrants from Zimbabwe, Malawi, Mozambique, and Congo. Thailand has operated state camps to aggregate and export Burmese migrants to other countries (Minority Rights Group International 2016).

However, western conceptualizations of these nonwestern policies conceal more than they explain. While western scholars often employ the terms *xenophobia* and *racialization*, these are inadequate approaches to explain why nonwestern semiperipheries react to refugees and transnational migrants in very different ways. While Latin American semiperipheries have absorbed few refugees and migrants, every other semiperipheral subregion—especially the Middle East and Subsaharan Africa—has accepted both categories at levels that place far greater pressures on their GDP per capita and on competition for jobs than is true in the core (see Table 8). On the one hand, it is clear that western academic preoccupation with the *positive* impacts of migration in rich countries leaves us ill-equipped to explore societies that are faced with high levels of unemployment, poverty and political instability that do not characterize the core. In Subsaharan Africa, for example, the local negative costs of refugees and migrants are enormous. "For every two refugees, one local is pushed out of the home labor market" (Hatton and Williamson 2008: 258). On the African continent, South Africa has inequitably borne the brunt of both refugees and economic migrants for more than a decade, at the same time that the state is confronted by the world's worst income inequality and unemployment of nearly one-third of its workers. On the other hand, several sociopolitical and economic factors are interwoven with public ethnic/racial prejudice (or acceptance) toward migrants.[32] Even when semiperipheries have open borders toward foreign workers (e.g., Saudi Arabia, Malaysia, Czech Republic, Estonia, Kazakstan), domestic ethnic minorities and women's groups call for state policies to subsidize training of local workers who are marginalized in the labor market. In the Middle East, for example, women are excluded from the labor force while states encourage the recruitment of foreign female servants, nurses and teachers. In some instances, states extend forms of assistance and subsidy to refugees and migrants that they do not make available to internal ethnic minorities or poor women. In those instances, public resistance is aimed more at changing state policies than at the migrants themselves (e.g., Uganda).[33]

[32] Consider Hungary, for example. In comparison to European core countries, Hungary has born an inequitable economic load in order to comply with EU migrant/refugee quotas. As a result, the 2016 referendum about whether the country would continue to comply with EU policy about migrants was overshadowed by polarized views about whether the country should withdraw from the European Union. However, the extremely low voter turnout indicates that there is NOT widespread xenophobia among the general public (https://en.wikipedia.org/wiki/Hungarian_migrant_quota_referendum,_2016).

33 For more case histories, see Minority Rights Group International (2016), UNHCR (2016) Migration Policy Institute (www.migrationpolicy.org), Citizenship Rights in Africa Initiative (http://citizenshiprightsinafrica.org).

The Subimperialism of Semiperipheries

In their rivalry to ascend to core level or to prevent decline into the periphery, semiperipheries engage in *subimperialism*, i.e., they behave like the core in their economic and political relationships with peripheries and other semiperipheries (Chase-Dunn 1989: 210).

Semiperipheries are exploited by the core, but they, in turn, exploit poorer countries. A "subimperial" state exerts "a regional hegemony akin to the global dominance of an imperial power but at a subsytemic level." Consequently, subimperialism often "produces ethnic opposition within local spheres, both within the semiperipheral state itself and within the wider regional periphery" (Shaw 1979: 348-51). Semiperipheries often act in the interests of the core, sometimes putting them in ethnic conflict with other semiperipheries or peripheries. For instance, the BRICs are far less likely to bring about systemic change than they are to "play a 'subimperialist' role to neoliberal regime maintenance" (Bond 2014a: 1). When they act in a subimperialist fashion, semiperipheries employ strategies that target, marginalize and oppress ethnic minorities in other countries (e.g., Martin 2008, Bond 2012, Misoczky and Imasato 2014). Nel and Taylor (2013: 1096) observe that "evidence is mounting that the traditional fault-lines of North-South interaction are being replicated in the burgeoning trade between Southern states. . . . Worsening wage inequality levels in some middle-income developing states are the result more of South-South trade than the effect of North-South interaction." As part of their rivalry for greater status in the world-system hierarchy, semiperipheries are widening their FDI in peripheral countries, e.g., the development agendas in Subsaharan Africa of China and the other BRICS (Brautigam 2009, Carmody 2013, Bond and Garcia 2015: 15-68, Robinson 2015). One of the clearest patterns of semiperipheral subimperialism is the trend in transnational land grabbing. Between 2000 and 2016, two-thirds of the largest transnational land grabs were undertaken by corporations based in six semiperipheries. Capitalists based in Malaysia, Singapore, Saudi Arabia, India, China and Argentina grabbed nearly 11 million hectares in peripheral countries, capturing nearly 2 hectares to every one secured by core corporations in the United States, England and Netherlands.[34] Increasingly, there are strong causative linkages between transnational land grabbing and nonwestern ethnic conflict. Analyzing 133 countries, Krieger and Meirrecks (2016) found that the negative socio-economic and demographic consequences of large-scale land acquisitions "outweigh its potential benefits, consequently influencing the opportunity costs of ethnic conflict in ways that make ethnic tensions more likely."

There has been a great deal of scholarly, NGO, and journalistic coverage of the confrontations between semiperipheral development projects and negatively impacted ethnic communities of Latin America, Asia and Africa (e.g., Bryceson, Kay and Mooj 2000; Human Rights Watch 2007;

[34] Analysis of Nolte, Chamberlain and Giger (2016: 18, 23).

Michel and Beuret 2009; Pearce 2012). Furthermore, ethnic conflicts are exacerbated by semiperipheral arms trading and transnational interference. Some semiperipheries are significant exporters of arms (e.g., Russia, South Africa, China) to other semiperipheries (e.g., Israel) and to peripheries (e.g., Sudan, Yemen) where ethnic conflict is occurring (Holtom et al. 2013). As we saw in 2016 news coverage of conflict in Yemen, South Sudan, and Syria, some semiperipheries align themselves with partisans in ethnic conflict in other countries, either through hidden support of repressive states (e.g., China, Saudi Arabia), arms trafficking (e.g., South Africa, China, Russia), or direct participation in warfare (e.g., Russia).

Semiperipheral Resistance toward the Core

World-systems analysts argue that the United States is in hegemonic decline, making this an historical period in which semiperipheral competition is intense (Arrighi and Silver 1999; Bornschier and Chase-Dunn 1999; Wallerstein 2003b). "The history of hegemonic successions shows that the slipping economic dominance of a hegemonic state weakens international order and opens the door to competition from other states" (Bergesen and Sonnett 2001: 1606). Wallerstein (2004a: 42) points to the "new reality" of semiperipheral and peripheral challenges to the world hegemon.

> It is no longer true that the U.S. unilaterally defines the rules of the geopolitical game, nor is it true that it gets its way most of the time simply by political pressure, or even gets its way most of the time. . . . The last time the U.S. snapped its fingers and got its way was on September 11, 1973, when it engineered a coup in Chile and put Pinochet in power. On September 11, 2001, it was Bin Laden who snapped his fingers, and the U.S. people and government are still reeling from the blow.

Semiperipheries have received "unprecedented visibility" (Boatca 2006: 343) as they seek to preserve their "exclusive identities, rather than simply 'servicing' the core" (Worth and Moore 2009: 150). For example, Turkey, Russia, China, Saudi Arabia, and Egypt defied U.S. geopolitical stances in the Middle East and North Africa in 2015 and 2016.

Ethnic Resistance within Semiperipheries

Worldwide since 1995, half or more of ethnic mobilizations have emerged as resistance against capitalist economic agendas, but semiperipheral states bore the brunt of local opposition (Dunaway 2003). What are the world-systemic causes of ethnic/racial resistance in the semiperiphery? There is growing evidence that "the diffusion of a world system culture of human rights" (Olzak and Tsutsui 1998: 714) is leading to increased ethnic resistance (Dunaway 2003). Universal human rights and multiculturalism have reinforced the tendencies toward ethnic identity formation and

persistence in semiperipheral countries. While strengthening world capitalist agendas, the recent core ideological focus on multiculturalism has empowered ethnic minorities in the nonwestern semiperipheries to resist policies of their own governments (Friedman 1997: 83-85). To exacerbate those trends, there has been "a qualitative shift in political structures" that results from "the geometric rise in the number of international organizations . . . that form alliances with subnational ethnic groups" (Boswell and Stevis 1997:3-4). Two human rights resistance strategies threaten state sovereignty: (a) *subnational* political alignment around ethnic identities and (b) *supranational* alliances with international organizations and movements. Many ethnic movements play on the sympathies of distant international audiences they hope will move to weaken the position of their states (Dunaway 2003; Karatasli and Kumral 2017). Dialectically, the semiperipheral state is simultaneously pressured by contradictory universal ideologies and policies. While the universal economic ideology prioritizes economic growth strategies, semiperipheral repression of ethnic opposition to those development goals will attract world criticism and the emergence of "a global moral community" against such public actions (Baruah 1994).

Clearly, the economic changes that lead to ascent or decline of a semiperiphery in the world-system hierarchy "expand opportunities for social insurgency," creating new political openings for ethnic/racial minorities to solidify and to increase their social visibility and political leverage (Anderson-Sherman and McAdam 1982: 168). Transnationalized semiperipheral states are caught in contradictory *universal* economic, political and human rights mandates. First, there is a structural contradiction between the world-system need for relatively strong states (Wallerstein 1980a) and the universalization of *democracy*. Tendencies toward homogenizing nationalism and centralized control over territories—the prerequisites to be a strong state in the world-system—are not democratic, and they have triggered resistance from ethnic minorities (Dunaway 2003). Consequently, the semiperipheral state is ensnared in a paradox in which "too much centralization causes rebellion, and too little centralization would cause fragmentation" (Yavuz 2001: 21). To complicate matters, democraticization agendas create new *structures of political opportunity* (McAdam, McCarthy and Zald 1996). Because counter-hegemonic resistance is deterred in circumstances of extreme state repression, ethnic mobilization increases as semiperipheral states democratize. Why? Ethnic minorities have resisted newly democratic states when they have been previously repressed by or fear they will be oppressed by new ruling elites (Olzak and Tsutsui 1998). Universalization of human rights for indigenous peoples and ethnic minorities poses a second world-systemic contradiction for semiperipheral states. On the one hand, semiperipheral governments follow the core model in which "eminent domain in the public interest" is the legitimate means of extinguishing ethnic autonomy over lands with valuable ecological resources.

On the other hand, those same governments are expected to recognize the universal human right of ethnic minorities to self-determination (Svoksy and Cuffe 2015).

Many scholars point to the semiperiphery as the locus of significant future systemic change, but none of them addresses the reality that semiperipheries are not moving any further toward eliminating ethnic/racial inequality than the core or the periphery. For example, Chase-Dunn and Lerro (2014: 58) argue that "some of the most potent efforts to democratize global capitalism will come out of movements and democratic socialist regimes that emerge in semiperipheral countries." Despite their optimism, neither democratic nor socialist countries have eliminated ethnic/racial inequality and exploitation historically (Olzak and Tsutsui 1998; Yavuz 2001). Furthermore, semiperipheral ethnic minorities have been excluded from "democratizing" states just as they were marginalized from the previous regimes (e.g., Noonan 1995; Kadouf 2001; Nettles 2007). Indeed, many democratizing states have continued to marginalize and repress ethnic minorities and indigenous people (e.g., Gurowitz 2000; Kadouf 2001; Munoz 2006; Nam 2006; Krøvel 2011). Phoebe Moore and Charles Dannreuther (2009: 138-39) are convinced that the semiperiphery

> is not going to accept its position as a mouthpiece for the core, nor as a purgatory for the periphery. It is no longer a circumvention of resistance, but *is* resistance, as it becomes increasingly powerful transnationally. . . . Today, the semi-periphery challenges the system itself. . . . The new transformative semi-periphery is not interested in simply 'developing' according to the pre-ordained sets of institutional structures to then achieve 'core' status amongst battling hegemons. Rather, its potential today is its ability to challenge and perhaps alter the entire system.

Even if their optimism were well-founded, we certainly cannot assume that systemic economic or political change will lead to the elimination of ethnic/racial inequality because social equality is not at the heart of semiperipheral rivalry for economic growth. Unfortunately, the accumulating evidence is leaning the direction of indicating that the early 21st century semiperiphery is characterized by greater ethnic/racial inequality and exploitation than the core. While semiperipheries may have an historically unparalleled degree of bargaining leverage against core states (e.g., Li 2005), that semiperipheral resistance has not prioritized improving the status of ethnic/racial minorities.

Part III. Theoretical Retrenchment: Moving Toward Theory for the Excluded Middle

We have reached a point in the history of the modern world-system that requires "theoretical retrenchment" from the vantage point of the world's "excluded middle." We argue that 21st century theory must *decenter* analysis of global ethnic/racial inequality by bringing the nonwestern

semiperiphery to the foreground. We have examined the ways in which nonwestern semiperipheries are having a more significant impact on global ethnic/racial inequality than either core or periphery.[35] Since 1980, three-fifths of world population has been concentrated in nonwestern semiperipheries (see Table 1), and those countries account for a majority of the world's diverse array of ethnic/racial groups. Consequently, nonwestern semiperipheries are the loci of an overwhelming majority of the world's annual tally of state repression of and violence toward ethnic/racial minorities, state displacement of ethnic communities for development projects, and ethnic/racial resistance and activism. To complicate matters, nonwestern semiperipheries now host a high proportion of the world's refugees and transnational migrants, and anti-immigrant biases are intensifying in those societies.

From a political economy perspective, the transnational capitalist class is no longer as strongly dominated by the core as it was in the 20th century, because nonwestern semiperipheral capitalists and corporations are now entering those ranks in record numbers (see Tables 3, 3A and 4). These countries are growing economically at higher rates than core countries (Mahutga and Smith 2011), and they are achieving that growth through intense exploitation and dispossession of ethnic/racial minorities. While they are draining away record levels of wealth accumulation that once went to the core, those countries are characterized by concentration of wealth and income into the hands of a few ethnic/racial groups to degrees that exceed core or peripheral trends. Moreover, the territories and laborers targeted for deeper incorporation into the world-economy are disproportionately concentrated in the homelands of semiperipheral ethnic/racial minorities.

Seeing beyond White Racists and Colonists

As we face an unstable 21st century and the semiperipheral challenges to the core that it will bring, we will not be able to explain much— even to ask effective research questions— if we stay focused on "western white supremacy" as the universal dilemma to be examined. "Race essentialist positions that hold only whites accountable for racial oppression are overly simplified, miss the complexity of the issues involved, and encourage a focus on one set of villains," contends Radha Jhappan (1996: 34). While homogenizing all whites as the singular perpetrators in "the international hierarchy of oppression," such arguments fail to analyze the oppressions that result from sharp differentials in the economic and political power of two key groups of actors in the world-system: the transnational capitalist class and nonwestern states. But is there such a thing as a widespread identity of western "whiteness?" Indeed, "international white solidarity" is neither a

[35] "The trend in the 2000s has been that overall inequality between advanced economies and emerging economies is narrowing while inequality in emerging economies is increasing" (Pieterse 2011: 26, cf. also Arrighi, Silver and Brewer 2003). For instance, China's GINI coefficient increased from 30 to 50 between 1980 and 2010 (Xie and Zhou 2014).

geopolitical identity nor a transnational reality across very different European nationalisms (Bonnet 2004). Europe is itself too ethnically/racially fragmented to be unified around any ethnic or racial identify, including "shared whiteness." Gerard Delanty (1995: 3) argues that

> What we call Europe is, in fact, a historically fabricated reality of ever-changing forms and dynamics. Most of Europe is only retroactively European and has been invented in the image of distorted modernity. . . . European identity. . . is a doubtful construct, given the apparent irresolvable conflict of national cultures and oppositional collective identities.

Second, the white/nonwhite dichotomy that predominates in the western race paradigm offers little explanatory traction in a majority of the world's countries where such "color" categories are not employed as the markers of difference or inequality. Indeed, western scholars conceal far more than they explicate when they arbitrarily apply the white/nonwhite dualism to societies where people do not employ such concepts to justify discrimination or exploitation.[36]

Research by the United Nations (2003) indicates that the commonly used terminology of western race scholarship rarely appears in the census data collected by a majority of the world's countries. Two-thirds of national censuses ask questions about ethnicity or race, and a majority of those censuses employ identity categories that involve neither race nor color. Only 15 percent of national censuses employ *race* as a category while less than 2 percent employ *color* designations; and most of those countries are situated in the Americas.[37] In comparison, a majority of national censuses enumerate their populations by ethnic group, nationality, cultural, religious or linguistic group or indigenous status. While these census categories are sometimes a reflection of nation-building myths and agendas set by elites, they are more often the outcome (a) of the changing sociopolitical construction of groups that do not identify themselves in terms of color or race and (b) of pressures on states from international development agencies, NGOs and courts to account for vulnerable minorities (Lucassen 2005, Morning 2010). Despite the popularity of *white* as a pivotal identity group among American and British scholars, that category is rarely employed in

[36] Such ethnocentric errors are not rare. For instance, Roman (2002) conceptualizes Russian biases against non-Russians as "making Caucasians Black." There is growing controversy about scholarship that casts the Israel/Palestine conflict in white/black terms; see http://www.thecrimson.com/column/dining-on-sacred-cow/article/2012/11/16/Lispon-Israel-race/ and http://mondoweiss.net/2016/08/palestinian-struggle-supremacy/.

[37] In her analysis of the United Nations database about national census taking methods, sociologist Ann Morning (2010: 32-33) observes that "the United States is one of a small number of nations to enumerate by *race*. . . . The United States is virtually alone in treating "race" and "ethnicity" as different types of identity. . . . One unintended effect of this practice may be to reinforce essentialist biological understandings of *race*, since it is presented as distinct from culturally-delineated and socially-produced ethnicity."

national census taking methods. Indeed, only six national censuses enumerate the number of "whites" among citizens: Brazil, Haiti, South Africa. United Kingdom, United States and Zimbabwe (see Table 10). Even in the Americas people outside the United States are far more likely to identify themselves with a specific *European nationality* or as *mestizos*, *mulattoes* or *creoles* (with mixed European/indigenous or European/African heritage) than as *white*.

Table 10. Ethnic/Racial Identifiers Employed in National Censuses

Subregion of the World-System	Ethnic/Racial Identifiers that are most often employed	Is "white" an ethnic/racial identifier?
Western/ Northern/Southern Europe	Historical ethnic groups, ethnolinguistic groups, foreign nationalities	Only the United Kingdom employs *white*. Moreover, "color" is not integral to expressions of bias toward immigrants except in the UK (Lucassen 2005).
Post-Socialist Eastern Europe	Historical ethnic groups	None
Middle East/North Africa	Historical ethnic or ethnoreligious groups, foreign nationalities	None
Subsaharan Africa	Historical ethnic or ethnoreligious groups, foreign nationalities. Mestizo categories are reported in some countries (e.g., Angola)	Only South Africa and Zimbabwe employ *white*. Others employ specific European nationalities.
Asia	Historical ethnic groups, ethnolinguistic groups, foreign nationalities. Indigenous peoples distinguished. India & China do not collect ethnic or racial data in national censuses, but do collect population data for officially recognized ethnic minorities.	None
Latin America & the Caribbean	*European nationalities* more often used than *white*. Indigenous peoples distinguished in most countries. *Mestizo* (mixed European and indigenous) and *Creole* or *Mulatto* (mixed European and African) are Census categories in most countries. Argentina does not collect Census data about ethnicity or race, but its 2010 Census attempted to identify people of indigenous or African heritage for the first time. Chile's census reports only the numbers of *indigenous* or *non-indigenous*.	Brazil and Haiti are the only countries that employ *white*. Several other countries report those of *European* heritage or identify specific European nationalities (e.g., Uruguay). No recent Argentine census has included questions about ethnicity, but numerous studies show that a majority of Argentinians identify themselves as *European* in heritage (a category that allows concealment of *Mestizo* or *Creole* lineage).
North America	Ethnic/racial group, nationality identify, or indigenous people designators. In Mexico, *mestizo* is the most popular self-identification.	US is the only country to employ *white* as a Census category. Canada employs ethnic groups, nationalities and indigenous groups.

Source: Analysis of country data in United Nations Statistical Division (2003), Morning (2010), and the website of the United Nations Population Division. Lucassen (2005) was helpful in analyzing Europe. For Uruguay, see http://www.ine.gub.uy/c/document_library/get_file?uuid=0d5d2e5d-898c-49f6-8465-c3a5b606a284&groupId=10181.

Moreover, we need to broaden our sights beyond the racial dualism of "European modernity versus dark coloniality" (Mignolo 2011). On the one hand, this global racial dualism requires us to deny that many Europeans were historically colonized and victimized by the same forms of ethnic/racial oppression that a few European countries inflicted on the Americas and nonwestern territories.[38] In the early 21st century, the European core and semiperiphery are closing their borders against Eastern Europeans, and animosities toward some European ethnic minorities are as nasty as those toward nonwestern migrants (Boatca 2006; Beatty, Deckard and Coakley 2016). Yet these oppressed Europeans are silenced victims in an approach that focuses narrowly on "the 'colonial'" axis between Europeans/Euro-Americans and non-Europeans" (Grosfoguel 2008: 6-7). On the other hand, this dualistic model forces us to treat as historically inconsequential the imperialistic histories of nonwestern colonizers. Well into the 20th century, the combined reach of the Ottoman Empire, the Russian Empire, China's Qing Dynasty, the Japanese Empire and the Soviet Union encompassed most of 21st century Asia, the Middle East/North Africa region, Post-Socialist Eastern Europe, most of the countries that comprise Oceania, parts of Western Europe, and five Pacific coast states of the United States.

In the 19th and 20th centuries, Russia, China, Japan and Vietnam captured large territories, exterminated thousands, and resettled lands (Elkins and Pederson 2005). In the 21st century, at least half the world's population bears legacies of (and animosities toward) those ethnic/racial oppressions. Since the fall of the USSR, for example, 25 million Russians reside in non-Russian countries without clear citizenship rights (Delanty 1995), and their presence is the basis for ethnic conflicts and political power struggles in countries like Ukraine. To complicate matters, there are indicators of new forms of colonialism that are not addressed by the European/non-European dualism. Questions are being raised about the degree to which China and the fastest-growing nonwestern semiperipheries are constructing new relationships of dependent neo-colonialism through their development activities in nonwestern peripheries and weaker semiperipheries (Gallagher and Porzencanski 2010, Carmody 2011, 2013, Kurecic and Bandov 2011, Mbaye 2011, Nel and Taylor 2013, Bond and Garcia 2015, Garcia 2016). Furthermore, nonwestern states are now routinely engaging in tactics of *regional subimperialism* and *internal colonialism* to capture the lands and territories of ethnic minorities to fuel their economic growth (for examples, see Table 9).

[38] Every European country was itself the historical product of conquests of resistant peoples, and there are still numerous ethnic minorities throughout Europe. Moreover, Eastern Europeans have endured multiple historical eras of imperialism and settler colonialism (e.g., the Austrian Empire, the Hapsburg Empire, the British Empire, the Russian Empire, the German Nazis, the Ottoman Empire, the Soviet Union). Wolff (1994) calls attention to white/white enslavement of Eastern European peasants (Marshall 1772, Richardson 1784) at the same time that African enslavement was occurring in the New World.

Overcoming Western Biases in Knowledge Production

Despite the tendency of many western scholars to universalize the western race paradigm to the entire world-system, these global trends make it clear that its applicability is limited racial and color designators. Manuela Boatca (2006: 328) observes that "the intellectual division of labor. . . places theory, together with civilization and culture, in the core." Because of universalization of western knowledge to the entire world, semiperipheries and peripheries are trapped in "the status of 'silenced societies' in terms of production of knowledge," including theory construction about the processes through which peoples are otherized and exploited. As a result, analyses of global race/ethnicity are an extension of the predominant "Atlanto-centric race paradigm" (Wimmer 2015) that explains nonwestern dynamics by superimposing western race categories and binaries. In this paradigm, "the category of the Other is ahistorical and takes little account of the specificities of time and place in the creation of the discourse of race," argues Kenan Malik (2000: 158). Since we are not the first to address this problem, we call your attention to the ideas of six colleagues. While the world is "pluri-epistemic," argues Boaventura de Sousa Santos (2014), western paradigms have practiced "epistemicide against non-Western knowledge construction." According to Ramon Grosfoguel (2014: 125-26),

> Epistemic racism is the inferiorization of non-Western epistemologies and cosmologies to privilege Western epistemology as the superior form of knowledge and as the only source to define human rights. . . . Non-Western epistemologies that define human rights and human dignity in different forms from the West are simply excluded from the discussion. Eurocentric fundamentalism is the 'sacralization' of the Western tradition of thought and the inferiorization of non-Western epistemologies and cosmologies. . . . The invisibility and even extermination of other epistemologies is at the root of Eurocentric fundamentalism.

For these reasons and others, we agree with Howard Winant (2001: 15) that analysis at the global level requires us to "reject the division of the world between 'the West and the rest.'" However, that step alone is not sufficient, for it will not address the western domination of knowledge production, the epistemic racism or the racialization of social science that concern Boatca (2006), Santos (2014), Grosfoguel (2014), and Wimmer (2015). In order to confront those problems, we need to undertake two further steps. First, we need to stop imposing on "the rest" theoretical explanations that are derived from the colonial history and contemporary identity politics of "the West." We concur with Andreas Wimmer (2015: 2201) that "a truly global analysis. . . needs to go beyond an Atlanto-centric view, take other patterns of domination and exploitation

not associated with race into account, and critically assess their respective roles in the generation and transformation of hierarchies of exclusion." In similar fashion, Haitian anthropologist Michel-Rolph Trouillot (2003: 35-36, 72) raises concern about the careless deployment of concepts he terms "North Atlantic universals." Because they are grounded in "a historically limited experience" in terms of time and specific societies, these concepts are "as difficult to conceptualize as they are seductive to use." Even though race is universally applied by many scholars, he points out that "there is more conceptual confusion about race [at the beginning of the 21st century] than there was at the beginning of the last century."[39] When it is applied outside the societies in which it was created, race "disguises and misconstrues the many Others" it claims to represent, and it erases "the Other's historical specificity." For example he observes, people did not become "black" in France or England the same way they did in the United States.

Second, we need to stop filtering and packaging nonwestern contexts through the lens of western race categories that ignore many layers of complex underlying causes that are not captured by those concepts. Manuela Boatca (2015: 231) makes this point far more powerfully than we have.

> What is needed is an adequate un-erasure of the history and experience of non-White and non-European populations as well as non-European regions from social scientific theory-building. The unerasure of the non-European from mainstream social theory would not only reveal a far more entangled history of multiple Europes than the one we are accustomed to reading, but would also result in global instead of universal sociology. Instead of overgeneralising from the particular history of its own geopolitical location, a global sociology which has moved beyond Occidentalism would be able to account for the continuum of power linking geopolitical locations.

Looking toward the Future

To emphasize Boatca's point, we call your attention to an omission that we must "un-erase" in order to move toward theory that is more inclusive of nonwestern semiperipheries. We must come to grips with the rise of the Asian semiperiphery where 42 percent of world population is now concentrated (see Table 1, 1A). In these societies, race is almost never a cultural or socio-legal

[39] Trouillot (2003: 105-106) points out that there is little agreement on the definition of race and "the absence of a conceptual core." Omi and Winant (2013: 963) agree, pointing to "the "wobbly social scientific status of the race concept."

marker of group differentiation or stigma, and "white supremacy" obviously does not underpin nationalism. Indeed, the word "race" does not exist in a majority of the multiple dialects of the Asian semiperipheries. To claim that these societies are "in denial" because they do not delineate by race is an extreme form of western intellectual arrogance about knowledge production.[40] On the one hand, we need to employ the local indicators that are employed to marginalize groups and move beyond the lazy imposition of western categories. On the other hand, the theoretical problem is made more complex since the large Asian semiperipheries are widening their development activities all over the world. For example, arbitrary applications of western race theory that couches "whites" as the dominators are of little utility if we want to research the complex causes of anti-Chinese sentiments from very different ethnic/racial contexts, including Vietnamese fishers, Nigerian villagers, indigenous Chileans, unemployed Czechs, or low-paid white Americans in Chinese-owned factories.

Howard Winant (2001: 215) makes clear the scope of the task that faces us, for we must conceptualize at "a planetary level."

> At the dawn of the new millennium, there is a pressing need for a new *global* approach to race. . . . Adequately to understand the importance of race—historical and contemporary—requires us to reconsider many of our ideas and assumptions about modernity, development, labor, democracy, identity, culture, and indeed, our concepts of social action and agency. Taken as a whole, these are the coordinates of all social theory. We need a new, racially more adequate, theoretical compass if we want to navigate properly in the twenty-first-century world.

While we concur with Winant's call for change, we contend that we need to move beyond this kind of unilateral focus on the western concept *race*. Moving the direction of new theory that is only "*racially* more adequate" will not solve the problems of epistemic racism (Santos 2014; Grosfoguel 2014), racialized social science (Goldberg 1994) or Eurocentric erasures (Boatca 2015). Indeed, pursuit of new theory that is only "*racially* more adequate" (Winant 2001: 15) will keep us trapped in western "disciplinarian straightjackets" (Coates 2002: 7) that:

1. will "leave unscathed the [nonwestern] systems, structures, and processes that continually produce ethnic and racial oppression(s)" [our one-word paraphrase of Coates 2002: 7];

[40] Regarding Japan and China, for example, see Mushakoji (2015), Onuki (2015) and He (2017).

2. will continue to privilege race over ethnicity and other nonwestern markers of differentiation. We agree with Wimmer (2015: 2198-2202) that race is not "the dominant form of ethnic-racial classification around the world. . . . Ethnic forms of categorization are more frequent than racial ones in the world as a whole" (cf. also Morning 2010).
3. will deter cutting edge explorations by junior scholars who are likely to encounter the kind of rancorous scholarly gatekeeping (Kuhn 2012) to protect the "paradigm of race-centrism" (Wimmer 2015) that we two senior scholars triggered from pre-publication reviewers; and
4. will continue to silence or to erase alternate epistemologies from nonwestern intellectuals and activists who might foster different lines of theory and praxis.

Shall we continue to tilt, Don Quixote style, at the ethereal windmill of *globalized white supremacy*, which offers momentary catharsis through rhetoric of outrage, but ultimately offers no viable path toward effective theory or praxis? Are we willing to put aside the academic drive to universalize and to "overgeneralise" the western paradigm of race-centrism (Wimmer 2015) in order to move toward a "*globa*l sociology which moves beyond Occidentalism" (Boatca 2015: 231)? Can we find the courage to ignore the paradigm gatekeepers (Kuhn 2012) in order to "unthink" (Wallerstein 1991) our racialized social science (Goldberg 1994) and to effect "the unerasure of the non-European" (Boatca 2015) in our theory construction? It is only through such a difficult intellectual and activist process that we will be able to reveal—and to combat—the multiplicity of locations at which 21st century semiperipheral states, elites and transnational capitalist classes are inventing patterns of exploitation and marginalization that are concealed by western race dualisms, like the global apartheid model.

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The Centrality of Race to Inequality Across the World-System

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> While the gap between rich and poor nations—as well as between the rich and the poor—is widening everywhere, global wealth is concentrating in fewer hands, and these few include those of subaltern elites. In this reconfigured global landscape, the "rich" cannot be identified exclusively with metropolitan nations; nor can the "poor" be identified exclusively with the Third and Second Worlds. The closer worldwide interconnection of ruling sectors and the marginalization of subordinate majorities has undermined the cohesiveness of these geopolitical units. […] The social tensions resulting from these processes often lead to a racialization of social conflict and the rise of ethnicities (Coronil 2000: 361).

> Some groups can be mobile in the ranking system; some groups can disappear or combine with others; while others break apart and new ones are born. But there are always some who are "niggers."If there are no Blacks or too few to play the role, one can invent "white niggers." (Wallerstein 2000: 350).

The starting point of Wilma Dunaway and Don Clelland's article is the observation that "more of the share of the world wealth that once accumulated in the core and in the European semiperiphery is now being appropriated by nonwestern semiperipheries" (2017: 11). The article offers a wealth of much-needed empirical evidence against the recurrent catching-up development rhetoric that

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World Bank reports often derive from undifferentiated data on population size and economic growth in low income countries. It also makes a strong case for a more differentiated analysis of hierarchies of oppression that would account for the diverse ethnic make-up of the transnational capitalist class as much as for the actions of nonwestern states. The article thus intends to decenter Eurocentric perspectives by bringing nonwestern semiperipheries to the forefront of social theory and by denouncing approaches centered on race as universalization of Western knowledge. To this end, Dunaway and Clelland strongly emphasize the visibility of semiperipheries, yet underplay and even explicitly argue against the importance of white supremacy for an understanding of global inequality. While I agree, and have previously argued myself, that closer attention should be paid to semiperipheries in terms of their transformative potential, I consider the claim that nonwestern semiperipheries exacerbate and even cause racial/ethnic inequality misleading. The data provided in the article do speak to the role of semiperipheries more generally (Western and non-Western) in lending stability to the system by replicating, mirroring and disseminating racialized mechanisms of endless accumulation of capital at different levels in the structural hierarchy; yet this does not amount to the nonwestern semiperipheries' ability to overturn the racializing logic on which endless accumulation has been premised since the emergence of the modern/colonial world-system, and should not be mistaken for it. In the following, I thus want to caution against what I think are three weak links in the authors' argument: mistaking visibility for causation, conflating the concept of race with the reality of racism (and its many historical and geopolitical configurations), as well as throwing the baby (white supremacy) out with the bathwater (Western knowledge).

I will limit my comments to two aspects. The first one is methodological and concerns the unclear unit of analysis that underlies the authors' claim for the centrality of non-Western semiperipheries to ethnic/racial inequality. The second aspect is more substantive and targets the relationship between racism and the emergence, functioning, and reproduction of the modern/colonial world-system.

The Unit of Analysis

In order to draw attention to the role of nonwestern semiperipheries in causing and exacerbating ethnic/racial inequality, Dunaway and Clelland observe that "greater wealth accumulation has not been accompanied by an end to ethnic/racial oppression in the core, nor has ascent to semiperipheral status led to less ethnic/racial exploitation in nonwestern societies" (2017: 15). South Africa is mentioned as an example where the dismantling of white rule has even led to a Black elite oppressing a Black majority. Together with the fact that the richest countries now include many nonwestern states and that large numbers of nonwesterners have joined the capitalist class in recent decades, this is viewed as evidence against a global apartheid thesis — according

to which white supremacy dictates the terms and amount of wealth accumulation: "[…] why did "white supremacy" not operate to prevent 'nonwhite' interlopers from accumulating wealth between 1980 and 2015 that this racial dualism reserves to "western" countries? […] Why did "coloredness" not prevent seven Third World countries from achieving GDPpc that was 2.3 times greater than that of the United Kingdom in 1980?" (2017: 14).

Answers to the questions thus formulated seem to be possible only as blatant negations of the white supremacy thesis. Yet this is due to the methodological bottleneck inherent in the questions themselves: on the one hand, their focus constantly shifts from structural positions in the world-system (core, semiperiphery) to national units (societies, countries) to regional constructs (the West, Eastern Europe, the Third World); on the other hand, these units seem to operate on their own, rather than as parts of the capitalist world-economy. For nonwestern semiperipheries to cause ethnic/racial inequality, mechanisms of the production and reproduction of difference would need to be available there that are unavailable elsewhere in the world-system, and that are somehow confined to that particular location. For South Africa to experience the dismantling of exploitation and segregation of the nonwhite majority after the end of apartheid, racism would need to have worked there independently of the racism built in the exploitative logic of the capitalist world-economy. Yet the very contribution of world-systems analysis to understanding global inequality consists in viewing capitalism as operating at the level of the entire world-system, rather than in individual countries going through different stages. Shifting the unit of analysis from the nation-state to the world as a whole makes it possible to view inequalities as intrinsic to the world-economy, their increase in the longue durée as part of a secular trend, and their eventual disappearance as premised on a fundamental transformation of the entire world-system, not just individual units — be they countries, regions, or semiperipheries. If we are to understand the ways in which racism produces ethnic and racial inequality in the world-system today, the unit of analysis of the questions we ask has to be the world-system as well. The so-called West is only "white," the allegedly post-Socialist Europe "white, but not quite" and the former Third World "colored" in relation to each other and in a world-system premised on a constructed notion of whiteness as the norm. Indeed, Wallerstein's early engagement with race in the African context does justice to both the systemic logic and the local fluctuations that operate to maintain white supremacy:

> Race is, in the contemporary world, the only international status group category. It has replaced religion, which played that role since at least the eighth century AD. Rank in this system, rather than colour, determines membership in the status group. Thus, in Trinidad, there can be a 'Black Power' movement, directed against an all-Black government, on the

> grounds that this government functions as an ally of North American imperialism. Thus, Quebec separatists can call themselves the 'White Niggers' of North America. Thus, Pan-Africanism can include white-skinned Arabs of North Africa, but exclude white-skinned Afrikaners of South Africa. Thus, Cyprus and Yugoslavia can be invited to tricontinental conferences (Asia, Africa and Latin America) but Israel and Japan are excluded (Wallerstein 1979: 180).

Race In The Modern/Colonial World-System

However, Dunaway and Clelland further clarify their strong disavowal of white supremacy as an explanatory factor for racial/ethnic inequality. They argue that, while ethnicization and racism are structured into the dynamics of the world-system, they operate at multiple levels across the structural positions of core, semiperiphery, and periphery, rather than as a racial dualism that pinpoints "whites" as the only perpetrators of ethnic and racial inequality (19f.) across all tiers. They thus take the increasing racial and ethnic diversity of the transnational capitalist class in the past decades as a particularly strong indication of the ways in which nonwestern semiperipheries will increasingly cause and/or exacerbate most of the world's ethnic/racial inequality in the 21st century. As much as 53 percent of the world's wealthiest capitalists today are not Westerners, Dunaway and Clelland point out, and yet globally visible outlets, such as Oxfam's 2016 report on the concentration of wealth in the hands of ever fewer billionaires, disregard this momentous change in this class' composition.

The evidence pointing to an unprecedented shift in the nationalities of the world's most recent billionaires is indeed both striking and mounting. World-systems scholars found that the number of billionaires in middle-income countries tripled in just six years despite the 2008 recession, with Brazil, Hong Kong, and India registering a twofold, Russia almost a threefold, and China a staggering twelve-fold increase in their respective number of billionaires from 2006 to 2012 (Albrecht/Korzeniewicz 2018: 103). At the same time, global financial consultancies such as Arton Capital predict that the billionaire population is going to grow nearly 80% by the year 2020, an increase of 1,700 billionaires, to which China and India are expected to contribute disproportionately (Arton Capital 2017). Such trends clearly render the Asian semiperiphery more visible with respect to its impact on global inequality — but they are neither caused nor exacerbated by the semiperiphery. Rather, they provide further evidence of the world-system's increasing polarization into an ultra-rich transnational class and an increasingly impoverished 99%: As Oxfam has calculated, since 2015, the richest 1% have owned more wealth than the rest of the world, while the number of individuals that held the same wealth as the bottom half of

humanity has rapidly decreased from 388 in 2010 to 62 in 2016 and to only 8 in 2017 (Oxfam 2017).

It is therefore misleading to treat the (relatively and absolutely) fast-growing, but nonetheless relatively small group of non-Western billionaires as an indicator of changes in the role of the semiperiphery as a whole. First, because even between 2006 and 2012, the period of the fastest increase in the number of ultra-rich non-Westerners for which there are data, the odds of becoming a millionaire were still twice as high for citizens of high-income countries than for citizens of middle-income countries that qualify as semiperipheries (Albrecht/Korzeniewicz 2018: 105). Second, because a large number of the semiperiphery's billionaires is made up of non-residents who either already have a second citizenship in a core country or are in the market for one, which is what makes them more interesting for global financial consultancies in the near future than they already are. The same financial recession that marked the shift towards more non-Western capitalists becoming billionaires after 2008 also saw the proliferation of investor residence and citizenship programs throughout the European semiperiphery (Western and non-Western). It thus became possible to acquire a European Union residence permit or a second citizenship with a sizeable investment in real estate or government bonds (Boatcă 2016).

The main beneficiaries of such programs, implemented since 2010 in Hungary, Cyprus, Malta, Macedonia, Greece, Bulgaria, Lithuania, Spain, and Portugal have been Chinese, Russian, but also Lebanese and Egyptian investors who thus obtain the right of visa-free travel to core countries, the citizenship of a Schengen-zone state (except in the case of Bulgaria) and the right to reside and work anywhere in the European Union. None of these programs include strict residence requirements for their investor citizens, who thus use the rights they purchased as remote access to the wealth accumulated in Western core states and shielded from the majority of the world's population through Western core states' enforcement of borders, visa regimes, and citizenships. As summed up by Arton Capital: "With more and more wealth being created in Asia, yet demand for residence in European territories being so high, this trend of UHNW [ultra high net worth] individuals seeking global citizenship will undoubtedly continue to grow" (Arton Capital 2017). The boom in the number of non-Western capitalists seeking the advantages of residence and citizenship in the U.S. and Europe is therefore hardly a challenge to core dominance or white supremacy. Rather, it points to the paramount role that race continues to play for a global stratification in which the "premium citizenships" of core Western states highly correlate with whiteness; and to which only very wealthy non-whites have recently gained access through the commodification of rights in semiperipheral states that share a visa-free travel zone with core Western states. For wealthy non-Westerners, investment residence and citizenship of Western states constitute global social mobility as well as a means of "buying into" whiteness. The European Union is the historic heir to Western colonial states (Böröcz/Sarkar 2005) whose wealth

accumulation has been highly premised on a racialized division of labor and a structurally unequal distribution of resources to those racialized as non-White

The Henley & Partners Visa Restriction Index, produced by a private British consultancy in cooperation with the trade association for world's airlines, IATA, ranks Germany number one on account of a total score of 176 countries to which their citizens can travel visa-free (out of a maximum score of 219, the number of world's sovereign states). Sweden ranks second at 175, followed closely by Denmark, Finland, Italy, Spain, and the US, which all give their citizens visa-free access to 174 countries worldwide. Most passport holders in Africa, the Middle East, and South Asia have scores below 50, while mainland China has a slightly higher score of 51 — similar to India's at 53, but below Ghana's, Morocco's, and Indonesia's (Henley & Partners 2017). This explains why EU residence permits are extremely attractive to Chinese investors, and much more so than for Hong Kong investors, who have access to 152 countries on account of having a "Special Administrative Region of China" passport — a reminder of residual colonial ties.

It is thus even more misleading to view the ethnic and racial diversity of billionaires from semiperipheral countries as an argument against white supremacy. The growing number of Brazilian millionaires has increasingly sought either a U.S. green card, the investor citizenship of a Caribbean country still part of the Commonwealth, or European citizenship through descent from a European ancestor as a means of translating material wealth into global social mobility (Fellet 2016). Such capital-facilitated moves up the citizenship ladder are themselves ways of buying into whiteness, or what, in the context of racial inequalities in Brazil has been referred to as "whitening with money" (Hasenbalg 2005). At the global level, they are strategies of eluding the ascription of citizenship of one's place of birth. As such, they belie the experience of the great majority of transnational labor migrants, for whom international migration in search of upward economic mobility entails the risk of downward racial mobility through reclassification as non-white.

That race is used as a census category in few states and whiteness seldom chosen as a means of self-identification, as Dunaway and Clelland observe, should not deceive us into denying the processes of racialization being replicated throughout the structural positions of the world-system. Nor should the fact that the word "race" does not exist in a majority of the dialects of Asian semiperipheries (p. 58) be taken to indicate the absence of whiteness as the norm and racial stratification as a reality in Asia:

First, as scholarship on Orientalism, racism, and critical whiteness has repeatedly shown, prevailing norms — whether it is the West, Europe, heterosexuality, or whiteness — feature as unmarked categories (Hall 1992, Todorova 2005). Their normative character becomes visible through the simultaneous construction of difference — of the Orient as the non-West, of Eastern Europe as lesser Europe, of homosexuality as non-heterosexuality, and of blackness as non-whiteness. All deviant categories thus constructed require naming, while their unmarked

counterpart remains unnamed, unqualified, or unstressed. The label of "Europe" always includes both Western Europe and its white populations, but Eastern Europe needs to be specifically mentioned in order to be included in the term, while Black Europe needs to be argued, defended, and explained. In this context, the fact that the European East is often portrayed as "semi-Oriental" or "somehow Asian" not only serves to sanction Western Europe's position as the norm, but also to legitimate the – geographically untenable – continental division between Europe and Asia (Lewis/Wigen 1996). The vast regional inequalities and trade imbalances that Dunaway and Clelland observe in Asia are undeniable, yet they only prove that Asia as a whole is not a unit of analysis, but a racialized, Orientalist construct. As critical geographers have long pointed out, the very fact that regional commonalities in Asia made it impossible to pinpoint an "Asian identity" is precisely what "has allowed Europeans to see the disproportionate diversity of the Asian "continent" as a challenge *for Asian civilization*, rather than as a challenge to their own system of geographical classification" (Lewis/Wigen 1996: 37).

Second, the extent to which Asian societies are impacted by racialization as deviance from whiteness becomes apparent, among other things, in the fact that economies — as well as politics — of beauty have consistently privileged whiteness in ways that reinforce and reproduce colonial patterns of racialization despite the absence of explicit references to whiteness (see Haritaworn 2012). Instead, what is often labeled the "Eurasian" or "Pan-Asian" look that is considered more attractive than darker skin by a large majority of men and women across Asia and associated with racial superiority, status, and higher income, fuels a booming cosmetics industry that thrives on skin-bleaching. Accordingly, 4 out of 10 women surveyed in Hong Kong, Malaysia, the Philippines, and South Korea use skin-whitening products, the global market for which is "projected to reach $19.8 billion by 2018, driven by the growing desire for light-coloured skin among both men and women primarily from the Asian, African and Middle East regions" (Pe 2016).

Does all of the above amount to evidence for the existence of the "global racial dualism" that Dunaway and Clelland seek to disprove? Not necessarily. It certainly is not evidence for a "fixed racial axis of the world-economy" which "reduces the world's diverse people into two lumps that conceal massive ethnic/racial complexity" (2017: 13). When attempting to see "beyond white racists and colonists" (2017: 46), we however need to take into account that, even if not all racists are white, racism in the world-system is premised on colonially enforced whiteness. In this context, whiteness is just as much a geopolitical category as it is a racial designation. The modern/colonial world-system piggybacked on previous forms of xenophobia and discrimination and incorporated them as part of the logic of endless accumulation just as it incorporated older regimes of labor control, such as slavery, serfdom, and tenancy. In ancient China, India, and Japan, fair skin implied wealth and nobility, while darker skin signaled work in the field (Pe 2016). In Europe, medieval

Christendom offered an entire apparatus of otherness formed by unmarried and learned women, heretics, Jews, and Muslims, that prefigured colonial racism and sexism (Shohat 2017). The incorporation of the Americas into the emerging world-system entailed transforming such imperial differences into colonial ones, as well as inventing Europeanness, ethnicity, and race (Quijano/Wallerstein 1992, Mignolo 2006). Semiperipheries today are therefore (still) competing within a capitalist world-economy based on racism and inequality and their strategies are imbricated with nationalist, fascist, and racist ideologies recurrent throughout the system, but they neither originated with nor were enhanced by the structural position of nonwestern semiperipheries.

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Class Struggle for the 21st Century:
Racial Inequality, International Solidarity, and the New Apartheid Politics

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Wilma Dunaway and Donald Clelland's article, "Moving toward theory for the 21st Century: The centrality of nonwestern hemispheres to world ethnic/ racial inequality," is structured around a contradiction between the interrogation of global apartheid theory's political correctness and reverse racism and the scathing, yet hyperbolic, critique of the semiperipheries as the most egregious site for the reproduction of racial inequality in the world today. This contradiction is articulated in the form of a disavowal of race: On the one hand, they criticize global apartheid theory and whiteness studies scholars, and rightly so, for enforcing a Eurocentric conception of race that racially codifies the increasing polarization of wealth in the non-western world into a dichotomy between "white affluence" and "colored poverty/ stagnation." The claims of global apartheid theory, they suggest, are undercut by the ascent of the transnational capitalist class (Robinson 2014) and the rising power of the semiperiphery as a neo-colonialist and sub-imperial power block which "causes, contributes to, and exacerbates" ethnic/ racial inequality around the world today.[1]

[1] The authors use extensive data on income levels and DGP per capita to demonstrate the ascent of the semiperipheries, in order to delineate ten different ways by which nonwestern semiperipheries allegedly perpetuate and aggravate

On the other hand, they themselves reproduce the same reification of race they seek to distance themselves from and transcend in their discussion of the function of race and racial oppression in the intensified integration of the semiperipheries in the global capitalist system. The authors homogenize race as an analytical concept, treating it as an abstract and universal idea in their analysis of the vast geographies and histories that constitute the borders of semiperiphery they identify in their article. Hence, they fail to ground their critique of ethnic/ racial inequality of the semiperiphery in any substantive discussion of racial politics, institutional structures, and ideologies, including the cross-cultural appropriation of Western scientific theories and cultural mythologies in non-western racial economies.[2] In this sense, the terms of the analysis of racial inequality conflate race with other analytical concepts that inform specific forms of oppression and exploitation in these semiperipheres. In an earlier version of this article (Dunaway and Clelland 2016), moreover, they even refer to this transnational capitalist class as "dark capitalists," who deserve as much critique as white capitalists in the analysis of the world-system. As such, they end up reinscribing their analysis of inequality in the semiperiphery in the same racial terms they reject in the critique of Western imperialism, racial privilege, and white affluence.

In this paper, I propose to interrogate the implications of Dunaway and Clelland's disavowal of race in relation to two major themes that emerged in their analysis of racial inequality in the semiperipheries namely, the reification of race and the refugee crisis. Drawing on the work of the Slovenian philosopher Slavoj Žižek, I will argue that in their critique of the Manichean racial economy and empty liberal posturing of global apartheid theory, the authors move in the right direction and they should be applauded for it. However, they miss an important opportunity not only to transcend the reification of the idea of race altogether, but also to extend world-system as well as global apartheid theories in new directions.

ethnic/racial inequality around the world in the 21st century. However, the direct correlation the authors make between the increasing wealth of the semiperipheries and their rising hegemonic status in the world-system overlooks the debates about the most reliable measure of state wealth—whether state assets or measures of income and flows of services and goods constitute the real source of state wealth. As John Mearsheimer remarks in a different context, the economic resources a state has at its own disposal to develop its military power, what he refers to as "mobilizable wealth," "is more important than overall wealth because what matters is not simply how wealthy a state might be, but how much of that wealth is available to spend on defense" (Mearsheimer 2003, 62). Moreover, the categorical claims they make about the rising power of the semiperiphery are still undercut by many of the assertions they make about the unwaning power of the core in the world-system today.

[2] A cursory look at the available literature on the problem of race in the semiperiphery demonstrates the massive differences in the perception of race and racial politics in these countries. Indeed, the difficult task of accounting for the nuances among such histories of racial inequality in the vast areas of the semiperiphery cannot be underestimated. For a very useful and in-depth discussion of the problematic of race in China and India, please see Jacques (2009) and MacDuie-Ra (2015), respectively.

Juxtaposing Dunaway and Clelland's claims with Žižek's is not an arbitrary choice: Although Žižek is critical of world-system theory, especially the problem he sees in Wallerstein's conceptualization of the proper dialectical tension between the universal and particular (Žižek 2002), he shares with Dunaway and Clelland the same animus against the liberal posturing and the political correctness of contemporary theory and cultural studies. For him, as he has succinctly put it recently, "the cruel irony of anti-eurocentrism is that, on behalf of anti-colonialism, one criticizes the West at the very historical moment when global capitalism no longer needs Western cultural values (egalitarianism, fundamental rights, the welfare state) in order to function smoothly, and is doing quite well with authoritarian 'alternative modernity'" (Žižek 2017). Nonetheless, Žižek's political theory is grounded in a specific understanding of the necessity of the class struggle and the intensification of the antagonism between the included and excluded in the expanding global apartheid regime, around which all the contradictions of the global capitalist system collapse.

In what follows, I will first, discuss Dunaway and Clelland's critique of global apartheid theory in relation to Žižek's uncompromising interrogation of liberal, multicultural strands of contemporary theory especially, postcolonial studies and postmodern feminism, for their "culturalization of politics." For Žižek, the reification of race here, like many other secondary contradictions, only distorts the realities of class exploitation and obfuscates the truth of the fundamental antagonism (class struggle). As he shows in the example of Malcolm X and the case of postcolonial Indian subjects who are fully integrated in the global capitalist system, only the renunciation of identity markers, ontic properties, or roots can open up a space for a true radical universality. In the context of his specific understanding of the new apartheid politics in the world today, he thus insists that the class struggle cuts across and throughout all world societies and the apartheid politics that pervades them. While Dunaway and Clelland hint at these realities in their discussion of the transnational capitalist class and their reference to South Africa, the authors substitute class for the class struggle today, opting instead to show the bankruptcy of the racial divisiveness of global apartheid theory.

Second, I will contrast Dunaway and Clelland's treatment of transnational migration and the global refugee crisis with Žižek's analysis of the humanitarian tragedy of the refugees. Their acknowledgment of the humanitarian campaigns on behalf of refugees in the semiperipheries notwithstanding, Dunaway and Clelland cynically use transnational migration and the refugee crisis to establish their claims about the major role the semiperipheries play in reproducing racial inequality in the world through their brutal mismanagement of the crisis. In contrast, Žižek frames the problem of the refugees in the context of the totality of the crisis in both host countries and countries of origins, relinks the crisis to the political economy of the refugees, and discusses the implications of the refugee crisis for the future of a truly radical solidarity politics. Dunaway and Clelland are surprisingly silent about the issue of international solidarity in their discussion of

ethnic resistance to state power which they ascribe to the widespread appropriation of the culture of universal human rights and multicultural ideology in the semiperiphery.

In Žižek's political theory, the refugees stand in for the surplus, disposable, and excluded populations that embody a genuinely radical universality, in a way that can reinscribe the class struggle and engage in a "positive universal project shared by all." This is the only ground from which a meaningful solution can emerge. While Dunaway and Clelland argue that the transformative power of the semiperiphery lies in its "ability to challenge and perhaps alter the entire system," this potential cannot be actualized without offering the refugees and other surplus, excluded populations a place in the class struggle within the global capitalist system.

The culturalization of politics and the new apartheid regime

One of the main goals that Dunaway and Clelland set out to accomplish in their article is decentering dominant Western theoretical paradigms in contemporary sociology and international relations especially, what they refer to as the "Western race paradigm" and theories of global apartheid and white supremacy. After almost a decade and half of debates about post-theory which announced the premature death of theory, the authors seek to revamp theories of racial inequality and reshift the conceptual framework of hegemonic Western theories to reflect the realities of the nonwestern part of the world-system. These theories reify race, framing the problem of racial inequality in global racial Manichean terms that promote a "West vs. the rest" worldview, identify whiteness as the exclusive site of racial privilege and affluence, and ascribe to whiteness the sole agency in the oppression of "the rest" and the perpetration of the majority of cases of inequality in the world today.

Likewise, Žižek condemns hegemonic Western theories for their "culturalization of politics," or the institutionalization of postpolitical multicultural ideology as "the cultural logic of multinational capitalism" (Žižek 1997: 28). This postpolitical multicultural ideology makes possible the proliferation of social movements that inscribe their presumably oppositional subjects primarily within the sphere of cultural production. For Žižek, multicultural postpolitics, embedded as it is in proliferating narratives of victimization and the primacy of identity and ontic properties, reduces the struggle for emancipation and economic justice to a struggle over identity politics and the politics of recognition, be it gender, racial, sexual, national, ecological, and so on (Žižek 1999: 396; Žižek and Daly 2004: 143). He deems it symptomatic of these movements' complicity with capitalism that multiculturalism enumerates these ontic properties or secondary contradictions within the constellation of identity politics, bearing "witness to the unprecedented homogenization of the contemporary world" by the "(dead universal)" global capitalist machine, which colonizes the "heart of each (particular living) ghost" (Žižek 1997: 45-46).

In his specific engagement with feminism and postcolonialism, which for him constitute dominant forms of multicultural identity politics, Žižek thus calls for more reflexivity in interrogating the constructivist content of feminist theories of performativity and the radical postcolonial critique of liberalism and Eurocentric universality. For him, the content of both these theories is "insufficient:" on the one hand, feminism merely describes the dominant attitude concerning the possibility of repositioning and restructuring identity; on the other hand, postcolonial discourse not only repeats the standard Marxist critique of "false universality" but also levels this critique through the very same liberal vocabulary it purports to criticize, thus failing to transcend the constitutive contradictions of the dominant neocolonial liberal ideology (Žižek 2008: 148). Moreover, feminism and postcolonialism, like all other social movements structured around the identitarian logic of multiculturalist postpolitics, are embedded within the mainstream logic of domination. Therefore, these discourses are necessarily susceptible to "inherent commodification," since "the very space for this proliferation of multiplicity is sustained by the recent stage in the development of capitalism" (Žižek 1999: 395).

For Žižek, these theories define the terrain of struggle around multicultural issues of tolerance, diversity, and identity, distorting the instrumental role multiculturalism plays in the reproduction of global capitalist hegemony. He thus argues that multiculturalism is the ideal form of global capitalist ideology, and as such it constitutes "the form of appearance of its opposite, of the massive presence of capitalism as *universal* world system" (Žižek 1997: 46). As he makes clear in the parallels he draws between multiculturalism and colonialism, multiculturalism replicates the same racist and Eurocentric colonial structures; he asserts that

> multiculturalism is a disavowed, inverted, self-referential form of racism, a 'racism with a distance'—it 'respects' the Other's identity, conceiving the Other as a self-enclosed "authentic" community towards which he, the multiculturalist, maintains a distance rendered possible by his privileged universal position. (Žižek, 1997, 46)

Unsurprisingly, Žižek maintains that the multiculturalist inhabits the privileged position of the "*empty point of universality* from which one is able to appreciate (and deprecate) other particular cultures properly—the multiculturalist respect for the Other's specificity is the very form of asserting one's own superiority" (Žižek 1997: 44).

Žižek's main problem with multiculturalism is that the terrain of struggle in multicultural politics is constructed around the cultural-ethical mandate of tolerance. Žižek shows that this multicultural discourse "involves the 'repression' of a different discourse to which it continues to refer," namely, the socioeconomic struggle (Žižek 2010: 137). For Žižek, as he suggests in the

case of feminism and postcolonialism, the extent of the class struggle is repressed or displaced by offering excessive representations of the "horrors of sexism, racism, and so on," an excess that can be attributed to "the fact that these other '-isms' have to bear the surplus-investment from the class struggle whose extent is not acknowledged" (Žižek 2000: 97). The problem here is that this reification of identity distorts the potential of the particular reality structured around these specific identities to actualize the condition of its abstract universality (universal emancipation).

Žižek makes these claims clear in his discussion of the revolutionary thinking of his hero Malcolm X. Unlike other black nationalists, Malcolm X was not obsessed with searching for precolonial African roots. Rather, as Žižek states, Malcom X saw the opportunity afforded by the traumatic African-American history of slavery, forcible dislocation and the involuntary erasure of culture and the past, as an opening to the freedom to invent a new universal identity. This is precisely the meaning of his newly iconic last name (X). As he says to Tavis Smiley in an interview,

> Because of this Malcolm X [. . .] wasn't playing the Hollywood game, *Roots*. You remember that stupid TV series? The greatest honor for you blacks' desire is to find some tribe in Africa. Oh, I'm from there. No. Of course, Malcolm X meant by the brutality of white men, being enslaved, we were deprived of our roots and so on.
> But he wrote about it. But this X paradoxically opens up a new freedom for us, all that white people want to be, not primitive tribal, but universal, creating their own space. We, black people, have a unique chance not to become, not to return to our particular [roots], to be more universal, emancipated than white people themselves. You see, this is the important thing for me. (Žižek and Smiley, 2015)

Malcom X thus traversed the fantasy of roots and past. Since local traditions work well with global capitalism, as Žižek points out, the precondition for a new path of freedom is precisely the renunciation of all roots in favor of an emancipatory universal identity.

This dialectical tension between the particular and the universal, a tension that is inherent to any identity, cultural content, and/ or life world, is best exemplified in his critique of the postcolonial axiom that the truth of the postcolonial subject living in a globalized world is its cultural lifeworld, tradition or way of life. Žižek refers to the Indian historian Dipesh Chakrabarty's example of the Indian software programmer who represents the truth of Indian lifeworld through his concrete (cultural) content such as rituals, etc (Žižek, 2010, 280-285). For Chakrabarty, this Indian programmer is a paradigmatic cipher of the unproblemtic simultaneity or

"normalized coexistence of the universality of modernization and of particular lifeworlds." Žižek, however, correctly notes that "postmodernity is not the overcoming of modernity but its fulfillment: in the postmodern universe, pre-modern leftovers" are no longer experienced as obstacles to be overcome by progress towards a fully secularized modernization, but as something to be unproblematically incorporated into the multicultural global universe —all traditions survive, but in a mediated "de-naturalized" form, that is, no longer as authentic ways of life, but as freely chosen "life-styles." In other words, within the totality of global capitalism, "elements of pre-existing lifeworlds and economies (including money) are gradually re-articulated as its own moments, "exapted" with a different function."

Žižek thus concludes that the truth of the postcolonial subject is its abstraction (incorporation into the global capitalist system) not in its concrete (cultural) content. Indeed, according to Marx's critique of commodity fetishism, in the global capitalist system, the subject relates to itself and its reality as "contingent embodiments of abstract universal notions": the particular life world or cultural content is merely experienced as contingent, since the "abstract universal capacity to think and/ or to work" constitutes the ultimate ground for self-definition (Žižek, 2012, 356-357). His point here is that "in the specific conditions of commodity exchange within a global market economy, 'abstraction' becomes a direct feature of actual social life," for it "has an impact on the way individuals behave and relate to their fate and to their social surroundings" (Žižek, 2012, 356-357). Žižek thus maintains that under the hegemony of the global capitalist system, subjects are actually more universal than they think and that particular identities themselves are "always already traversed by universalities, and caught up in them" (Žižek, 2014, 260). Indeed, he maintains, these particular identities are nothing but a "fragile ideological fantasy" that overlooks "how universality manifests itself in the gaps, failures, and antagonisms at the very heart of these very identities" (Žižek, 2014, 260).

What partisans of identity politics tend to forget is that "every particular position is haunted by its implicit universality, which undermines it" (Žižek, 2012, 360). Every cultural content or life world seeks to repress the universal dimension which lies at its core, since this actual universality mediates, destroys, and splits all particular cultural content or identities from within. It is sufficient to mention that any critique of or protests against the excesses of a particular cultural content are "formulated from the standpoint of universality" (Žižek, 2012, 357). Therefore, he insists, above all, on the need to fully assume the repressed point of exclusion as "the gap between the particular . . . and the universal which destabilizes it from within" in order to reconfigure the very coordinates and terms of universality (Žižek, 2012, 361).

It is important to note that Žižek posits "the empty place" of universality for human beings as a problem, in the sense that it is "simultaneously necessary and impossible" (Žižek, 2012, 356). In

contrast to Ernesto Laclau's idea of hegemony, in which a particular content can predominate in the struggle for hegemony by assuming the empty place of universality, Žižek maintains that universality "can never be filled with any proper content." The problem for the human subject lies in the contradiction between its "singular subjective viewpoint," through which it perceives and colors reality, and its status as another object in that reality (Žižek, 2012, 356-357). Consequently, any particular content will never succeed in filling in this universality or in bringing the particular content into harmonious relations with the universal. As such, universality is unavoidable and empty at the same time.

In a different context, Žižek uses feminism to draw the radical political implications of this problematic status of universality. . According to this model, feminists would not simply engage in inscribing a particular form of difference (i.e., gender or sexual difference) within the matrix of the dominant symbolic order; rather, they would interrogate and destabilize the universal framework within which a troubling excess is foreclosed:

> This is what you must be conscious of, that when you fight for your position, *you at the same time fight for the universal frame of how your position will be perceived within this universal frame*. This is for me, as every good feminist will tell you, the greatness of modern feminism. It's not just we women want more. *It's we women want to redefine the very universality of what it means to be human*. This is for me this modern notion of political struggle. (Pound 2010: 113)

The concern with particular sexual or gender difference in feminist discourses should not be to single out this particular difference and elevate it to the level of the universal. Such a move can only represent radical antagonism in a distorted way, "through particular differences internal to the system" (Žižek, 2012, 357). In Fabio Vighi's words, the struggle for a particular form of difference becomes "nothing but a content that is necessarily distorted by its own attempt to fulfill the demand of its abstract universal"—in Žižek's example above, sexual difference and human emancipation, respectively (Vighi, 2006, 108). The point is to instead appropriate the form of feminist particularity in order to interrogate and destabilize the very universal framework (i.e., multiculturalism and identity politics) within which this particular form of difference is posited. In other words, as he states, "the true particularity is, primarily, the particular subjective position from which the universal Notion is acceptable to me" (Žižek, 2012, 360). In the case of particular cultural content or life world, to paraphrase his example about the state, the idea is not simply to recognize that the subject lives in a particular life world and that there are other types of life worlds, but that the recognition of being a subject of a particular life world, framed within

its specific ideological structures, informs, shapes, and "colors the universal notion" of a life world.

This is not to say that Žižek dismisses the important struggles against particular forms of oppression structured around secondary (visible) contradictions. His crucial point here is that the emphasis on these secondary contradictions mystifies and displaces—even effaces—the fact that the struggle for universal emancipation (the class struggle) must be made "through or at the site of *a thwarted particularity*" (emphasis in the original; Žižek, 2012, 362). Hence, he argues that universality in itself is nothing but the failure to realize a particular identity—when a particular identity falls short of becoming itself, it rises up to the status of the universal (Žižek, 2012, 362). He thus states, "it is not only that universality inscribes itself into my particular identity as its rupture, its out-of-jointedness; universality 'in itself" is in its actuality nothing but this cut which blocks from within all and every particular identity" (Žižek, 2012, 362). Hence, Žižek points out, the precondition for a new path of freedom is precisely the renunciation of all cultural content and/ or roots in favor of an emancipatory universal identity. Elsewhere, Žižek calls this process "subjective destitution," which makes it possible for the revolutionary subject to invest in a new radical universal subjectivity. For him, as he maintains, a genuine anti-colonialism cannot be grounded in the glorification or defense of specific cultural content, traditional lifeworlds, or identity narrative, but can only be based on their evacuation.

The differences between Dunaway and Clelland's and Žižek's approaches to race and the struggle for justice and equality under the hegemony of the global capitalist system can be attributed to the way Žižek frames his critique of the integration of the semiperipheries in the new logic of global capitalist economy within a specific understanding of the growing global apartheid regime around the world (Žižek 2010). For him, new forms of capital and profit have privatized the three major commons of humanity, including the ecology, genetics, and intellectual property, at the expense of the surplus and disposable part of humanity, the majority of the world's population, in ways that culminate in new forms of apartheid that register the gap between the included and the surplus, disposable, and excluded humanity in the global capitalist system. Unlike the bifurcated model of global apartheid theorists that Dunaway and Clelland criticize, Žižek appropriates the conservative German philosopher Peter Sloterdijk's idea of the cupola (Sloterdijk 2013) to argue that the included, or privileged elite (the transnational capitalist classes), everywhere live under a protective, self-enclosed cupola that groups and segregates them from the rest of surplus, excluded humanity.

These new forms of apartheid remain central to the transformation of the global capitalist system. In *Against the Double Blackmail*, he thus writes:

> In the series of four antagonisms outlined above, the one between the Included and the Excluded is the crucial one: without it, all others lose their subversive edge. Ecology turns into a problem of sustainable development; intellectual property into a complex legal challenge; biogenetics into an ethical issue. One can sincerely fight for ecology, defend a broader notion of intellectual property, oppose the copyrighting of genes, without confronting the antagonism between the Included and the Excluded. (Žižek 2016: 105)

As he forcefully concludes, such politics cannot lead to true universality, because only the antagonism between the included and excluded can testify to the threat that global capitalism poses to "the commons of humanity itself" through all its apartheid technologies. In short, as he states, while the first three antagonisms "effectively concern questions of humanity's economic, anthropological, even physical survival," the fourth contradiction between the included and excluded is "ultimately a question of justice" (Žižek 2016: 105).

Žižek's political theory underscores the centrality of the surplus, excluded humanity in any understanding of the global apartheid regime that cuts across all world societies. As such, Žižek concludes, "Capitalism's global reach is grounded in the way it introduces a radical class division across the entire globe, separating those protected by the sphere from those outside its cover" (Žižek 2017). The refugees and other surplus, disposable, and excluded communities, exist without a proper place in the global capitalist system, and, therefore, introduce a "totally different universal, that of an antagonistic struggle." Žižek explains that "rather than taking place between particular communities," this antagonistic struggle "splits each community from within, so that the 'trans-cultural' link between communities is one of a shared struggle" (Žižek 2010: 53). As such, these surplus, excluded communities turn the conflict under global capitalism from one between two particular groups to one between the global order and this radical universality, since such communities are more than willing to "introduce a division of 'Us' versus 'Them'" (Žižek 1999 201).

For this reason, Žižek rejects modern theories' overinvestment in new forms of domination that erase capitalist exploitation in their theoretical paradigm, serving as an alibi for the market. On the one hand, just like Dunaway and Clelland, Žižek insists that western theories of domination ignore the extent to which particular lifeworlds and cultural traditions are invested in "domination and oppression and conceal hidden (or not) antagonisms" (Žižek, 2014, 261). On the other, he maintains that any analysis of the way in which domination and control interlock with neoliberal ideology must above all address capitalist exploitation. Quoting Frederic Jameson, for example, Žižek writes in relation to the theories of Foucault and Agamben: "All their detailed elaborations

of the regulatory power mechanisms of domination, all the wealth of notions such as the excluded, bare life, homo sacer, etc., must be grounded in (or mediated by) the centrality of exploitation; without this reference to the economic, the fight against domination remains "an essentially moral and ethical one, which leads to punctual revolts and acts of resistance rather than to the transformation of the mode of production as such" – the positive program of such "ideologies of power" is generally one of some type of "direct" democracy. The outcome of the emphasis on domination is a democratic program, while the outcome of the emphasis on exploitation is a communist program" (Žižek, 2012, 1003). The problem with this emphasis on domination is that it "fails to register . . . that only in capitalism is exploitation naturalized, inscribed into the functioning of the economy" (Žižek, 2012, 1004). This logic of domination, as Fabio Vighi notes, is incompatible with the Marxist critique of exploitation which is "characterized by the incessant production and re-appropriation of that excess called surplus value" (Vighi, 2014, 17). Ultimately, for Žižek, in its inability to reinscribe the fundamental antagonism qua class struggle, contemporary theory will miserably fail in politicizing "the growing masses of excluded subjects as the locus of universality" (Vighi, 2014, 18).

Žižek thus insists on relinking the ongoing integration of the semiperipheries into the global capitalist system back to the fundamental antagonism or class struggle. What needs to be remembered is that the class struggle for him is not about the division of the world's population between two clearly defined, antagonistic and opposed classes, which would turn the class struggle into a pure struggle that could be peacefully resolved. Rather, her agues, there is a class struggle, because a supplementary excess, a third class that Hegel refers to as the "rabble" and Jacques Rancier as "the part of no part," exists in a way that "blurs or displaces the purity of the class struggle" and forever forecloses its reconciliation (Žižek 2010: 136-137). The differences between Dunaway and Clelland's and Žižek theoretical approaches to the global apartheid regime and the antagonism between the included and excluded inform the way they reframe the humanitarian refugee crisis.

The refugee crisis and the future of the class struggle

Under the section, "Global Migration crisis," Dunaway and Clelland discuss one of the ten ways by which the semiperipheries allegedly "cause, contribute to, and exacerbate" racial inequality, paying special attention to transnational migration and the refugee crisis and its management in core and semipeperipheral countries. The authors engage in several debates and respond to various contradictory claims in academic and popular discourses on these issues, calling into question mainstream media reports about and academic theories of "unidirectional South to western core flow," the utopian representations of diasporic and migrant experiences in the West, the critique of western anti-immigration policies, the chauvinistic and racist white backlash against "racial

minorities and immigrants of color," and the problems of appropriating western concepts such as xenophobia and racism in discussions of migration in non-western countries. Unfortunately, some of their hyperbolic claims about the management of the refugee crisis in the semiperiphery are undercut by their own claims about the role of the core countries in causing and exacerbating this crisis.

Interestingly enough, the authors begin this section by indicting the core countries not only for their mismanagement of the refugee crisis, but also for causing this crisis through their imperial politics and consequently, for fueling racial inequality in the new century. They thus make it clear that core countries exploit the semiperiphery and periphery and drain "them of resources to resolve a refugee crisis exacerbated by its military imperialism." They also correctly note the disproportionate levels in the accommodation and integration of the refugees between core countries and semiperipheral countries—despite their volatile economies, high levels of unemployment and poverty, and unstable structures, the semiperipheries seem to be engaged in a heroic effort to accommodate higher numbers of transnational migrants and refugees, by straining their GDP per capita and bearing the cost of the core countries' imperial politics. They thus state that "a majority of the world's refugees are being welcomed by countries with unemployment rates that are three to eight times worse than in the western core countries and in which a majority of the population lives on less than $2 per day."

Ironically, however, the ultimate goal of this section turns out to be establishing the extent to which "semiperipheral states are just as involved in regulating migration flows and restricting citizenship rights as western core countries," and how "ill-equipped" they are to accommodate the refugees. In their response to western scholars who ignore the mismanagement of transnational immigrants and the refugee crisis in the semiperiphery, the authors insist that "semiperipheries are as enmeshed in as much conflict over transnational migrants as western states" through reactionary chauvinistic politics, infringement upon the human rights of "foreign aliens," intolerance of foreign migrants, the use of quotas in administering migrants and refugees, deportation programs, the creation of enclaves for foreign workers, institutionalized xenophobia and racism, and even the administration of state camps for immigrants and refugees.

In contrast to Dunaway and Clelland's cynical use of the humanitarian refugee crisis to shift the scene of the struggle for refugee rights from the core to the periphery and the semiperiphery, Žižek is concerned with showing that the humanitarian tragedy of the refugees must be understood in the context of the totality of the refugee crisis, the political economy of the refugee crisis especially, the privatization of asylum accommodation in the European system in which market considerations supersede any other calculations, and with the question of radical solidarity as a way to break out of the global capitalist deadlock and its multiculturalist logic (Žižek 2016). Žižek makes it very clear that the refugee crisis is a symptom of the global capitalist system especially,

its recent mutation into authoritarian capitalism, or capitalism with Asian values (Lingle 1996). As a result of these changes, global capitalism intensifies world-wide crises, in order to relocate disposable and uncountable populations in zones of unemployability in the global North. Consequently, these refugee communities can be managed and controlled more easily on welfare and other schemes.

For Žižek, first of all, the refugee crisis has to be understood in its totality—that is, the totality of the invisible, yet constitutive scene of violence that generates the refugee crisis in both host countries and countries of origin within the contradictions of the global capitalist system. In an interview with RT, Žižek discusses the "cinematic effects" of the image of the boatload of refugees, stating that when the camera pans back, the whole of "social totality" can be uncovered. Developing this insight, I propose to examine this totality in relation to the actually-existing exclusionary asylum accommodation process in core countries and the causes of the refugee crises in their countries of origin. Dunaway and Clelland overlook the extent to which the new asylum paradigm in the core already applies harsh exclusionary measures to restrict integration of the refugees and their access to refugee status in Europe. This paradigm places heavy restrictions on the mobility of the refugees through a complex legal pending asylum process, lack of physical and social mobility, warehousing, and an assemblage of ideological, political, social, and discursive mechanisms that subject the refugees and other forced migrants to an intricate system of monitoring, tracking, regulation, examination, surveillance, and policing that arrests, fixes, and freezes many refugees and other forced migrants in place (Witteborn 2011: 61).

Benjamin Mullen, for one, notes how in the post-September 11 global world order, states have intensified their use of technologies of control and surveillance and "heightened border controls, increased passport restrictions, and embarked on an overall clampdown of movement" (Muller 2004, 50). He examines a UK White Paper entitled *Secure Borders, Safe Haven* as a manifestation of this paradox and the increasing trend towards the biopoliticisation of the refugees. *Secure Borders, Safe Haven*, which came out in February 2002, led to the Nationality, Immigration and Asylum Bill 2002, intended to make necessary adjustments to the existing act from 1999 and reflecting the contemporary realities in the politics of asylum. Under the subheading "The Challenge of Globalization," the White Paper mentions the increased interconnectedness and interdependence in the world, and the need to further liberalize movement, which was under negotiation in the WTO. In a section entitled "Biometric Registration," the Paper introduces a series of measures and mechanisms intended to both "detect and deter clandestine entrants," as well as increase the speed and management of legitimate migrants. These measures are carried out by employing "biometrics technology" and other technologies of control that were allegedly put in place to "discipline" movement and expose human trafficking.

In this new asylum paradigm, various technologies of administration and control are used to regulate movement and limit access to refugee status. Saskia Witteborn (2011) discusses two major technologies that regulate and control the body of the refugee in the pending asylum process. First, Witteborn examines the use of bureaucratic labelling (where the asylum applicant is a refugee, asylum seeker, a person entitled to asylum, a convention refugee, or a quota refugee) that construct refugees and their bodies in terms of deviant Otherness, security threat and terrorism, through the institutionalization and legalization of exclusionary practices and restrictive accommodation policies that place the refugees under heavy surveillance, examination, control, administration, detention, even criminalisation technologies. The bureaucratic labelling produces a particular status that can determine the type of "subsidiary and complementary forms of protection," eligibility for family reunification, employment, restrictions on physical mobility, or access to particular resources that can be granted the refugees (Tax 2014: 27). Nonetheless, as B. S. Chimni notes, the labelling of the refugees and their definition is rooted in policy-making practices and was always designed to serve state policy (Chimni 2009: 13-14). He correctly points out that the emphasis on the legal status of the refugees reflects a "certain legal fetishism" that seems to imply that "legal categories provide protection to refugees," while in fact these "legal categories are not merely devices for inclusion but also for exclusion" (Chimni 2009: 11).

As some commentators have referred to the "Palestinianisation" of the Syrian refugee crisis, especially their fears that the crisis might be intractable and permanent, it might be useful to consider the implications of these labelling practices on the Palestinian refugees. As Ilana Feldman (2012) shows, labelling, identification and categorization of the Palestinian refugees is not merely a bureaucratic decision. Rather, these practices constitute a far-reaching process that creates not only "discursive and material framework for action and opportunity", but is also a "source of constraint" (Feldman 2012: 388). Labelling has subjected Palestinian refugees to regulatory techniques that served as an important mechanism for "managing access to relief under the UNRWA rolls" (Feldman 2012: 394); it determined eligibility and regulated membership in the available refugee categories through highly punitive and intrusive measure that were assisted by security systems in the host countries. The label obstructs rights (citizenship, homeland) and provides access to others (relief, recognition); it confers recognition of loss and reduces refugees to the vulnerable status of victims and dependents (Feldman 2012: 389). Hence, even the labels and categories were subjected to policing and investigation. These practices have had three major effects on Palestinian refugees: first, they exposed the refugees to new modes of governance and policing, for UNRWA's definition of the refugee was created "for the purpose of the administration of its relief and other programs" (Feldman 2012: 401). Second, they introduced the already traumatized Palestinian refugees to new experiences of loss, especially of rations and

assistance. And third, they made possible the elaboration of political claims and the demand for recognition.

Witteborn also discusses the ways in which the new asylum paradigm also assigns refugees to heterotopic spaces, separate housing and warehousing that freeze them in social, semiotic and discursive locations that eventually aim to normalize and contain the refugees socially, culturally, and legally (Witteborn 2011: 1154). These spaces are usually excluded from the typical biopolitical sites of exception. In these shared refugee and asylum-seeker accommodations (*Gemeinschaftsunterkunft* or *Asylunterkunft*), they are required by law to stay for a period of time that ranges between three and seven months for purposes of bureaucratic registration, after which they are transferred to more permanent (collective) accommodations. These heterotopic spaces are comprised of different types of accommodation, including the stand-alone, multi-storey concrete apartment buildings, which provide shared apartments and kitchen/bathroom facilities. There are also the barrack-like structures, which are the most difficult to live in due to the basic scheme of the accommodations, the lack of privacy, thin walls, and sometimes problematic hygienic conditions. Different rules pertaining to food package pick-up time, the use of amenities on the premises, or appointments with the social services department make social relations among the refugees even more difficult. Unsurprisingly, as Witteborn mentions, refugees refer to these accommodations as *asylum camps* (*Asyllager* in German), *reception camps* (*Aufnahmelager* in German), or *deportation camps* (*Abschiebelager* in German), to foreground the institutionalized nature of these accommodation services and shift the responsibility back to the state that tends to blame and scapegoat individual refugees for failing to integrate in these accommodation centres.

Dunaway and Clelland also fail to address the cause of the refugee crisis and ramifications of the crisis in their countries of origin, opting to highlight some of the chauvinistic responses to the crisis without paying enough attention to the nuances, reversals, and paradoxes of the crisis. For example, debates in the Arab world raged about the legal, social, economic, and cultural effects of the accommodation of the Syrian refugees, whose image was constructed at the intersection of human rights discourses and different dominant epistemes such as national security, border control and the war on terror. Indeed, the Arab press was replete with stories about the "cultural divide" between the Syrian refugees and the neighbouring Arab countries and the debates around the integration of the refugees in the Gulf and elsewhere. Saleh Al-Kilani (2014), for example, notes that the movement of Syrian refugees into Jordan threatens Jordan's national identity and suggests that the Jordanian government supports resettlement, which they do not discuss in public media to discourage other refugees from "coming to Jordan as a gateway to third countries" (Al-Kilani 2014: 30-31). Omar Dahi (2014) even claims that the Jordanian government fears that "substantial investment in refugees will provide incentives for further inflows—or integration of existing

refugees." He quotes a Jordanian minister who "admitted in 2013 that conditions are calibrated to provide minimal aid so that refugees will have no incentive to remain, and this appears to be an unspoken policy in other host countries as well" (Dahi 2014: 11-13).

Part of the problem is that neighbouring countries such as Jordan and Lebanon are non-signatories to the 1951 Refugee Convention, and therefore do not see themselves under any international legal obligation to offer the displaced Syrians the asylum and protection accorded refugees in the cosmopolitan human rights regime (Peteet 2009). Moreover, as Al-Kilani notes, Jordanian law on refugees does not allow for integrating the refugees locally as a solution, and restricts the option of applying for political asylum to most refugees (Al-Kilani 2014). In Lebanon, Syrian refugees are accorded limited legal status. As Dalia Aranki and Olivia Kalis (2014) demonstrate, Syrian refugees "without the required entry or stay documentation to be in Lebanon" are considered to be "illegal," giving them only limited legal status in the country. Consequently, many of these refugees "feel that they have been forced into the situation of being illegally present in Lebanon and feel compelled to limit their movements for fear of being arrested, detained or even deported back to Syria" (Aranki & Kalis, 2014, 17-18). This limited legal status makes it almost impossible for many Syrian refugees "to access basic services, work and UNHCR registration sites, and to register births and marriages is severely limited." It also placed severe restrictions on their "freedom of movement" and many feared crossing checkpoints, especially in areas that have been heavily monitored and policed. As a result of the history of the tensions between Palestinian refugees and their Lebanese hosts, furthermore, Palestinian refugees from Syria find "the restrictions on entering Lebanon and on renewing their legal stay . . . much more severe" (Aranki and Kalis 2014). Indeed, Lebanon's experience with Palestinian refugees since 1948 affects its practices and policies toward the displaced Syrians. The Lebanese authorities have refused establishing camps, fearing history will repeat itself.

The accommodation of the Syrian refugees has escalated tensions between the Syrian refugees and their host communities in Lebanon and Jordan, who view the resettlement of the refugees outside the camps as a severe social and economic burden on the local and host communities, and as the primary source of depressed wages and limited employment opportunities. Omar Dahi (2014), for instance, notes that in Jordan and Lebanon, these challenges have been "felt on a day-to-day basis by all Lebanese and Jordanian citizens, whether through higher rents and declining public service availability, or through health and education infrastructure that is stretched beyond its limits" (Dahi, 2014, 11-12). Consequently, he adds, "the tensions between host communities and refugees within Lebanese society are obvious, and in both countries a lot of government and societal discourse about refugees has become palpably resentful" (Dahi, 2014, 11-12). In many cases, tensions erupt because humanitarian agencies assist refugees,

but not the local population. Consequently, the Syrian refugees have been labelled and used as scapegoats in matters of economic as well as political insecurity. As the refugees compete with host communities for even lower wages, resentment against the refugees increases, since they are seen as recipients of humanitarian aid.

Interestingly enough, cultural differences have been the site of clashes between Syrian refugees and Jordanian host communities and NGOs in the Zaatari camp. As Sarah Tobin and Madeline Campbell (2016) remark, cultural clashes erupted over the curriculum in the camp, since many refugees thought it was incompatible with their experiences and outlooks. One particular cultural difference between the two was the question of domestic violence and the physical/corporeal punishment of children. Tobin and Campbell write that "the refugees felt that domestic violence, particularly directed at children, was the only means by which the children would heed their parents' admonitions," while the Jordanian hosts "expressed shock and frustration that the debates, for the Syrians, cantered on acceptable "degrees of violence" rather than the acceptability of violence itself" (Tobin and Campbell 2016).

Moreover, these cultural differences were a source of contention in issues related to child labour and child marriages. In the case of early consanguine arranged marriages in particular, refugee communities clashed also with Jordanian NGOs that work in the camp. As Tobin and Campbell note, these marriages are "deemed 'illegal', as the age of consent for marriage in Jordan is 16 for females, and marriages must be registered locally in accordance with Jordanian law." Moreover, early marriages expose these young girls to domestic violence and abuse (Tobin and Campbell 2016) Ironically, refugees have complained that host communities are imprinting "local sensibilities and laws on the refugee population, at times challenging young women to choose between family and tradition, and what they hope or anticipate might be their futures."

Ultimately, these problems have led to the central debate in Arab countries regarding the refugees: the debate about nationalizing (*Towteen*) the refugees as citizens and compatriots in their host Arab countries. Sari Hanafi (2008) explains in the case of the Palestinian refugees, towteen is the bogyman that can "release a public phobia against the basic rights of the Palestinians." Any debate about the civil and economic rights of the refugees is structured around making towteen impossible "to the point that rights become substituted by fast humanitarian or security solutions." Indeed, as Hanafi points out, various Lebanese political parties operate with the unwritten rule that *towteen* is a major taboo and is tantamount to national treason. By foregrounding sites of exception in Europe only, biopolitical theories gloss over equivalent spaces of exception in other parts of the world that are important for mapping common strategies of disposability within the neoliberal global capitalist economy.

The second difference between Dunaway and Clelland's and Žižek's approaches to migration and the refugees is that Žižek insists on addressing the "netherworld" political economy of the refugee transportation and its profit in a global capitalist economy, in which "commodities—but not people—are permitted to circulate freely." This black market in the refugees is important to address as it is intertwined with the exploitation of the refugees within human trafficking and sex trafficking networks around the globe. However, the obverse side of this black market in the refugees namely, is the privatization of asylum accommodation in the European system must also be interrogated in a critique of the political economy of the refugees, since it demonstrates the extent to which the market logic dominates all decision and considerations in contemporary refugee politics.

Jonathan Darling (2016), for example, argues that the asylum seeking and accommodation/ refugee processing in the UK has been embedded in a neoliberal governmentality that shifted the management and administration of these humanitarian services from local authorities to private delivery companies. He explains that in March 2012, the UK government signed six contracts, known as COMPASS (Commercial and Operating Managers Procuring Asylum Support), with three private delivery companies to manage the accommodation and reception of asylum seekers and their families. Although prior to COMPASS, he points out, asylum accommodation and reception were framed within a business model, including the employment of private security companies to manage the UK's deportation system and exorbitant legal services to asylum seekers and refugees, this new development marked an intensification of neoliberal governmentality in this humanitarian field. As such, the institutionalization of this accelerated for-profit market rationality in the asylum accommodation and reception services has been translated into pure economic calculations, market competition, consumer choice, and economic efficiency (Darling 2016, 232). "In effect," he states, "local authorities, private providers and third sector organisations are all positioned as constituting the neoliberal governmentality of asylum accommodation through assenting to a model of provision that is based on market logics of efficiency, flexibility and cost" (Darling 2015, 25).

Darling thus suggests that now not only humanitarian considerations underpinning the asylum accommodation and reception process but also the overlapping of private, public, and state interests have been completely superseded by market norms. Moreover, it facilitated the production of "new spaces of dispersal," new relations and positions of authority, and "increasingly fractured assemblages of governance," expanding the state's jurisdiction under new modalities of governance (Darling 2016, 232). Finally, this neoliberalization of the asylum market made it possible to reconstruct the image of the refugees and other forced migrants rhetorically and discursively as a burden through "narratives of 'worthiness,' 'welfare,' and 'prioritization'" that repackage the "economic account of asylum as a question of resource allocation, cost, and

productivity" (Darling 2016, 39). This was, as he says, a "part of a revanchist trend to socially marginalize those seeking asylum as an economic and fiscal drain during a time of austerity, at the expense of a citizenry constructed as 'our' people" (Darling 2016, 235).

Ultimately, the intensification of neoliberal governmentality led to the depoliticization of the asylum seeking process, even though Darling's conceptualization of the terms is limited to democratic debate and decision making. First, the form and content of the debates, what is considered legitimate and acceptable viewpoints, over asylum accommodation and refugee processing are "defined in advance" so that "other potential political viewpoints on how asylum might be framed in public policy" are foreclosed. Second, depoliticization normalizes the neoliberal rationality underpinning the asylum market, turning the whole process into an issue of contract negotiations with private delivery companies (Darling 2016, 238). Darling, however, obfuscates the most important aspect of depoliticization namely, the structural violence of the global capitalist economy in the production and circulation of asylum seekers, refugees, and other forced migrants.

Moreover, he does not examine how this privatization of humanitarian services is interlinked with the national securitinization episteme in the global capitalist economy. It is no coincidence that two of the private corporations contracted by the British government include G4S and Serco, a multinational security services company and an international services company, respectively, have previously managed "immigration removal centers and aspects of the UK's deportation regime" (Darling 2016, 232). In other words, the reproduction of neoliberal governmentality is embedded within a securitinization and surveillance episteme that regulates and polices the undesirable, foreign, and disposable body of the asylum seeker and refugee.

This privatization of the refugee management process is also evident in the Arab world. Tobin and Campbell (2016) show that the Jordanian government has "outsourced the provision of humanitarian aid and services in refugee camps" to hundreds of non-governmental organizations, limiting its role to "regulating camp access and deploying police." Consequently, they maintain, these neoliberal policies in the governance of the Syrian refugees have led to "the privatization of the refugee experience" and the spread of campaigns whose goal is to cultivate the refugees into "new moral subjects" or even figures of the "ideal refugee." Consequently, NGOs working with Syrian refugees in camps in Jordan have tried to "inculcate certain 'proper' or 'ideal' understandings of women and work, youth, and early marriage, or the marriage of teenage girls. In each of these cases, the NGO guidelines for the "appropriate" understanding clashed with the refugees' own understanding of these issues. They conclude that the suffering and uncertainty of these refugees increased as a result of these neoliberal policies, "by rendering Syrian refugees responsible for their own management and aid provision."

The last, and most important difference between Dunaway and Clelland's approach and Žižek's analysis of the refugee crisis is Žižek's insistence on the need to build "global solidarity of the exploited and oppressed," a politics of solidarity structured around a common struggle for a "positive universal project shared by all" (Žižek 2016, 100). For him, this is the only ground from which a meaningful solution can emerge. As Žižek made clear over and over again, this new position cannot be carved out by celebrating diversity and multiculturalism. The reason is that multiculturalism, as he states in no equivocal terms, serves as an alibi to the global capitalist system, operating as the main ideological vehicle for suppressing and displacing the class struggle. In turn, the false universalism of global capitalism, especially in its recent shift into Asian values, sustains this multicultural ideology, allowing people universal access to economic exchange, while keeping cultural identity particular (Lingle 1996).

Žižek grounds his understanding of the radical solidarity with the refugees in the Hegelian notion of "concrete universality." According to Žižek, Hegelian universality requires a point of inherent exclusion, "an exception at which it is suspended" (Žižek 1992, 98) and the refugees, like Hegel's rabble and Rancier's "part of no part," represent such a point. For Hegel, universality is inherently exclusive, not only in the simple sense of excluding the "underprivileged Other," but, more importantly, in the sense of excluding "its own permanent founding gesture—a set of unwritten, unacknowledged rules and practices which, while publicly disavowed, are none the less the ultimate support of the existing power edifice" (Žižek 2000, 217). Concrete universality thus refers to the exception that is "reconciled in the universal"—that is, concrete universality is formed through "the unity of the abstract universal with its constitutive exception" (Žižek 1992, 97). Unsurprisingly, Žižek considers such points of exception to be constitutive of the "very site of political universality" (Žižek 2000, 213).

This has to be understood in the context of the dialectical tension between the universal and particular in Hegel's work. The universal, as Žižek explains, coincides with the particular contents or concrete situations through which it can be "hegemonized," while at the same maintaining its universal frame in and through these concrete situations. Žižek thus maintains that for Hegel not only is the particular content a "subspecies of the universality of the total process, [but] it also hegemonizes this very universality," transmuting universality itself into a "part of (or, rather, drawn into) the particular content" (Žižek 2001, 23). As such, the universal does not stand in opposition to some concrete content or particular feature of the totality; rather, both universal and particular occupy the same paradoxical zone of extimate indistinction.

In this sense, universality, for Žižek, is not about abstract neutrality, because the abstract universal fails to include its particular content, thereby becoming itself something particular over and against the particulars it cannot include. That is, abstract universality is neither concrete nor transcendent; it is immanent to concrete reality and coincides with its own produced destabilizing

excess. It exists in the form of a gap/ impossibility in concrete reality. In this sense, universality is a "process or a sequence of particular attempts that do not simply exemplify the neutral universal notion but struggle with it, give a specific twist to it – the universal is thus fully engaged in the process of its particular exemplification; that is to say, these particular cases, in a way, decide the fate of the universal notion itself" (Žižek 1999, 102).

As such, universality is reconsidered in terms of its constitutive exception—the particular cases of the excluded determine what the universal is. Following Hegel and Marx, he points out that "universality becomes 'for itself' in so far as individuals no longer fully identify the kernel of their being with their particular social situation: they experience themselves as forever 'out of joint' with regard to this situation" (Žižek, 2012, 261). Hence, universality is hegemonized by including the exception under it, and hence "it is only through the exception that it becomes the rule, that is, a universalized function." In this sense, the excluded, in this case the refugees, stand out as a singular or concrete form of universality in the sense that they stand "alone among the other particulars, not as a particular kind over and against them (which would make it only particular) but as an exception to the very idea that it is a "kind" at all."

Žižek thus maintains that the "part of no part" embodies the failure of universality and stands for the lie of the existing universal system and "what is wrong with society." He thus writes that their "abject position stands for the lie of the existing universality and it doesn't necessarily have a direct positive dimension. In this sense the universality here is not fake, because it only embodies what is false in the existing universality. It gives body to the failure of universality and does not have any positive content" (Žižek and Daly 2004: 160). Žižek explains: " . . . when you have in a certain social totality those who are 'below us' -- the negated or outcast -- then precisely insofar as they are the abject, they stand for universality (Žižek & Daly, 2004, 160).

Needless to say, these excluded populations in the increasingly expanding modalities of apartheid are not the classical Marxist subject of the proletariat. As Žižek notes, one is lucky to be an exploited worker today; the real issue is that more and more people are not simply unemployed, but unemployable and discardable refugees, slum dwellers, surplus populations, bedoons, and homo sacers (to use Georgio Agamben's phrase). In a nutshell, they are the "part of no part," to use Jacque Ranciere's term, "the object of disciplinary measures and/ or even humanitarian help, but not full citizens," who lack any "determinate place" in the system and who are kept at a proper distance through technologies of surveillance, torture, and death (Žižek & Daly, 2004, 160).

Only by identifying with this uncounted and discardable then that the moment of the truth of the global capitalist system can be reached. Because these rabble populations "stand for the universal dimension of the society which generates them," Žižek maintains, they cannot be "abolished without radically transforming the entire social edifice" (Žižek, 2012, 432). The universality of these surplus, excluded populations becomes, then, the universality of "the public

use of reason," which can redefine "the very universality of what it means to be human." From this vantage point, it becomes possible to subvert the totality of the system, since the domain of politics proper is not simply about "the negotiation of interests but aims at something more, and starts to function as the metaphoric condensation of the global restructuring of the entire space (Žižek, 1999, 208). Any sense of radical universality that can oppose global capitalism must, therefore, be theorized from the perspective of the larger segments of the world population who are kept at a distance from the ideological construction of itself as an excess that is relegated to a position of abjection. What is needed then is to rethink the inequality and injustice of the global capitalist system from the perspective of this "part of no part," who are kept at a distance from the system by virtue of these technologies of apartheid and enclosure such as prisons, separation walls, gated communities, etc., that embody the proliferating forms of capitalist privatization. Indeed, as Jodi Dean (2006) notes, such a political act constitutes a reinscription "in another register, a register beyond itself," that can "unsettle or challenge the existing order" (Dean, 2006, 123).

This, for him, justifies the validity of the struggle for Communism as the grounds for a new configuration of solidarity based on the politics of the commons. The "progressing 'enclosure' of the commons" by the global capitalist system and its privatization technologies is the correlative of the "proletarianization of those who are excluded from their own substance," making it possible for them to inaugurate an alternative radical revolutionary project that can mobilize people outside the market and state control. This politics of the commons links diverse global struggles in anti-globalization and anti-capitalist practices that aim to reverse the oppressive technologies of apartheid and bring an end to the horrible policies of enclosure.

Hence, the political universality of the commons is a real and genuine form of universality, because it is "the universal link binding together all those who experience a fundamental solidarity, all those who [become] aware that their struggles are part of the very struggle which cuts across the entire social edifice" (Žižek, 2002, 177). That is to say, the subjects of this emancipatory universality posit the antagonistic struggle not between particular communities, but within each community, "so that the 'trans-cultural' link between communities is one of a shared struggle" (Žižek, 2010, 53). Their universality cannot be obtained by moving from particular lifeworlds or identity narratives upwards to some forms of shared or common humanity or histories, but "downwards, from the totality of a particular life form to the elements which signal its instabilities and inconsistency" (Žižek, 2014, 260). The excluded, that is, constitute the "lateral link" in each life world and identity narrative whose gaps, inconsistencies, and antagonisms serve as the ground for the emergence of emancipatory universality.

In so far as they lack any determinate place in the hegemony of the neoliberal global capitalist regime, the refugees can be said to represent the system's constitutive exception, its symptomal

truth qua the structural injustice and inequality of the system. In the case of another "symptomal point" namely, the proletariat, Žižek writes that "an event proper occurs only when this symptomal point is fully assumed in its truth—say, when the proletariat grasps that its lack of a proper place within the social body signals that it stands for universality (universal truth) of the society in which there are proletarians" (Žižek 2014, 78). The main challenge of emancipatory politics today is to assume this truth, by identifying with this symptomal point, the refugees, by "propos[ing] and fight[ing] for a positive universal project shared by all participants" and "offer[ing] them a common struggle, since our problems today are common" (Žižek 2016, 100). This is the only way to affect real change, if Dunaway and Clelland seek to actualize the transformative powers of the semiperiphery.

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Nonwestern Semiperiphery and Its Paradoxes:
Reflections for Struggles in the 21st Century

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What has historically been the role of the nonwestern semiperiphery (what was it expected to do and what did it really do) and how has this role changed in recent years? In their article, "Moving toward Theory for the 21st Century: The Centrality of Nonwestern Semiperiphery to World Ethnic/Racial Inequality," Wilma Dunaway and Donald Clelland provide important contributions to the efforts to rethink global inequalities and the potential to transform the capitalist world-system. Presenting a wealth of data compiled in graphs and tables, the article aims to decenter analysis of global ethnic/racial inequality by bringing the nonwestern semiperiphery to the foreground. In their examination of the rise of the nonwestern semiperiphery, the authors question the popular "global apartheid model," which identifies "white supremacy" as the sole cause of global ethnic/racial inequality. Their goal is to demonstrate that the nonwestern semiperiphery intensifies and exacerbates ethnic and racial inequalities in the world further by adopting political and economic mechanisms to exploit territories and workers both within and beyond their borders.

The article challenges the romanticised views that portray the "Third World" as a group of countries that, if they organize themselves into a cohesive front that acts together on common issues, could become agents of change in the world. The authors give a different picture: they show that the semiperiphery is not static, but rather dynamic. It has evolved in recent decades and plays

a more conservative than a transformational role, depending on the global economic and political context at the time. The article builds a solid line of argument that goes against a conventional wisdom that is widespread among intellectuals and social movements in the semiperiphery and the core who tend to look to the ascent of emerging economies, such as the BRICS, with hope that it will create a possibility for building a counter-hegemonic global order.

Understanding the paradoxical role of the nonwestern semiperiphery is fundamental. While on one hand, it may compete with hegemonic powers and fight to change the world-system, on the other, it will play a decisive role in structuring and maintaining ethnic-racial inequality in the 21st century. The authors present ten ways the semiperipheries will increasingly exacerbate this inequality. Some of these are particularly interesting when we think of the case of Brazil and the BRICS countries. My reflections are from within the nonwestern semiperiphery and based on a left-wing intellectual and political view that is grappling with the ambiguous role of being both an exploiter and the exploited, while fighting against the expropriations and oppression of semiperipheral capitalism.

The authors highlight the growing flow of investments from the semiperiphery to other peripheral countries or to the core, the rising number of nonwestern corporations and the increase in the concentration of wealth and the amount of billionaires in the semiperiphery. UNCTAD's annual investment reports do, in fact, show an increase in foreign direct investment originating in developing and transition economies, which grew to 17 percent of global investment flows in the mid-2000s (UNCTAD 2006). With the economic crisis in the core countries, these investments rose even higher, to the point where they represented approximately 30 percent of the total in the late 2000s (UNCTAD 2010). In 2015, 15 percent of global investment flows were concentrated in the five BRICS countries; China was the third largest global investor, with US$ 128 billion in foreign direct investment that year (UNCTAD 2016). In economic terms, high commodity prices and low wages fuelled the BRICS' accelerated growth as they absorbed large amounts of global investment. They managed to concentrate approximately 28 percent of global GDP in 2008. However, these countries' economic growth did not automatically bring improvements to the well-being of their people. The majority continue to live in poverty, with no access to basic infrastructure and little access to education, while the wealth of a tiny fraction of the population in these countries grew exponentially. Therefore, the economic growth of the BRICS was marked by *inequality*, despite their demand for greater *equality* in the international system.

As I have argued in earlier publications (see Bond and Garcia 2015; Garcia 2017), the BRICS as they exist today—that is, a project of the national elite and their multinational corporations—have not succeeded in effectively formulating an ideological alternative to neoliberalism, nor institutions capable of founding a global order on more socially and environmentally just bases. Even though in some cases, their development strategies pursue paths that seek to "overcome

barriers" of (scientific, industrial, trade and military) monopolies created by the traditional superpowers, they do so *within* the capitalist order and occupy an increasingly important place in the expanded reproduction of global capital. Therefore, it is necessary to reflect on the rise of a "Global South (and East)" in the context of the expansion and the deepening of capitalism in the 21st century, and not as an alternative to it.

According to Dunaway and Clelland, the other two elements that exacerbate ethnic-racial inequalities are the exploitation of global commodity chains and the exploitation of ethno-territories. The authors present a summary of mega-projects and human rights violations in semiperipheral countries (table 8). What stands out here is the semiperiphery's role as both the exploiter and the exploited due to its position in global value chains and its participation in infrastructure mega-projects and export-oriented investments. Semiperipheral states act in conjunction with large corporations and financial funds (originating in core or semiperipheral countries) to exploit natural and energy resources, causing serious impacts on local communities, workers and the environment. Ethnic minorities, such as traditional, peasant and fishing communities are presented as obstacles to development that must be "removed" through forced displacement.

We can observe that there is a *global consensus* on the "need" for infrastructure to leverage economic growth, which is built or developed via public-private partnerships that facilitate and promote the entry and operations of international investors in these regions.[1] At the same time, large infrastructure projects (within the semiperipheries and in their regions of influence, in Africa, Asia and Latin America) seek to serve the interests of the extractive and agribusiness industries, as the goal is to transport the raw materials to the international market. These investments become "new pillaging routes," as they establish large logistics corridors that connect territories and natural resources to foreign markets.

The Nacala Corridor in Mozambique is one example of this. Dating back to the Mozambican colonial period, this corridor was identified by the World Bank as being key for the construction of poles of development. Today, it is crucial to the logistics of the Vale mining corporation's operations, as it links the Moatize coalmine to the port and to the special economic zone of Nacala, which, in turn, serves the interests of Brazilian and other, mainly Japanese, agribusiness investments in the north of Mozambique. The Nacala Corridor, then, is a fundamental piece in the plans to guarantee the viability of Brazil's main cooperation project in the area of agriculture, the

[1] The new multilateral institutions based in the "Global South", the New Development Bank (NDB) and the Asian Infrastructure Investment Bank (AIIB) were created with a focus on infrastructure projects in Asia, Africa and Latin America. They follow the same lines as the traditional multilateral financial institutions, such as the World Bank (and its Global Infrastructure Initiative), Inter-American Development Bank, and even the G20, which had previously launched the Global Infrastructure Hub.

ProSavana programme, and for Vale's strategies in the African country, as it broadens and favours the consolidation of *global mining and agribusiness value chains* that are interlinked with the international markets (Garcia and Kato 2015).

Thus, the semiperipheries are found to be more cooperative with core countries at times, while at others, their actions are antagonistic to them. They combine moves to gain more autonomy and sovereignty, while they compete for "a place in the sun" on the limits of capitalist accumulation. If we take the example of the BRICS countries, we find that they cooperate with one another to defend common positions at international decision-making bodies, but they compete for natural resources, consumer markets and investments in other countries and regions of the South, such as Africa and Latin America. As such, the semiperipheries end up reproducing imperialist practices that they dress up in "horizontalness" in their relations with other peripheral countries.

It is worth recalling here an element that Dunway and Clelland's article does not explore in depth: the fact that the rise of some multinational corporations originating in the semiperiphery and their bourgeoisie (that now participate in the global circles of the transnational capitalist class) reinforces the deeply rooted imaginary of "modernization" and "development." The promise of economic development—and the different paths to achieve it —has strongly marked the major political discussions and intellectual evolution of the left in former colonies in the semiperiphery, as well as theories, political projects, and government programmes it has produced. As a result, development and economic modernization have become an ideology proper to the semiperiphery, which typically traces a *capitalist* path to development based on the exploitation of the workforce and nature.

Connected to this is the role played by semiperipheral transnational states and the subimperialism phenomenon. Semiperipheral states are not mere instruments of the internal bourgeoisie; instead, they actively seek to establish political, legal and economic structures that foster the accumulation of capital, whether it is national or foreign-based, within or outside of their territories. They develop different kinds of public policies (for example, financing from public banks) to support the internationalisation of semiperipheral corporations. In them, public and private interests come together: the need to provide support to the companies is justified by the benefits they are to generate for the entire country. Particular interests are thus portrayed as being universal. In the case of state-owned or former state-owned enterprises (such as the Vale mining corporation or the Petrobras oil corporation, in the case of Brazil), they are strongly linked to the "national interest" and the fight for sovereign control over natural and energy resources in the 20th century. Such multinationals are represented as a new "stage of development" in the developmentalist imaginary and the popular common sense. However, as global multinational corporations, they compete with other firms in the world by extracting surplus value from the workforce and nature of other peoples, who are also engaged in struggles for sovereignty and the

rights over their territories. In light of this, one must question how semiperipheral working classes benefit from the extraction of surplus value and the exploitation of the natural goods and resources of peoples from other countries and regions.

We can thus identify two major challenges. First, there is the direct confrontation between affected communities, workers and social organisations and multinational corporations, and the states that support them, over projects that destroy their livelihoods and the environment and absorb public resources. Secondly, we have the challenge of changing the imaginary on "development" within semiperipheral societies and of building a new consensus that overcomes the idea that we need to "develop" by following the same model as western core countries did.

What role remains, then, for the core countries, their corporations and financial institutions in causing and intensifying ethnic/racial inequalities in global capitalism? Dunaway and Clelland do not explore this issue in their article, nor do they sufficiently discuss the relation between nonwestern semiperipheries and subimperialism. The notion of a transnational capitalist class and the transnational state captures an important aspect of the current context: the level of mobility of transnational capital (especially financial capital). This mobility directly affects internationalised production processes and significantly increases the degree of interpenetration and interconnection between them. It is what led the BRICS countries, especially China, to grow and go through an extensive modernisation process fuelled by the influx of transnational capital. However, this capital would not be able to operate if it were not for the infrastructure and guarantees of host states and states of origin. On one hand, global capitalism could not have been built in the 20th century had it not been for the proactive role of the US state, as Panitch and Gindin (2012) demonstrate. On the other hand, in dependent economies, bourgeois domination occurs where there is a strong disassociation between capitalism and democracy: in the semiperiphery, the bourgeois revolution combines capitalism and authoritarianism. As Florestan Fernandes (1981) rightly explains, intense industrialisation and modernisation, induced from the outside in, had to be constantly controlled and could not be allowed to lead to a national revolution. The state became the core of bourgeois decision-making power and actions, which explains the bourgeois sectors' close ties with the military. Therefore, one cannot talk about a transnational capitalist class as if it were homogenous. It takes on different forms and its effects vary according to territories, states and social formations.

The transformation of the capitalist world-system will be the result of struggles, mobilizations and resistance backed by theoretic reformulations that break with ethnic-racial simplistic binaries. As Dunaway and Clelland have elaborated, we need to stop filtering nonwestern contexts through the lenses of western categories of race that ignore the multiple layers of the more complex causes of inequality and oppression. Latin America provided fundamental theoretical contributions in the 20th century, such as Ruy Mauro Marini and Florestan Fernandes' work on the Marxist theory of

dependency. The struggles of the 21st century certainly need new advances and Dunaway and Clelland are pointing in the right direction.

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Is Racism Global?

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I have only a short contribution to make. I offer praise to Dunaway and Clelland for taking on this important subject; especially for those of us in the United States who need to have a more comparative, more global and historical perspective on race and racism. But I am far from convinced by their argument.

The title question, "Is Racism Global?" answers itself. Speaking of historical perspectives, it is important to grasp that the onset of modernity and the global European empires, the rise of capitalism, AKA the modern world system, was a centuries-long process. A good Wallersteinian would recognize this. The creation of the modern world system was also a racist project. Wallerstein's project avowedly builds on Marx, including Marx's analysis in *Capital* I of "primitive accumulation:"

> The discovery of gold and silver in America, the extirpation, enslavement and entombment in mines of the aboriginal population, the beginning of the conquest and looting of the East Indies, the turning of Africa into a warren for the commercial hunting of black-skins, signalized the rosy dawn of the era of capitalist production. These idyllic proceedings are the chief momenta of primitive accumulation (Marx 1967: 351).

For Marx, primitive accumulation via empire was as basic to the rise of capitalism as was the enclosure movement. Empire was racialized by every ruling power, every "mother" country. Empire was a gendered enterprise too (Federici 2004); this is an important matter that I cannot address now, but that will not come as news to engaged scholars.

We know a lot today about how empire and metropole, core and periphery, influenced each other (Cooper and Stoler 1997). Techniques for recruiting and exploiting labor, for managing settlement and displacement of natives and peasants, for augmenting the encroachment of capitalism in the hinterlands (see also Luxemburg, 2003 [1913])—these are also Wallerstein's themes. Just as metropolitan capitalism learned from peripheral capitalism to characterize the English (and French, and Portuguese, etc.) lower classes as "lazy" and hypersexualized, so too did it introduce racial ideology into the metropole. This was hardly difficult, since enslaved and colonized subjects flowed back to London, Lisbon, Paris, and elsewhere along with the primary commodities they produced. Since racial slavery was the primary source of imperial wealth, racial ideology too flowed around the world. Wallerstein, who personally knew Fanon, Cabral, Rodney, and many other anti-colonial and revolutionary theorists/practitioners, is hardly unaware of this. As he and Balibar point out

> Racism - a true "total social phenomenon" inscribes itself in practices (forms of violence, contempt, intolerance, humiliation and exploitation), in discourses and representations which are so many intellectual elaborations of the phantasm of prophylaxis or segregation (the need to purify the social body, to preserve 'one's own' or 'our' identity from all forms of mixing, interbreeding or invasion) and which are articulated around stigmata of otherness (name, skin color, religious practices) [Balibar and Wallerstein, 2011, 17-18].

This brings us to modern times. Racial theory today recognizes both (1) the instability and flexibility of racial categories, and (2) the deep social structural dimensions of race and racism. To grasp the global dynamics of racism, you have to wrap your head around those two ideas. It's not so different from thinking about gender, or class for that matter. The modern world system framework is built on race as much as on class (and gender). That framework has necessarily varied over time, just as the meaning of racial has varied over time.

Therefore it is unsatisfactory to dismiss raciality as a source of identity, stratification, or conflict, in the semiperiphery or anywhere else. Let us recall the epic of empire in the semiperiphery, say in South Asia. Let us remember how that huge sector of the world was labeled

as the home of wogs and kaffirs. Consider the racial *geography* of empire. Does it leave anyone out?

But wait! my colleagues tell me. Sometimes slavery, peonage, and other forms of superexploitation has existed within racially homogeneous groups, and even within ethnically homogeneous groups. S*lavery doesn't have to be racial.*

That is true. There are many cases in which slavery wasn't racial, especially in the pre-capitalist world but also sometimes in the modern world system (Kolchin 2009). But in most cases, wherever mass recruitment of labor is taking place, wherever superexploitation is occurring, wherever there is a comprehensive system of domination, racial dynamics will also be present. In the US for example, prisoners classified as white early in their sentences tend to get reclassified as black or brown as their time prison gets longer (Penner and Saperstein 2012). The periphery has now properly been redesignated the "postcolony," and operates as a racially demarcated zone of precarity, under a permanent "state of exception" (Mbembe 2001; Agamben 2005). In the semiperiphery too, in contemporary India, for example in contemporary India, we have the case of the Dalit, who draw on the image of the Black Panther, who travelled *en masse* to Durban to take part in the 2001 UN World Conference on Racism, and who have equated caste oppression to racism, following their great leader Dr. B.R. Ambedkar (Pinto 2001; Prashad 2000; Maitland forthcoming).[1]

Some argue, as Dunaway and Clelland do, that religious differences (i.e. ethnically-/culturally-defined group and individual identities) are not racial. But are there not racial elements embedded in Hindu views (and treatment) of Muslims in India, and in Pakistani and Bangladeshi treatment of Hindus as well? The list could go on across Asia: Indonesia, Philippines, Korea, Myanmar, China too. Indeed it could with ease encompass the whole semiperiphery: the BRIC countries etc. Of course there would be immense variations: from Singapore to South Africa, from India to Brazil. Yet *nowhere* in this picture would racism be absent.

So very soon we find ourselves dealing with Islamophobia and anti-semitism as racial projects (to use Omi's and my term).[2] Why? Because these patterns of stratification and exclusion also contain "racial elements." By this term I mean the *corporealization*, the *phenotypification*, of "difference," both individual- and group-based. This invocation of the body, this dimension of corporeal rule that is characteristic of every form of racism, can be understood as the core act of *social construction* that shapes race in the modern world. For (much) more on racial formation, see Omi and Winant 2015.

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[1] See also the "Dalit Panthers Manifesto" (Joshi, ed. 1986).

[2] On the question of anti-Semitism as racism, see Fredrickson 2015, Mosse 1997.

In this sense of a simultaneously flexible and structural construct, race and racism are everywhere, and variable everywhere. This is why the question "Is Racism Global?" answers itself. Race and racism are not excrescences on the capitalist system; they are constitutive of that system. Race is not a mere phenomenon of the past; race cannot be characterized as absent, as having been transcended, or as having been eclipsed by ethnicity. Not globally, not regionally, not locally.... To argue for its absence, to dismiss race, is to "erase" it, as the common phrase goes. To their credit, while reducing (inordinately in my view) the spectrum of social relations in which they say race figures, Dunaway and Clelland do not dismiss the concept entirely. They do not entirely reduce race to ethnicity (i.e. cultural difference, "ethnic boundary-making," a la Wimmer and others) (Wimmer 2013). But many scholars today still pursue intellectual (and perforce political) projects of *racial reductionism*, as was true in the past as well. Race is not "real," they argue. Race is an exception, they claim, to a social order built on rational choice. It is a manifestation of class; it is a cultural/ethnic phenomenon; it is tool of nation state-building. But it is not real. It is not really there. It is absent. Such claims, whether wishful thinking or ideological, persist in the present. But they are no more true now than they were in earlier times.

Despite the enormous vicissitudes that demarcate and distinguish national conditions, historical developments, roles in the international market, political tendencies, and cultural norms, racial differences often operate as they did in centuries past: as a way of restricting the economic mobility, political access, and indeed life itself,[3] not just of racially subordinated groups, but of all those at the bottom end of the system of social stratification.

About the Author

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Disclosure Statement

Any conflicts of interest are reported in the acknowledge section of the article's text. Otherwise, author has indicated that he has no conflict of interests upon submission of the article to the journal.

[3] Ruth Wilson Gilmore memorably defined racism as "…the state-sanctioned or extralegal production and exploitation of group-differentiated vulnerability to premature death" (Gilmore 2007).

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Response to Commentators

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We would like to thank the JWSR editor for pushing forward this debate about the impacts of the nonwestern semiperiphery on world ethnic/racial inequality. We would also like to thank the four commentators who sacrificed time from their summer writing schedules to participate in this symposium. Most particularly, we wish to express our appreciation for the cogent reformulation of our arguments by Brazilian scholar-activist Ana Garcia. Unfortunately, three of the commentators pay little attention to the conceptual arguments or the empirical data presented in our essay. Consequently, their ideas render invisible the important middle tier of the world-system upon which we focus. One of the worst flaws of global racial dualisms is their description of world ethnic/racial inequality as though it was structured once in the past and has never changed over the history of the modern world-system. According to Winant, the 21st century nonwestern semiperiphery is unimportant because "racial differences often operate as they did in centuries past." Boatca insists that the historical "colonial axis" constructed by white western colonizers is of greater significance than systemic changes that are occurring in the 21st century nonwestern semiperiphery.

We have analyzed four systemic trends that challenge their positions. First, a majority of the world's population is now concentrated in the nonwestern semiperiphery, and this zone now accounts for most of the world's ethnic/racial exploitation and conflict. Second, nonwestern semiperipheries are expanding their economic agendas globally and nationally in ways that parallel past western colonialism and imperialism. Third, our empirical analyses point to recent wealth accumulation in nonwestern semiperipheries, driven by emerging nonwestern fractions of the transnational capitalist class. We have emphasized the growing significance of nonwestern transnational capitalists and their compradors who structure ethnic/racial exploitation throughout the millions of commodity chains that orchestrate the world-economy. Fourth, we have examined ten ways in which nonwestern semiperipheries cause and exacerbate world ethnic/racial inequality through mechanisms that the global apartheid and colonial axis theses attribute only to western whites.

We do not lose sight of the world-system as unit of analysis, as Boatca suggests. Nor does Wallerstein (1974b, 1976, 1983, 1990) conceptualize the world-system in the unidirectional, historically static way that Boatca does. Instead, the world-system consists of the *ever-changing trimodal structure* of exploitative relationships that are loosely "governed" by an *interstate system* comprised of *nation-states*—all of which operate in contradictory ways to both support and resist the survival of the system. We follow closely Wallerstein's dialectical thinking to analyze the ways in which semiperipheral elites inconsistently abet and resist core agendas about world ethnic/racial exploitation. Like other world-systems analysts, we conceptualize nonwestern semiperipheries to be far more than weak puppets of the core. Indeed, we examine them as zones of potential systemic change, and we contend that semiperipheral ethnic/racial conflict can be very costly to the core and to the world-system. In contrast to world-systems analysis, the global apartheid and colonial axis models cannot account for the rise of previously colonized nonwestern semiperipheries to core status, nor do they allow for such future systemic changes. Moreover, global racial dualisms silence the history of nonwestern actors that engage in colonialism or imperialism. We have pointed out that nonwestern semiperipheries often employ ethnic/racial conflict to engage in subimperialism toward other societies in order to implement core and/or nationalistic goals. Garcia summarizes our argument quite well when she observes: "What stands out here is the semiperiphery's role as both the exploiter and the exploited due to the position it occupies in the global value chains and its participation in infrastructure mega-projects and export-oriented investments."

Khader is wrong when he claims that we "reify race." Our goal is to challenge the ethnocentric, sloppy universalization of this concept to the entire world, most especially to the nonwestern semiperiphery. Indeed, our central argument is that *we have reached a point in the history of the modern world-system that requires "theoretical retrenchment" from the vantage*

point of the world's "excluded middle." We argue that 21st century theory must decenter analysis of global ethnic/racial inequality by bringing the nonwestern semiperiphery to the foreground. In sharp contrast to our argument, Winant contends that "race" and "racism" should be applied universally. In doing so, he plays paradigm gatekeeper (Kuhn 2012) to argue that no new knowledge production is needed beyond the current western race paradigm. What does he offer as evidence? According to him, *western* biases like Islamophobia prove that racism is "global." In an attempt to trivialize challenges like ours, he insists that we accept the faulty assumption that his research question ("is racism global?") answers itself. The answer to this question is obvious, he suggests, and it is beyond debate. Through such teleogical reasoning, he substitutes ideological posturing for sound theory construction, and he attempts to stigmatize the normal social science doubting (Kuhn 2012) in which we have engaged. In contrast to the recommendations of Winant and Boatca that we continue to hang onto approaches grounded in the past, *we contend that the future of the world-system is not what it used to be*. Increasingly, the extraction of world surplus is dependent upon the widening and deepening of ethnic/racial exploitation of workers and ecosystems in nonwestern semiperipheries and upon the subimperialism of nonwestern semiperipheries toward internal and external peripheries.

We hope this essay will stimulate new research questions that move us further toward new conceptual approaches. We are quite aware that many of our theoretical and empirical points need further debate, reformulation, and data testing. Many of our subsections cry out for full essay interventions that we hope to see others develop. We regret that we were unable to explore the ways in which nonwestern ethnic/racial inequality are complicated by gender and class. We are well aware that many academics and readers will cling to the western race paradigm in which they are trained, teach courses, publish or conceptualize praxis. We are not naive enough to expect knowledge conversion experiences from established scholars. Rather we expect the kind of resistance to theoretical change that Thomas Kuhn (2012) describes and that Immanuel Wallerstein (1974b) faced when he introduced the world-systems framework. For that reason, we focus on trying to bolster those thinkers who are courageous enough to break new ground despite the politics of paradigm protectionism. While most western scholars continue to limit themselves to analyses bounded by the race paradigm, nonwestern semiperipheral capitalists and states are carving new directions in ethnic/racial exploitation and inequality, and nonwestern communities and social movements are resisting those strategies. As we face the volatile 21st century, there are few relevant conceptual tools in the western race paradigm to explore and to research these systemic changes. As Garcia notes:

> The transformation of the capitalist world-system will be the result of struggles, mobilizations and resistance backed by theoretic reformulations

> that break with ethnic-racial simplistic binaries.... We need to stop filtering nonwestern contexts through the lenses of western categories of race that ignore the multiple layers of the more complex causes of inequality and oppression.... The struggles of the 21st century need new advances.

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A World-Systems Frontier Perspective to Land:

Exploring the Uneven Trajectory of Land Rights Standardization in the Andes

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Abstract

This paper proposes a world-systems frontier framework by approaching frontiers and frontier zones as analytical tools in indicating and understanding the uneven local-global interactions underlying world-systemic incorporation processes. It argues that the notion of frontier can highlight the role of 'peripheral agency' in local-global interactions, revealing incorporation as a negotiated process. This paper applies a world-systems frontier perspective to the analysis of historical processes of land rights standardization in the Andes. Based on a longue durée assessment of the implementation and contestation of land reforms in Highland communities in Bolivia, the formation and reorganization of a centralized land regime in a peripheral setting is unveiled as a negotiated process. Its course is shaped by the interplay of the modernizing aspirations of public authorities and international interest groups and the strong communal land claims defended by indigenous peasants. This complex (re)negotiation over rights and resources drives the creation and movement of (new) frontiers of land control, materializing in an uneven trajectory of land commodification. The presented frontier perspective is instructive to questions on the expansion, limits, and contradictions of the capitalist world.

Keywords: Frontier; Incorporation; Land Rights; Commodification; Bolivia

In his influential book *The production of Space*, the French Marxist sociologist Henri Lefebvre argued that every society not only occupies but also produces its own space (Lefebvre 1991). [1] Within historical capitalism, the accumulation of capital is the production of space. Accumulation booms and busts are themselves products and producers of spatial configurations. All social relations are spatial relations; they develop through, and actively co-produce space (Harvey 1982). In his recent book, *Capitalism in the Web of Life*, Jason W. Moore develops a powerful argument to analyze capitalism as a way of organizing space and nature, including human nature (Moore 2015). Historical capitalism, "the thrust towards the commodification of everything" (Wallerstein 2003:16), is a frontier process. Endless accumulation and endless geographical appropriation drives capitalism's extension to new, uncommodified spaces.

The opening of the "Great Frontier" made new supplies of land, nature, labor, and energy more or less cheaply available to the centers of capital and power. The rise of capitalism launched a new way of organizing land and nature, mobilizing for new inputs of labor and energy premised on the rise of labor productivity. The incessant reduction of labor time can only occur to the extent that new bundles of uncapitalized nature, work, and energy can be mobilized and secured through new waves of appropriation (Moore 2015:301-303). The massive internalization of new spaces allowed for the appropriation of new free inputs and the externalization of new costs. These great frontier movements are the counterpart of the spatial and productive "fixes" of capital accumulation in the metropoles.

Geographical expansion and incorporation necessitated new ways of mapping, categorizing, and surveying the world. The Great Frontier had to be imagined, conceptualized, and materialized. This allowed capitalists, empires and states "to construct global webs of exploitation and appropriation, calculation and credit, property and profit, on an unprecedented scale" (Moore 2015:190; Webb 1964).

The notion of the Great Frontier goes back to Frederick Jackson Turner's *American frontier* (1920) and, later, Webb's *Great Frontier* (2003 [1951]). These classics in Western history gave shape to a broad field of frontier studies in which essentialist visions portraying the opening of the frontier as a one-directional transmission of modernity are being challenged by a critical reading of the opening of the frontier as shaped by agency and negotiation. The former current continues to reproduce dichotomist representations of peasant and indigenous societies as either unequivocally vanishing or untouchable reserves. This essentialist stance is upheld in

[1] This article is the outcome of a Phd project (2009-2014) and the fruitful collaboration with Prof. Dr. Eric Vanhaute and Drs. John Wang at Ghent University within the research project "The end of peasant societies in an historical and comparative perspective. A comparative research project into the changing peasant societies in Europe, Asia and Latin America" funded by the Research Foundation – Flanders (FWO). The author gratefully acknowledges the insightful comments provided by the editors and several anonymous reviewers.

contemporary development and adjustment schemes pushing to open those societies for investment and accumulation (e.g. World Bank, IMF) and popular science books stripping those societies from much of their complexity and global interconnectedness (e.g. Diamond 2005 and 2012). This paper contributes to this Great Frontier debate by highlighting the role of "peripheral agency" in processes of incorporation—without negating the role of asymmetry—and its consequent deviating course and uneven spatial impact.

The theoretical framework and its application as elaborated in this paper adds to research exploring how world-system peripheries are incorporated and reproduced over long periods of time (see e.g. Hopkins and Wallerstein 1987; Dunaway 1994; Carlson 2001; Kardulias 2007; Kaup 2013; *Journal of World-Systems Research*, Volume 19, Number 1, Winter 2013). In addition to the cited work of Jason W. Moore, it builds particularly on the work of sociologist Thomas Hall who explicitly unveils the margins as the pulsating heart of expansive systems (Hall 2013:50-1; Hall 1989 and 2000), as well as Kardulias' notion of "negotiated peripherality" unveiling the periphery as "a zone of opportunity" (Kardulias 2007).

Andean communities present a case in point. In order to construct and safeguard maneuvering space, they have obtained official recognition of their customary land tenure regulations through diverse repertoires of negotiation and resistance consisting of legal action, political alliances, and violent conflict. According to the Global Platform of Indigenous and Community Lands, Bolivia holds one of the strongest legal bases to protect indigenous and community land rights (LandMark 2015). These land rights do not fit the dichotomous categorizations of "full-fledged" private property or "underdeveloped," non-commodified forms. They must be understood as the outcome of a longer trajectory of successive phases of land appropriation, land reform and land conflict. Peasant and indigenous mobilizations and achievements underscore—as Kardulias demonstrates for ancient Cyprus—that in core-periphery interactions "you don't get what you deserve, you get what you negotiate" (Kardulias 2007: 78).

This paper positions the frontier at the center of analysis. It consequently proposes world-systems analysis as a world-systems frontier perspective, with the purpose of problematizing and understanding the role of peripheral agency in local-global and internal-external relations beyond isolation or opposition. In the first section of this paper, frontier processes and frontier zones are discussed as analytical categories that enable the tracing of temporal and spatial shifts in frontier processes and that explain how these frontier movements shape the inherent unevenness of capitalist development.

The second section addresses a central question within the Great Frontier debate, the question of land control, and particularly the persistence and recreation of communal land tenure systems in a globalizing world. It explores land rights as a point of friction between peripherally located

groups and state authorities, nowadays identified as a pivotal action terrain for the struggle against poverty and hunger, environmental challenges and climate change, and injustice.[2]

In the third section of this paper, the reorganization of Bolivia's centralized land legislation and the repertoires of reaction by Highland communities are discussed in relation to the notion of world-systemic frontiers. This trajectory is analyzed through the method coined by Philip McMichael as "incorporated comparison," in which cases are contrasted because of their historical connectedness and mutual shaping rather than their separateness (1990), identifying four to five frontier shifts respectively in the early colonial period, the late 19th century, the mid-20th century and over the last decades.

In the concluding section, the case study on land commodification in Bolivia is framed as a frontier process. The benefits of a frontier perspective that displaces the center of analysis are discussed in terms of enhancing a more textured understanding of how temporal and spatial unevenness is shaped in the modern world.

A World-Systems Frontier Perspective: Incorporation as Negotiation

Foreshadowing the notion of the frontier, a number of world-systems scholars have repeatedly demonstrated the role of peripheral agency in shaping core-periphery relations (Bunker 1984; Bunker and Ciccantell 2005; see also O'Hearn 2005:132-135; Hall and Fenelon 2009:12). These insights have generated increased understanding within the field of world-systems research, not only of world-systemic expansion needing and simultaneously generating frontiers but also that the role of agency in/at/on the margins of expansive systems is essential in shaping the expansion, limits, and contradictions of the world-system. Several notions of frontiers and frontier zones have been put forward, forged within or in critical dialogue with world-systems analysis (Hall and Fenelon 2009:11; Vanhaute 2013:157-159). Operationalizing these notions demands an apt systemic framework that counter-argues images of peripheral groups as captured in sterile conservation or powerless assimilation.

Within this theoretical framework, frontier as an analytical category entails the basic three-dimensional scope of world-systems research: time, space, agency. First of all, it concerns a historical, creative *process* of encounter, which by definition has a start and an end. Second, these frontier processes have a concrete *setting*; encounters produce spatial reorganizations. Third, this encounter is structured by asymmetrical *power* relations, yet has strategic potential for the most powerful as for the powerless involved in this encounter (Sassen 2013). There is an analytical difference as well as interconnection between frontier (the process) and frontier zone (the space). Frontier zones emerge where different actors—be they individuals, companies, projects,

[2] See the recently launched global campaign #LandRightsNow http://www.landrightsnow.org/en/why/

institutions, etc.—embedded in different forms of organization based on different systemic logics come into sustained contact without predefined common rules of encounter (Hall 2012:51; see also Sassen 2013:67). They are key to capitalism's constant drive "to divert or attach itself to other kinds of energy or logic" (Gidwani 2008:xix).

Within a world-systemic framework, the frontier perspective is adopted to assess the unevenness of capitalist expansion in terms of a 3-step mechanism of restructuring, interruption and feedback. These processes of incorporation entail the *reordering* of zones that were first open, undecided, or under negotiation, into commodified social structures. Incorporation restructures encounter by imposing new delineations and classifications functional to the envisioned social order. Schematically, the trajectory of frontier processes can be envisioned as the process in which fuzzy zones of contact are defined (as poor or rich, uncivilized or acculturated), shaken-up (by revolutions and reforms) and fragmented (through impoverishment, resistance or segregation) (Hall 2000:241; Kaup 2013:112).

Systemic restructuring is discontinuous; *interrupted* by the unfolding of social change. Frontier zones provide a vacuum for this irregularity. They are mobile and mutable constructs, where a new order is created whose outlook is still wavering. Contrary to the first theoretical conceptualizations of frontiers, notably Turner's work on the movement of the U.S. western frontier and the transmission of modernization (Turner 1920), frontiers are essentially two-directional processes. Frontiers become visible in a concrete locus of both confrontation (war, resistance, lawsuits, intolerance, plunder, extraction, sabotage, ecological degradation, segregation) and cooperation (biological symbiosis, marriage, economic partnership, political bonds and treaties, celebration, conversion, gifts). Because the outcome of these confrontations and alliances seldom acquires a definitive status, constant renegotiation in lived settings forms a fundamental process in the shaping of ongoing, accelerating, retreating or stagnant incorporation processes. Incorporation consequently proceeds in waves. Its irregular rhythm reflects how the "profit-centered rationality" of capitalism is being "contaminated, consolidated, and continuously interrupted by other logics" (Gidwani 2008:xxiv).

This "contamination" points to the role of peripheral agency. Numerous ethnographic studies on both historic and contemporary cases give empirical evidence of how peripheral groups negotiate the terms of participation and autonomy and how this may *feed back* into the system. Kardulias' concept of "negotiated peripherality" explains how peripheral groups' "willingness and ability [...] to determine the conditions under which they will engage" in frontier-creating practices (trade, marriage, religion, ideology etc.) involves them as decision-makers in the encounter with agents of expansive systems (2007:55). Incorporation thus proceeds through feedback loops, tempering the ambition of complete assimilation and even generating a boomerang potential that may alter the course of incorporation. This is evidenced in the forging of alliances, carving out of

concessions or retreat, particularly in the case of indigenous peoples in the contemporary world (Hall and Fenelon 2009).

This perspective has implications for world-systems analysis, in terms of promoting an explicit focus on peripheral agency, but also in terms of the world-system itself. The analysis of frontiers and frontier zones is instructive to questions on the functioning, the dynamics and the limits of systemic expansion. A frontier perspective has the potential of understanding why the impression that global incorporation proceeds towards the eventual evaporation of systemic difference (homogenization) is constantly countered by the observation of the reproduction of different spaces from where frontiers are being contested and (re)created (heterogenization). Rather than instances of isolation or confrontation, a world-systems frontier perspective reads and exposes these spaces as the lever that converts incorporation into a negotiated, hence instable process.

Land Rights Commodification and Communal Land Control

In order to clarify the still abstract notions of incorporation and frontier, this paper approaches land rights commodification as a concrete—and possibly "the single most important"—frontier that has shaped the historical trajectory of capitalist expansion (Wallerstein 2012:7; Araghi and Karides 2012:1; Weis 2007:48-50). The commodification of land rights corresponds to a reshuffling of labor, legal, fiscal and spiritual ties to the land among people living from the land and of those living from the property of the land in such way that it separates the former from nonmarket access to land (Sevilla-Buitrago 2015). The advance of commodified relations to the land was a diverse process shaped by shifting economic conditions and emergent political ideologies, fueling an ideologically colored, power-attributing and hence highly disputed transition process that pretends to put the future of civilization at stake (Engerman and Metzer 2004:17; Cole and Ostrom 2012). The outcome was a modern private property regime that linked land to capital and that was consolidated and expanded through state power (Moore 2016:86).

The frontier as a tree-dimensional analytical tool can be applied to the land rights frontier, identifying and explaining its time (phases), spatial (zones) and agency (negotiation) dimension. Symbolically starting in 1492, this frontier shifted from a colonial phase of primitive accumulation (16th-17th centuries), through an imperial phase (18th-19th centuries), followed by a nationalist-developmentalist phase (mid-20th century), to a neoliberal phase (late 20th century onwards) of intensified globalization (Araghi and Karides 2012). Over the last five hundred years, these shifts have intersected with other frontier developments such as economic transformations in view of increasing resource competition (Barbier 2011), ecological changes (Moore 2008, 2010b, 2015), and the social reorganization of peasant livelihoods (Vanhaute 2012; Vanhaute, Cottyn and Wang 2016). Strongly related to European expansion into new (colonized) zones, privatization,

displacement, and depeasantization restructured places, landscapes, and territorial orders to a substantial degree, producing a secular growth in the concentration of land property (Araghi and Karides 2012:2). Through expropriation, enclosure and accumulation, as well as contestation, counter-enclosures and re-appropriation, new and old frontier zones were (re)created, where the direction and forms of the process were negotiated, thereby defining the changing shape of the world-system.

While the forms that this transformation took were complex and varied across time and space, four central features can be distinguished: the transformation of a complex system of customary rights to land usage to legal and written titles to land ownership (formalization); the transformation of the concept of property from jurisdiction over ambiguously defined areas to concretely defined, and possibly enclosed, physical spaces (fixation); the optimization of the use of such demarcated landed property as a form of capital (rationalization); and the absorption of the earth's surface into a land market (privatization), implying the dispossession and displacement of peasants and indigenous populations (based on Araghi and Karides 2012). Imperial and national states played a decisive role in creating the conditions for capitalist transformation, fostering the delineation, endorsement and extension of "a systematic legal basis for what is called title to the land" (Wallerstein 2012:7). In order to enforce a minimal degree of loyalty and obtain the necessary revenues to uphold centralized power, a homogeneous institutional framework for land ownership, use and transaction needed to be created, provided of property deeds and cadasters to make society 'legible' (Ubink, Hoekema and Assies 2009:11; Richards 2009:58; Scott 1998; Linklater 2013). Thereto, customary tenure arrangements are to be encapsulated within a standardized legal framework for land property, neutralizing the co-existence of multiple locally-rooted systems for communal control over land. In the process, the rural landscape and rural-urban linkages underwent repeated and radical transformations.

Yet, despite its force, this historical transformation did not pave the way for a definitive commodification of communal land rights systems. At the start of the 21st century, approximately 2.5 billion people hold, use or manage communally controlled lands, corresponding to more than 50 percent of the world's land area (Oxfam 2016: 7). On a global level, Latin-America is a particularly striking region, with about 20 percent of the land collectively managed—but not necessarily possessed—by indigenous and peasant communities, through different constellations of common and individual/family entitlements.[3] In South-America, Bolivia represents the strongest evidence, with 36.4 percent of its land surface assigned to, or in property of, indigenous and peasant communities (LandMark 2015). This indication of the continuing significance of

[3] Globally, this is not the highest result, but the most evenly spread, as the regional picture for Asia and Oceania depends on the dominance of one single country, respectively China and Papua New Guinea.

indigenous and peasant community structures unsettles the assumed force and global spread of standardized land titles.

Successive incorporation pressures effectively pushed the management of land and natural resources in many localities out of customary and communal control and under statutory laws that structure dualist and exclusivist land regimes. In this process, communal land systems did not just persist through isolation or expulsion, but were the product of the constant (re)creation of "new frontiers of land control," which "are not sites where 'development' and 'progress' meet 'wilderness' or 'traditional lands and peoples'. They are sites where authorities, sovereignties, and hegemonies of the recent past have been or are currently being challenged by new enclosures, territorializations, and property regimes" (Peluso and Lund 2011:668). The expansion and contraction of these sites, or "frontier zones" results from re-negotiations among state, capitalist and communal interests of peasants, elite and broker groups, state institutions (and, increasingly, supra-national institutions), as well as the forces of nature. Central in this negotiation is the relation to the land, which under unequal power relation is squeezed into legible (alienable/private) "principles true in every country," superior to deviant (inalienable/collective) principles (Mitchell 2002:54-79)—taxable for the state; tradable on the market. Relations to the land are positioned on a continuum of tenure security (extensive-limited, short-long term, real-perceived, de jure-de facto, etc.) that establishes the superiority of private property arrangements (Ubink, Hoekema and Assies 2009:13-5; Ostrom and Hess 2007). Failing or refusing to grasp the value and normality of the pluralist character of most land systems and the responsiveness of the people managing them, the co-existence and overlap of private and public, open and exclusive rights is being substituted by an improbable uniformity.

The portrayal of alternative (spiritual, informal, communal, non-European) forms of access in terms of dichotomy and anomaly has been used to justify and further nurture the global trend in the incorporation and formalization of customary property relations (Van Bavel and Hoyle 2010:12; Rights and Resources Initiative 2014). However, disparities in local land right security testify that property regime changes through land reform programs, either state- or market-driven, are not deployed in a vacuum. Reproduced and accelerated under post-colonial regimes, this colonially-initiated trajectory took shape through localized interactions, interspersed with counter-enclosures, revolutions and alliances. Moreover, commodifying operations rarely produce a homogeneous property regime or foster the desired social effects. The outcome is a hybrid and uneven (trans-)national institutional control over territory with important achievements and bitter setbacks for communal and indigenous land rights in relation to fluctuations in natural resource demand (Benton 2009; Serrão 2013; Rights and Resources Initiative 2015). Through the erroneous equation between privatization and development (Engerman and Metzer 2004), the endurance of plural, community-based land rights systems in which individual and collective access co-exist

has been concealed or reduced to an anachronism. This obscures that the strategies of self-organized resource communities in (globalizing) local struggles are not targeting individual ownership in itself, but the absoluteness of private property arrangements. Communal ownership, and its persistent significance, as mentioned above, has been put forward as "the most fundamental challenge to capitalism, (…) because it denies the overarching dominance of private property rights" (Hall and Fenelon 2009:6). This counter-dichotomous resistance logic and the multi-scalar negotiation dynamics can only be grasped beyond local-global and incorporated-isolated dichotomies.

Here, the figure of the frontier is enlightening to understand the pulsatile expansion of standardized land rights and the ensuing interweaving of local patterns of land control and struggles for self-determination under the scheme of a globalizing property regime. The analytical category of the frontier is adopted to map the temporal and spatial *restructuring* of land rights, to interconnect formalization, fixation, rationalization and privatization pressures with bottom-up strategies of resistance and *interruption*, and to trace how negotiations on the part of peripheral groups are *feeding back* into expansive land rights agendas.

Land Reform in the Andes: Negotiating the Limits of Communal Autonomy

Seeking to trace and map the deviating pathways of communal land control reorganization in a concrete setting, there is a strong case for Bolivia. By 2014, 237,000 square kilometers, corresponding to 21% of the national land surface, was formally recognized as "Native Indigenous Peasant Territory," a juridical figure that assigns land in collective property to an indigenous community (Chumacero 2015:181). These lands have remained or been recuperated in communal hands through successive frontier shifts over the past five centuries. The long trajectory towards that constellation can be traced back to the Andean highlands, inhabited by rural communities with variating degrees of ancestral-ethnic (Quechua, Aymara and Uru) or peasant (syndical) forms of organization.

As the capitalist world-economy expanded geographically out of Western-Europe, the Andean region became one of the first testing grounds and testimonials of capitalist incorporation dynamics. Through conquest and colonization, a disconnected area—politically and economically tied to the Inca empire—became an area of European economic extraction and political influence. As the Andes transformed from an external into an internal frontier zone of the modern world-system, the region and its people were more closely yet asymmetrically tied to the pulsating rhythm of the modern world-system. This peripheralization—the restructuring of the region and its people into a dependent position—was a dialectical and heterogeneous process in which local histories refused to neatly integrate into more global flows.

Today, the Andean region contains complex land systems in which communal arrangements coexist with private land consolidation, cooperative property and state property. In the following, the formation and reshuffling of this complex is assessed as a frontier process. First, successive moments of land rights reorganization are identified, in line with the global commodification phases sketched out above by Araghi and Karides (2012), and parallel with Rivera's historical cycles of rebellion in the Bolivian highlands (Rivera [1984] 2010). Second, these phases are assessed through "incorporated comparison", juxtaposing specific cases as "relational parts of a singular (historically forming) phenomenon" (McMichael 2000: 672). This method serves to problematize global processes as single historical projects through which different periods and regions become conceptually interconnected and to identify parallel or repeated strategies across space and time. Examples are Arrighi's comparison of accumulation cycles as instances of the historical project of capitalist expansion (1994) or McMichael's juxtaposition of contemporary globalization ot free trade and market rule during 19th century British imperialism (2000). Araghi and Karides have made a similar exercise for processes of land rights standardization, interrelating colonial, liberal, revolutionary and neoliberal repertoires of reform, adaptation and resistance as constitutive to one single historical project (2012).

From precolonial times up to the twenty-first century, four to five frontier shifts are identified, which can be related to changing state-capital relations. The ensuing redefinition of incorporation strategies over time brought new threats and opportunities for communal systems. The way in which struggles in defense of communitarian land tenure informed frontier making and unmaking strategies around the implementation of modern land rights regimes in the Andean region is highlighted throughout the trajectory of indigenous communities of the Bolivian Highlands. The following assessment is based on an interdisciplinary (history, anthropology, geography) literature study in combination with the insights from ethnohistorical research (local and national archives and field work) on the repercussions of consecutive land reforms for Aymara communities of the Oruro department in the 19th up to 21st centuries (Cottyn 2014). The Oruro department is situated at the heart of the *altiplano* (high plateau) and is marked by strong rural experiences of colonial exploitation, indigenous market participation and mining expansion, interposed by mixed experiences of land usurpation, struggles and recuperation, peasant mobilization and ethnic revitalization. The trajectory of these communities offers a good example of what Kardulias defined as negotiated peripherality. The following trajectory is informed by the "agentic capacities" observed in the Aymara strategies of negotiation, adaptation and resistance, but reflects the more diverse experience of Bolivia's (mainly Quechua and Aymara) Highland communities over the last 500 years. An assessment of this trajectory of incorporation and contestation from a frontier perspective reveals how communal spaces were (re)created and thereby undercut the logic and outlines of a neatly commodified land regime.

The Tributary Frontier, 1532-1874

In a first phase of incorporation, the Andes was restructured into a new frontier of land control of the emerging capitalist world-economy. The setting of this frontier was the Potosí mining complex; its time frame that of Spanish colonial domination. When the first Spanish troops arrived to the South-American mountain ranges in the 1530s, a region-wide agrarian system was in place, marked by a complementary resource management that allowed for the "vertical control of a maximum of ecological niches" (Murra 1975). Inca rule, which had come to the area about 80 years earlier, built further on earlier forms of production and governance (Assies 2009:295). Local land administrations had been integrated in a tributary structure backed by a redistribution logic (Murra 1975). It was through this tributary mechanism—appropriated and distorted by the Spanish—that Andean frontier-making was channeled. It was only after the first chaotic decades of conquest, colonization, and indirect rule that the territorial, productive and representative organization of Andean rural communities was restructured accordingly, aiming at an incorporation that—while undeniably destructive—allowed the survival of its population and the extraction of their resources.

Formally, the incorporation of the indigenous population as vassals under protection of the Spanish Crown ensued from a series of regulations, later compiled into the *Leyes de Indias* (1680). It was only after nearly half a century of Spanish presence that demographic and fiscal pressures urged the Crown to enhance its direct control through a regulated property rights system. From the 1570s on, under viceroy Francisco de Toledo, a sweeping resettlement program was introduced that still counts as the most thorough and formative historical transition in Andean rural organization (Mumford 2012). Shortly before, communities had been integrated into *corregimientos* (provincial units), headed by a tax collecting official. Within the *corregimientos*, hamlets were concentrated into Spanish-style villages, called *reducciones de Indios*, under local control of the traditional chiefs, the *caciques*. The *reducciones* policy was intended to guarantee the survival of communal structures, for the sake of an optimal evangelization and labor and tax extraction. At the regional level, this reform set an amputation process in motion through which originally discontinuous (usually highland) territories lost their direct access to distant complementary production (usually valley) lands and were reorganized into enclosed entities.

The formalization of land rights involved the forced purchase of collective land titles from the Spanish Crown, thereby fixating communal boundaries in written property deeds. This mode of commodification established a paternalistic state-community relation, coined by Tristan Platt as a "reciprocity pact" (Platt 1982, 1984, 1987). According to this pact, the Spanish Crown protected communal land rights in return for free labor in the Potosí mines (*mit'a*) and taxation (*tributo*). The fiscal and labor obligations were key instruments in the organization of a colonial

intercontinental silver economy. Based on the exploitation of the Potosí mines, this silver flow nurtured the process of Andean ecological and social peripheralization (Moore 2010a). With Toledo's reform, the locus of indigenous incorporation shifted to the "renewal" of the communities' purchase of protected collective land rights trough two-yearly tribute payment. Indigenous contestation of these terms of incorporation is empirically traceable in migration patterns, switching between fiscal categories, lobbying and violent uprisings against the *mit'a* and *tribute* (Larson, Harris and Tandeter 1995). At the same time, the loyalty ties forged through fiscal and labor obligations entailed the guarantee of autonomous control over community lands, which would feed back into the Bolivian land regime once the colonial system crumbled. When privatization initiatives engulfed the Bolivian highlands, indigenous communities and their leaders heavily relied on colonial land titles and the granted rights as incorporated vassals as discursive negotiation resources. As carriers of identity and collective memory, these resources were appropriated as empowering tools for ethnic territorial defense.

The Liberal-Oligarchic Frontier, 1874-1952

From the 1860s on, land rights commodification in Bolivia—now independent—deepened and shifted in a dramatic way. In the late nineteenth century, the core of economic and political power moved on the highlands, from its colonial base in Potosí and the nearby capital of Sucre to La Paz. This shift was supported by the "second conquest" of Andean resources, spearheaded by British imperialist ambitions and supported by an attractive economic context for vast inflows of international capital (Larson 2004:46). In the transition to independence, the mutual state-community pact that protected the communities' landowning, taxpaying and representative competences initially survived (Antezana 2006:90-3). However, from the late eighteenth century on, new ideas on civilization and nation-building gave shape to a different concept of land property and the formulation of "dead hands" (mortmain), which gained major entrance under influence of the French Revolution (Linklater 2013:199-211). The debates at the *Cortes de Cádiz* (1810-1814), would influence the future reorganizations promoting land privatization in the entire Spanish American region (Rodríguez 2005). Also in the newly independent Andean nations, a wide debate developed on how to modernize the colonially inherited land system (Larson 2004). The emerging liberal elites decided the debate, pinning down the principle of private property as the basic condition for the free movement of goods and labor. This required the formation of a modern, legible, hence centralized and homogeneous legal framework for land control.

Because of the incompatibility detected between moveable private and immobile collective property, the movement of that frontier particularly targeted communal landholdings. Somewhat later than elsewhere in Latin America, this shift materialized in Bolivia only when the mining sector started to usurp the Treasury's dependence on the indigenous tribute tax in the 1860s (Klein

2003:136). In 1874, the government enacted the *Ley de Exvinculación* (Alienation Act), thereby radically and one-sidedly terminating the existing guarantees for communal land arrangements (Ovando Sanz 1985). While the law aimed at converting collectively owned lands into individual held marketable plots, and hence community members into smallholders, its effect was much more differentiated, manipulated and incomplete (Rivera [1984] 2010:88-89; Barragán 2012). In regions with appropriate ecological conditions for agricultural surplus production, privatization had a strong impact. However, in large part of the highlands, particularly in the La Paz area, numerous communities were absorbed by a large-scale expropriation movement between 1880 and 1930, incorporating communities into private estates, which boosted the expansion of the hacienda complex (Klein 1993:157). Liberal reforms consolidated an oligarchic land system.

Whether in the eye of the storm or enduring in the margin, indigenous communities in all regions witnessed an erosion of their land rights security and social safety net. The existing balance between communities and haciendas was broken (Grieshaber 1980). Some regions remained more easily excluded from the tragedy of the commons, particularly where factors of pastoralism, community organization and communal ethics outbalanced the factors of market forces and demographic pressures on resources (Guillet 1981:145-6). However, in all regions increased vulnerability incited a strong and coordinated reaction which was quite successful in defending key indigenous demands against weak state structures (Barragán 2012; Rivera 1991). In marginal regions, ecological conditions tempered privatization pressures of agricultural entrepreneurs, but it was through the combination of the indigenous numerical force, their coordinated anti-alienation resistance and the solidity of the colonial reciprocity pact that they managed to keep their community lands outside the reach of liberal policies (Cottyn 2014). Across the highlands, indigenous resistance relied to great extent upon the mobilizing potential of communal structures, a national grassroots movement of community leaders, and a pragmatic alliance between indigenous leaders and rural elites. Communal resistance strategies included legal procedures, political lobbying and violent revolts. This multifaceted maneuvering materialized in legal loopholes to circumvent the new legislation (Larson 2004:220). Communities in possession of colonial land titles successfully lobbied for a formal exemption from the law on a national level and compelled the state to a deliberate policy of oblivion and non-intervention (Barragán 2012). Hence, the frontier was prevented from settling in the Bolivian highlands.

The Peasant Frontier, 1952-1985

The next frontier shift consisted of an internal restructuring through the dissolution of the hacienda complex and the opening of a new land reserve for large-scale land appropriation. This was a double state-centered incorporation strategy, aiming at the land regime's rationalization by conditioning land property in the highlands to size limits and its effective "social-economic

function", and at its geographical expansion into the eastern lowlands. This phase was dominated by new revolutionary and moderate political movements and conditioned by a Cold War context in which the US sought to exercise internal influence, including in agrarian politics, and create room for foreign investment, however challenged by popular mobilizations and competing economic models (Field 2014; Young 2017).

The frontier shift materialized through a rupture, represented by the National Revolution of 1952 and the Agrarian Reform of the following year, as the result of accumulative cycles of popular resistance (Rivera [1984] 2010). The Chaco War (1932-1935) had put the land and the Indian question—amongst other topics that generated widespread discontent—on the political agenda in Bolivia. On the countryside, where 8% of the production units held 95% of all arable land of which they cultivated only 0.8%, organized protest against excessive land concentration and servile labor relations rose (Rivera [1984] 2010:132).

A combination of popular mobilization, syndicalist organization and the "discovery" of the peasants as political subjects led to the National Revolution of 1952. Counting as Latin America's first successful revolution after Mexico, the new nationalist reformist government of the MNR nationalized the major mining companies, declared universal suffrage and implemented an agrarian (1953) and educational (1955) reform. The 1953 Agrarian Reform Decree declared that land belonged to the person who worked it; its ownership should fulfill a social function; and the state was the final owner of all natural resources (Assies 2009:298). The reform promoted a reversal of the private land usurpations and servile labor relations on the countryside, at least in the highlands (Stern 1987; Larson 2004; Gotkowitz 2007). Under the premises of nationalist developmentalism, which defined the dominant economic policy adopted by Latin American countries since the 1930s to the 1970s, the reform was oriented towards redistributive justice, subdividing and relocating hacienda holdings into small individual plots for peasant families organized within agrarian syndicates, while non-absorbed communities retained their communal structures. However, criteria were lax and prevented the expropriation of many large properties, while the deficient technical-financial capacity of the Bolivian state impeded an increase of productive resources for peasants (De Janvry 1981:208-209). Still, the overall outcome of 1953 was an expansion of standardized property rights and an increasingly stronger connection of rural communities' land, labor and production to the market.

This phase corresponds to a process of "peasantization" which restored collective forms of land control through a reorganization of state-community reciprocity relations under a peasant-syndicalist scheme. This implied a denial of indigenous identities and logics and their formal substitution by peasant categories. In a following moment, the countryside was appeased through the authoritarian military-peasant pact, installed in 1964. While in several places communal forms of political mediation persisted, this explicit negation and pacification would trigger more radical

forms of rural-urban organization and negotiation. The indianist *katarismo* movement would break open the military-peasant pact and anticipated the communal redefinition of the land question in Bolivia in a successive moment (Rivera [1984] 2010). This latent unrest would merge with the effects of an inefficient land reform that augmented rather than mitigated the pressure on land. The 1953 legislation allowed for large estate formation in the lowlands, at the cost of indigenous community land. In the highlands, the reform spurred land fragmentation and forced indigenous peasants to choose between individual and undivided community land titles, molding peasants' access to land into a dual private-versus-collective pattern, ignoring that both usually coexist within community systems (Urioste 2005:17).

The Neoliberal-Indigenous Frontier, 1985-2015

A new shift in Bolivia's land regime trajectory was shaped by a double movement. In 1985, president Víctor Paz Estenssoro subjected Bolivia to an economic shock therapy, thereby definitively closing the period he had initiated himself as head of the revolutionary state of 1952. Heavily influenced and sponsored by supranational financial cooperation, neoliberal recipes were translated into a land reform focused on titling (INRA 2008:90-92). At the same time, the pursued land titling operation entailed important advances in terms of securing indigenous territorial rights, which might seem counterintuitive. While Bolivia's previous reforms focused on the highlands, this transformation was mainly triggered by lowland indigenous demands to secure an equal access to land – as a result of the spatial shift after 1953. The consequences of this shift in terms of communal rights provided indigenous communities with new tools for the consolidation of communal land tenure rights, thus reproducing the obstacles to incorporating these lands as commodities on the market.

By the end of the 20th century, it was irrefutable that the reformed land system had failed to halt land fragmentation, extreme poverty, and marginalization. It continued to favor capitalist agro-industrial production (Kay and Urioste 2007; Urioste, Barragán and Colque 2007). It became clear that the reform had been "abandoned" somewhere halfway (Urioste 2005), if not "reversed" (Rojas 2012). By the 1990s, national land distribution was marked by an asymmetric proportion between a growing group of *minifundio* landowners, occupying extremely small highland plots of less than 20 hectares, and a small group of *latifundio* landowners, now concentrated in the lowlands and including estates of over 5000 hectares (Chumacero 2012; Urioste 2005:24-25). Peasant and indigenous mobilizations pushed the agrarian question back on the political agenda. In response to the collective (land) demands of revitalized indigenous movements, a new legal figure of "Native Community Lands" (*Tierras Comunitarias de Origen*) or, in short, TCOs, was introduced. This was a major innovation as this title explicitly recognized indigenous rights to communal control over resources, customs and forms of decision-making. In 1996, this instrument was

adopted by the new land reform law *Ley 1715*, commonly known as the INRA Law. INRA refers to the reorganized National Institute for Agrarian Reform. Its objective was to normalize and modernize the agrarian property situation as inherited from previous governments (Urioste 2005:19). Thereto, all post-1953 land property documents and titling procedures were cancelled and subjected to a technical-juridical regularization operation, termed *saneamiento* (Art. 64. Ley 1715; Mendoza et al. 2000:53). However, after ten years, only 11.6% of the country's land base had been regulated (INRA 2008:153).

The INRA law reproduced the dual framework installed in 1953. The assumed incomplementarity of individual and collective rights inflamed feelings of insecurity that challenged intra- and inter-community relations and their national integration (Chumacero 2012). In the context of the radically new political landscape after 2006, with the ascent of Evo Morales and the MAS party, the legislation was modified in an attempt to respond to these tensions. In 2009, Bolivia adopted a new constitution, declaring the country a "Plurinational State." The constitutional reform opened more room for heterogeneity in local customary land tenure systems. Indigenous land rights were extended to territorial rights under the status of "Indigenous Native Peasant Territory" (*Territorio Indígena Originario Campesino* or TIOC) (Rojas 2012). This reinforced the established guarantee of non-intervention on part of the state in the internal organization of land use and property, leaving this to the supervision of indigenous community leaders. Here, a new frontier shift may be identified that can be categorized as the "autonomy" or "plural" frontier. However, the Law on the Communitarian Restoration of the Agrarian Reform (*Ley de la Reconducción Comunitaria de la Reforma Agraria*) was more about the reaffirmation of the legal security of indigenous and peasant land rights and the acceleration of land titling, than a structural reform (Rojas 2012) .

Legal innovations have encountered serious difficulties to live up to the rising expectations (Urioste 2008:8; Rojas 2012). The new measures did not protect communities from the ongoing land grab in Bolivia's lowlands nor from far-reaching land fragmentation in the western highlands (Achtenberg 2013). Hence, land rights are far from disappearing on the country's political agenda; as are indigenous rights. It shows that the expansion of land right frontiers comes with contradictions and conflict, resulting in differentiation (fragmentation vs. concentration of lands) and lacuna (special status for community lands), hence securing the constant recreation of frontier processes. The reproduction of incorporation pressures was most clear in the commodifying ambitions expressed at Bolivia's Agricultural Summit in April 2015 (Fundación Tierra 2015).

In the course of the last five centuries, the granting of formal land titles constituted an essential step in the advance of a strategic frontier of land control in the Andes. Yet the explicit recognition of collective land tenure would act as an important brake on the further incorporation of Andean rural peoples and resources. In a second moment, the privatization of land rights, functional to the

installation of a national land legislation framework, was undercut. The previous phase of formalization had resulted in colonial property deeds which now functioned as counter-enclosure instruments. In a third moment, the reorganization of land rights was functional to the national incorporation and pacification of the countryside. In a last moment, the Bolivian state seems to have made a deliberate choice to settle the land rights frontier without completely incorporating communal systems. By 2013, of all the land that had been regularized since the 1953 reform and under the more recent reforms, one-third corresponded to collective Native Community Land titles held by indigenous and peasant organizations (Achtenberg 2013). Through national revolutions, constitutional change and land reform, the state-centered land rights system of Bolivia was compelled to recognize room for heterogeneity and negotiation that allows for the existence of communal arrangements. This created an important margin for autonomy—albeit one subject to recurrent pressures to conform. In the face of growing state and private claims on the land, indigenous communities and their leaders are triggered to constantly renegotiate their land rights. It is this combination of autonomy and participation, rooted in the ability to carve out concessions but also to reconcile to supra-local control systems, that explains the resilience of Andean communal action and the re-production of communal spaces in an ever globalizing world. It gives evidence of how Andean rural communities define the conditions under which they will participate in incorporation strategies.

The Land Question as a Frontier Process

The expansion of global capitalism is the expression of a fundamental transformation of land rights. Being a constitutive frontier process, the land question can be understood as a central point of friction between peripherally located groups and the development of a capitalist world-economy. The struggle over rights to access, withdraw, manage, exclude or alienate land constitutes land regimes. They are the manifestation of the paradoxes of shifting world-historical processes of land commodification. This unevenness produces hybrid social spaces, fueling and fueled by partial incorporation of customary tenure systems.

While the commons disappeared in many other parts of the world, community land still stands out as a decisive component in the constitution of Andean land systems. Communal efforts to secure a margin for community-based land and resource management deal with the attempts of national governments to subject access to land to a centralized and standardized (legible, accountable) legal framework. Driven by liberal ideas on property and state aspirations for "modernity," the spatial and social structures of communal organization have been identified as to-be-incorporated. Incorporation pressures triggered diverse repertoires of reaction developed by local communities and their leaders. A frontier perspective reveals how these repertoires interrupted the development of a capitalist land regime, and connected the histories, spaces and

agency of peripheral groups to this expansive process. Tracing the temporal and spatial shifts in the shaping of Bolivia's plural land regime reveals how new places and societies were incorporated and transformed while explicitly recognizing degrees of non-incorporation.

This article has explained and tested the world-systems frontier perspective by tracing how a frontier zone has been (re)shaped in the Andean highlands throughout the historical formation of a national land regime. Land commodification in the rural Andes is analyzed through an incorporated comparison of successive frontier shifts over the last five centuries. This trajectory shifted from colonial *tributary* frontier evolved to as a post-independence *liberal-oligarchic* frontier, which was restructured into a *peasant* frontier in the context of mid-twentieth century nationalist developmentalism, and redefined as a *neoliberal-indigenous* frontier in the late twentieth century. The changes under Bolivia's first indigenous president announced a new frontier shift in the country's land regime towards pluralism, yet are currently being evaluated as a shift towards the exacerbation of capital vs. communal contradictions (Webber 2017). The spatial nexus of these frontiers shifted from the Potosí mining complex to the new liberal elites in La Paz, until historical highland dominance was lost to the lowland region of Santa Cruz. Neoliberal times witness an increasing transnationalization of power relations, currently challenged by a revitalization of lowland, highland, and international community voices. Externally, the frontier moved from the European mainland to the Americas and then from the colonial highland heartland into new peripheries. Internally, the frontier between individual private property and collective tenure is being redefined.

By adopting a frontier perspective the incorporation and reproduction of communal systems in the Bolivian highlands is deconstructed as a process of negotiation. The notion of negotiation does not neutralize the effects of commodifying pressures that push for a homogenization of spaces, but points to the simultaneity of counter-pressures that contribute to the heterogeneity of local spaces. The modernizing aspirations of public authorities and strong communal land claims forced local communities, rural elites, corporate interests and government actors into a complex interplay. Rather than passive victims or stubborn opponents, Andean rural communities appear as active negotiators. The repercussions of the conflicts and alliances developing on the Bolivian highlands produced an incorporation without commodification of community lands within a centralized land regime. Moving the frontier to center stage in world-systems analysis is instructive on several fronts. The frontier perspective elaborated in this paper enables scholars to analyze peripheral agency in the context of incorporative processes in other temporal and spatial settings. It explains how the (re)production of frontiers of land control in specific places gives shape to a far from homogeneous world-system. In that sense, a frontier perspective offers a strategic toolbox to enhance a more comprehensive and non-dichotomous world-systemic understanding of the expansion, limits and contradictions of the capitalist world.

About Author

Hanne Cottyn is a post-doctoral researcher and lecturer at the History Department and the Department of Conflict and Development Studies at Ghent University, Belgium. She holds a PhD in History from Ghent University (2014). Her current research compares historical trajectories of communal land rights transformation in the Bolivian and Peruvian Highlands (19th to 21st centuries). Research interest include land rights, peasant and indigenous communities, extractivism, world history, and Andean ethnohistory.

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The Paradoxical Relationship between Renewable Energy and Economic Growth:

A Cross-National Panel Study, 1990-2013

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Abstract

This cross-national study employs a time-series cross-sectional Prais-Winsten regression model with panel-corrected standard errors to examine the relationship between renewable energy consumption and economic growth, and its impact on total carbon dioxide emissions and carbon dioxide emissions per unit of GDP. Findings indicate that renewable energy consumption has its largest negative effect on total carbon emissions and carbon emissions per unit of GDP in low-income countries. Contrary to conventional wisdom, renewable energy has little influence on total carbon dioxide emissions or carbon dioxide emissions per unit of GDP at high levels of GDP per capita. The findings of this study indicate the presence of a "renewable energy paradox," where economic growth becomes increasingly coupled with carbon emissions at high levels of renewable energy, and the negative effect of economic growth on carbon emissions per unit of GDP lessens as renewable energy increases. These findings suggest that public policy should be directed at deploying renewable energy in developing countries, while focusing on non-or-de-growth strategies accompanied with renewable energy in developed nations.

Keywords: Climate Change; Economic Growth; Renewable Energy Consumption; Renewable Energy Paradox; World Economic System

Driven primarily by anthropogenic causes, the concentration of carbon dioxide (CO_2) in the atmosphere is at levels not observed for at least the past 800,000 years, if not longer (IPCC 2014a: 4). The concentration of greenhouse gases (GHG), particularly CO_2, will continue to alter the climate system, placing a disproportionate amount of stress on the poor and marginalized (IPCC 2014a:13). Fossil fuel combustion and industrial production are the largest contributors, leading many analysts to place a prodigious emphasis on decarbonizing the electricity and energy sector (IPCC 2014:28; Obama 2017; World Bank 2010:14). The ecological contradictions of fossil fuel use and production processes have been closely tied to a global, capitalist system that is based on exponential growth and profit accumulation (Foster, Clark, and York 2010). However, many policymakers and institutions have been reluctant to acknowledge or address the underpinnings and social relations of the macro-economic system on national and cross-national levels (see Obama 2017; OECD, World Bank, and United Nations 2012). In some quarters, promoting the deployment of renewable energy sources is a key strategy to mitigate carbon emissions (IPCC 2014b). However, scant attention has been given to macro-economic investigation of renewable energy and its relationship to various processes within the global economic system.

Myriad studies—including contributions in this issue of *JWSR*—have demonstrated the presence of asymmetric power relations and inequalities between countries, their position in the world system, and resulting environmental outcomes (Bunker 1984; Rice 2007; Roberts and Parks 2007; Jorgenson and Clark 2012; Jorgenson and Dietz 2015; Jorgenson 2016). Within this framework, this study investigates how the effect of renewable energy consumption on carbon emissions varies by country position within the world economic system. More specifically, this cross-national study examines the relationship between renewable energy consumption and economic growth, and its impact on total CO_2 emissions and carbon efficiency (CO_2 per unit of GDP).

Background

A host of international institutions (OECD 2011; World Bank 1992; World Bank 2010) and scholars (Lovins and Lovins 2000; Mol 2002) have argued, directly or indirectly, that a "green" capitalism or "green" growth is possible and sustainable. Proponents of the green growth paradigm argue that a decoupling between the environment and economic growth can occur, i.e., the economy can be transformed so economic growth lessens its negative impact on the environment.[1]

[1] There are two types of decoupling; relative and absolute. Relative decoupling occurs when the negative impact of economic growth on an environmental indicator becomes less intense but still results in environmental degradation. Absolute decoupling would occur if economic growth had no effect on the environmental indicator or actually improved environmental conditions (OECD 2002).

These arguments arise from two related theories. The ecological modernization theory posits that the economy and environment can decouple from one another through a transformation of ideas and processes that incorporate ecological considerations into the economy and social institutions (Mol 2002:93).[2] Similarly, the Environmental Kuznets Curve (EKC) school proclaims that even though economic growth may initially cause environmental degradation, it will eventually lead to cleaner production processes and sustainable practices (Grossman and Krueger 1995:370). In contrast, scholars working within theoretical schools such as the treadmill of production and metabolic rift theory assert that economic growth and improvements in global environmental conditions are incompatible goals (Foster 1999; Gould, Pellow, and Schnaiberg 2004). For example, the treadmill of production posits that increasing capital investments lead to increasing rates of resource extraction (Gould, Pellow, and Schaniberg 2004:297). Because the global economic system is built on profit accumulation and increasing production, efficiency improvements and technological advancements often lead to greater resource use and environmental degradation, i.e., the Jevons Paradox (Foster, Clark, and York 2010:179). Similarly, utilizing metabolic rift theory, Clark and Foster (2009) argue that the ever-expanding processes of capital accumulation creates a "rift" between human and natural systems, leading to social and environmental inequalities and contradictions (314).

Regardless of the evidence, global environmental policy has been closely aligned with the ecological modernization and EKC schools of thought. This is not surprising given these theories are less critical of the unequal power relations that exist in the current world economic system. Thus, the response to climate change has primarily focused on transforming the energy sector and promoting carbon efficiency. A common, but largely hidden assumption among policy makers and governmental bodies, is that fossil fuels will be displaced by merely increasing renewable energy production and consumption (York 2012). For example, 29 U.S. states and a number of countries have adopted Renewable Portfolio Standards (RPS) or similar mechanisms (National Conference of State Legislators 2016). These standards often set a future date by which a certain percentage of energy is to come from renewables, but they do not address the use of fossil fuels, implicitly assuming renewable energy will displace them. However, as York (2012) observed, renewable energy has only a modest effect in supplanting fossil fuels. Therefore, simply establishing percentage targets are likely to be an ineffective strategy for mitigating carbon emissions, especially without simultaneously reducing fossil fuel use.

Several previous studies have examined the relationships between the economy, carbon dioxide emissions, and renewable energy. Ben Aissa et al. (2014) found that renewable energy

[2] See Ewing (2017) and Salleh (2012) for critiques of "green capitalism" from a world-systems perspective. Ewing (2017) specifically critiques ecological modernization theory and outlines the salient role that world-systems research should play in environmental sociology.

consumption and trade openness had a positive, long run impact on GDP in their sample of 11 African countries. However, other studies have shown that economic growth is a main contributor of carbon dioxide emissions (Dietz, Rosa, and York 2007; Jorgenson, and Clark 2012; Rosa, York, and, Dietz 2004), suggesting that the negative effect of reneawble energy on carbon dioxide emissions may be offset by interactions with other economic processes. Assessing the relationship between GDP and renewable energy consumption, Apergis and Payne (2010) observed a bidirectional, causal relationship between the two in a panel study of OECD countries. Shafiei and Salim (2014), also examining OECD countries, found that renewable energy consumption negatively affected carbon dioxide emissions. These studies suggest that although renewable energy could decrease carbon dioxide emissions, the effect may be mitigated by renewable energy's positive feedback on economic growth.

A host of sociological studies have also examined economic/environmental decoupling across various ranges of time, space, and environmental indicators. Using per capita ecological footprints as their dependent variable, Jorgenson and Clark (2011) found that economic growth became more resource intensive over time for both developed and less-developed countries. Jorgenson, Clark, and Giedraitis (2012) explored the relationship between economic growth and carbon dioxide emissions in Central and Eastern Europe. They used three measures of CO_2 emissions (total carbon emissions, carbon emissions per capita, and carbon emissions per unit of GDP) and found an intensification occurred between each carbon measure and economic growth from 1992-2005 (Jorgenson, Clark, and Giedraitis 2012). Extending their analysis to the global economy and employing the same three measures of carbon dioxide emissions, Jorgenson and Clark (2012) found that a slight decoupling occurred between economic growth and total carbon emissions for the global economy and for developed countries from 1960-2005 (Jorgenson and Clark 2012: 21). However, they found an intensification occurred between economic growth and carbon emissions per capita on a global scale and for less-developed countries (Jorgenson and Clark 2012: 22). Their results also indicated that a decoupling between economic growth and carbon emissions per GDP occurred in developed countries, but the magnitude of the coefficient was near zero (Jorgenson and Clark 2012: 23). In an assessment of the relationship between the electricity sector and GDP per capita, York and McGee (2017) found that increases in renewable electricity had a larger negative impact on carbon emissions in poorer nations, and that economic growth had a larger positive impact on emissions in countries with a high degree of renewable electricity.

With the exception of York and McGee (2017), the aforementioned economic/environmental decoupling studies did not incorporate any measure of renewable energy into their models, which suggests that further investigation into the linkage between renewable energy, economic growth and carbon emissions is warranted. As renewable energy continues to be deployed, could economic growth become decoupled from carbon emissions? Could adoption of renewable energy in other

sectors besides electricity (e.g., transportation, industry, residential, commercial) further decoupling? Lastly, how does renewable energy affect carbon efficiency? In the cross-national analyses below, these considerations are tested by classifying countries as to their income position in the world economic system. By examining the effect of renewable energy in this way, the study seeks to provide insights into how renewable energy may impact carbon emissions across disparate economies and within country classification groups (e.g., high income, upper-middle income, lower-middle income, and low income).

Data and Methods

This study uses panel data from 1990-2013. There are 129 total countries used in the analysis. Countries were separated into four groups: high income, upper-middle income, lower-middle, and low income. The four categories were based on the World Bank's (2017a) classification of economies from 2013. The breakdown of countries into these groups allow for meaningful insight into how a country's income position in the world economy may impact how renewable energy influences CO_2 emissions.[3] Table 1 lists the countries by economic position.

The present study relied on an unbalanced panel. Most countries included in the panel had relatively complete data, but there were some missing data for former Soviet nations in the early 1990s. Also, a number of countries did not have full data for industry as a percentage of GDP. Additionally, only countries with a population over 1 million people were included in the analysis. Data were collected for every year from 1990-2013, which totalled 2,832 observations.[4]

Dependent Variables

This study employs two measures of CO_2 emissions as dependent variables: total CO_2 emissions and CO_2 per unit of GDP. Total CO_2 emissions are the most important measure for sustainability purposes, as they are the prime driver of climate change (IPCC 2014a:4). Total CO_2 emissions data were obtained from the World Resource Institute (WRI, CAIT 2017). WRI provides public climate data through their Climate Analysis Indicator Tool (CAIT). CAIT obtains most of their emission data from the International Energy Agency (IEA) (WRI, CAIT n.d.). The CO_2 emissions data excludes emissions from land use changes and forestry.

To measure how renewable energy consumption affects carbon efficiency, CO_2 per unit of GDP were also employed. Such an indicator is a common measure of efficiency (Jorgenson and Clark 2012; Roberts, Grimes, and Manale 2003; York, Rosa, and Dietz 2009). To obtain CO_2 per

[3] Though classifying countries by GDP per capita isn't exactly the same as world-system position, the two are highly correlated (Roberts, Grimes, and Manale 2003)

[4] The descriptive statistics are in Table A1 in the Appendix.

unit of GDP, the carbon emissions data gleaned from WRI was divided by GDP. GDP is measured in constant 2010 U.S. dollars and obtained from the World Bank (2017b).

Table 1. Countries included in the Study by Income Level

High	Upper Middle	Lower Middle	Low
Australia	Albania	Armenia	Bangladesh
Austria	Algeria	Bolivia	Benin
Belgium	Argentina	Cameroon	Burkina Faso
Canada	Azerbaijan	Congo, Rep	Burundi
Chile	Belarus	Egypt	Central African Republic
Croatia	Bosnia and Herzegovina	El Salvador	Chad
Cyprus	Botswana	Georgia	Congo, Dem Rep
Czech Republic	Brazil	Ghana	Ethiopia
Denmark	Bulgaria	Guatemala	The Gambia
Estonia	China	Honduras	Guinea
Finland	Colombia	India	Guinea-Bissau
France	Costa Rica	Indonesia	Kenya
Germany	Cuba	Kyrgyz Republic	Liberia
Greece	Dominican Rep	Lao PDR	Madagascar
Ireland	Ecuador	Mauritania	Malawi
Italy	Gabon	Moldova	Mali
Japan	Hungary	Mongolia	Mozambique
Latvia	Iran	Morocco	Nepal
Lithuania	Jamaica	Myanmar	Rwanda
Netherlands	Jordan	Nicaragua	Sierra Leone
New Zealand	Kazakhstan	Nigeria	Tajikistan
Norway	Lebanon	Pakistan	Tanzania
Poland	Macedonia	Paraguay	Togo
Portugal	Malaysia	Philippines	Uganda
Russia	Mauritius	Senegal	Zimbabwe
Saudi Arabia	Mexico	Sri Lanka	
Singapore	Panama	Sudan	
Slovak Republic	Peru	Swaziland	
Slovenia	Romania	Ukraine	
Spain	Serbia	Uzbekistan	
Sweden	South Africa	Vietnam	
Switzerland	Thailand	Zambia	
South Korea	Tunisia		
Trinidad and Tobago	Turkey		
United Kingdom	Venezuela		
United States			
Uruguay			

Independent Variables

The key drivers of CO_2 emissions included in the model are GDP per capita, total population, urbanization, trade openness (international trade as a percentage of GDP), and the percentage of GDP from industrial processes. These data were obtained from the World Bank (2017b). GDP per

capita is a measure of economic growth and affluence (Dietz, Rosa, and York 2007; Jorgenson and Clark 2012; Rosa, York, and Dietz 2004). GDP per capita is in constant 2010 U.S. dollars for each country. Urbanization was also controlled for, which has commonly been included in carbon emission models (Jorgenson and Clark 2012; Jorgenson, Rice, and Clark 2010; Lankao, Nychka, and Tribbia 2008; York 2008; York, Rosa, and Dietz 2003). Urbanization was measured as the percentage of people living in urban areas in a particular country. To control for a country's integration into the global economy, international trade (imports and exports) as a percentage of GDP was included. International trade has been demonstrated to have a positive influence on CO_2 emissions (Dietz, Rosa, and York 2010; Frey 2003; Roberts and Park 2007). Another key driver, total population, was included in the model as well (Dietz, Rosa, and York 2007; Jorgenson and Clark 2012; Rosa, York, Dietz 2004; York, Rosa, and Dietz 2003). To capture a holistic measure of the role manufacturing and resource extractive industries play in a country's economy, industry as a percentage of GDP was included in the model. Industry includes the mining, manufacturing, electricity, water, and gas sectors (World Bank 2017c). Lastly, the main variable of concern, the percentage of total final energy consumption from renewable energy, was included to measure the effect that renewables have on CO_2 emissions. This measure includes energy consumption from a variety of renewable sources (hydroelectric, solar, wind, geothermal, biofuels, etc.). Total final energy consumption measures how energy is employed in its end use. It includes not only electricity, but energy use from other sectors including industry, transportation, residential, commercial, and agriculture. Thus, using renewable energy consumption rather than a similar measure like renewable electricity output, provides a holistic measure of energy use across various sectors. All variables were logged to correct for skewness.

Model Estimation Technique

The present study utilized Prais-Winsten regression models with panel-corrected standard errors. Prais-Winsten corrects for first-order serial correlation (Baum 2006:159). Because the study used time-series cross-sectional data, panel corrected standard errors were employed in the analyses. Panel-corrected standard errors are more accurate than the alternative feasible generalized least squares (Beck and Katz 1995:634). Disturbances across panels were assumed to be heteroskedastic and contemporaneously correlated with panel corrected standard errors (Beck and Katz 1995:636). Two models were estimated for the entire sample and separately for high income, upper-middle income, and lower-middle and low income countries, as follows:

Model 1: Total Carbon Emissions or Carbon Emissions per Unit of $GDP_{it} = \beta_1$ Renewable $Energy_{it} + \beta_2$ GDP per $capita_{it} + \beta_3$ $Population_{it} + \beta_4$ $Urbanization_{it} + \beta_5$ $Trade_{it} + \beta_6$ $Industry_{it} + \beta_7$ year $1990_t + \ldots + \beta_{30}$ year $2013_t + u_i + e_{it}$

Model 2: Total Carbon Emissions or Carbon Emissions per Unit of $GDP_{it} = \beta_1$ Renewable $Energy_{it} + \beta_2$ Renewable $Energy_{it}$ * GDP per $capita_{it} + \beta_3$ GDP per $capita_{it} + \beta_4$ $Population_{it} + \beta_5$ Urban $Population_{it} + \beta_6$ $Trade_{it} + \beta_7$ $Industry_{it} + \beta_8$ year $1990_t + \ldots + \beta_{31}$ year $2013_t + u_i + e_{it}$

In Model 1, β_1 (% of Renewable Energy) is the coefficient of primary interest. An interaction term (Renewable Energy * GDP per capita) is added to Model 2. This interaction term captures the relationship between the effect of renewable energy and GDP per capita as each variable changes. Subscript *i* indexed each country, and subscript *t* indexed each time-period. The models are considered two-way fixed effects models (Baum 2006:224). Dummy variables were constructed for u_i and w_t. The former controls for time-invariant, unobserved heterogenity within countries, such as geography, and the latter controls for time-invariant, unobserved heterogeneity within each time-period, such as global economic changes that impact all countries (Baum 2006:221). e_{it} was the disturbance term for each country at each time-period. The study sample accounted for 95% of the World's population.[5]

Though the model employed in the study was relatively robust, not all time-variant controls were included. State or local factors and policies that change over time could impact CO_2 emissions, such as regulatory policies or environmental treaties between countries. Controlling for these factors are beyond the scope of this study. However, several studies have demonstrated that military expenditures and size have a positive effect on CO_2 emissions (Clark, Jorgenson, and Kentor 2010; Jorgenson, Clark, and Kentor 2010) Therefore, military expenditures per soldier are controlled for in the sensitivity analysis, but the results remain nearly identical to the findings below.[6]

Results and Discussion

Table 2 reports the results for total CO_2 emissions and their relationship to the share of renewable energy as a percentage of total final energy consumption for the entire sample and subsamples by country types. Model 1 reports the linear effects of renewable energy consumption, GDP per capita, population, urbanization, trade openness, and industry as a percentage of GDP. Model 2 presents the results of the interaction term (Renewable Energy * GDP per capita). As a reminder, the independent and dependent variables were all logged.

[5] This calculation was derived from The World Bank Indicators Database (2017b).

[6] Military expenditures were obtained from the SIPRI Military Expenditure Database (2017), and the total number of armed forces per country were obtained from the World Bank (2017b). Military expenditures are in constant 2014 US$. The sensitivity analysis is available upon request.

Table 2. Unstandardized Coefficients for the Regression of Total Carbon Dioxide Emissions, 1990-2013: PW Regression Model Estimates with PCSE and an AR (1) Correction

	World		High		Upper-Middle		Lower-Middle		Low	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
% Renewable Energy of Total Final Energy Consumption	-0.291*** (27.32)	-1.430*** (16.65)	-0.124*** (9.10)	-0.233 (1.09)	-0.281*** (14.20)	-1.478*** (7.56)	-0.602*** (15.92)	-0.253 (0.99)	-2.327*** (23.71)	-11.821*** (10.79)
% Renewable Energy * GDP per capita		0.128*** (12.80)		0.011 (0.52)		0.146*** (6.22)		-0.048 (1.34)		1.404*** (8.67)
GDP per Capita	0.578*** (21.38)	0.175*** (4.01)	0.563*** (8.77)	0.550*** (9.66)	0.538*** (8.86)	0.186* (2.23)	0.310*** (3.86)	0.437*** (3.88)	0.438*** (11.79)	-5.708*** (8.10)
Population	1.504*** (18.13)	1.418*** (20.18)	1.355*** (16.32)	1.381*** (12.93)	1.231*** (9.96)	1.407*** (11.19)	1.369*** (7.86)	1.361*** (8.43)	1.546*** (7.44)	1.470*** (7.77)
% Urban	0.666*** (9.63)	0.458*** (6.23)	0.469* (1.98)	0.460 (1.93)	0.424*** (3.90)	0.160 (1.39)	0.883*** (7.62)	0.969*** (6.94)	0.198 (1.17)	0.449*** (4.08)
Trade Openness	0.055*** (4.41)	0.044*** (3.19)	0.065* (2.38)	0.067* (2.48)	0.022 (0.88)	0.017 (0.69)	0.053*** (3.32)	0.057** (2.68)	0.045 (1.82)	0.044* (2.05)
% Industry	0.077*** (3.54)	0.089*** (4.38)	0.026 (0.37)	0.026 (0.37)	0.029 (0.65)	0.045 (1.13)	0.101** (2.75)	0.099** (2.68)	0.057* (2.53)	0.044 (1.94)
R^2	.981	.982	.994	.994	.984	.985	.964	.966	.938	.953
N	2,832	2,832	799	799	801	801	693	693	539	539
Estimated Coefficients	158	159	66	67	64	65	61	62	54	55

Absolute values of z-ratios are in parentheses; unit-specific and period-specific intercepts are unreported.
* $P < .05$
** $P < .01$
*** $P < .001$

The results of Model 1 for the entire sample indicate that all the key drivers of CO_2 emissions were statistically significant. For all country types, total population and GDP per capita were statistically significant. The coefficient for urbanization was statistically significant for the entire sample and all country types excluding low income countries. Furthermore, trade openness was statistically significant for the entire sample and for high income and upper-middle income countries. The industrialization coefficient was also statistically significant for the entire sample and for lower-middle and low income countries, but not for upper-middle and high income countries. These findings suggest there are substantial differences in the organization of production and types of processes that drive CO_2 emissions across country positions in the world economic system.

The main coefficient of interest in Model 1, the percentage of renewable energy as a share of total energy consumption, indicated a negative and statistically significant effect for the entire sample. For the entire globe, the coefficient was -0.291. Thus, holding other factors constant, a 1% increase in the percentage of renewable energy consumption is associated with a 0.291% decrease

in CO_2 emissions. Therefore, consuming a larger percentage of renewable energy, relative to all energy sources, does result in a decrease in total carbon emissions, holding other factors constant.

Examining countries by their position in the global economy indicates that renewable energy consumption has a different effect relative to economic position. The largest impact was in low income countries (-2.327), whereas the slope coefficient was -0.602 in lower-middle income countries and -0.281 in upper-middle income countries. Renewable energy consumption had the smallest effect in high income countries (-0.124). These findings suggest that the development level of countries and their position in the world economic system affects the responsiveness of their national carbon emissions to renewable energy.

Model 2 of the results incorporates an interaction term, allowing for a closer examination of the relationship between GDP per capita and renewable energy consumption. The linear coefficients in Model 2 are conditional, indicating these coefficients are the effect when all other variables are at zero (Jaccard, Wan, and Turrisi 1990: 469). The interaction term between two continuous variables (renewable energy * GDP per capita) is to be interpreted as the effect of GDP per capita on CO_2 emissions, given a one percent increase in the percentage of renewable energy (Jaccard, Wan, and Turrisi, 1990: 469). Conversely, the coefficient can also be interpreted as the effect of renewable energy given a one percent increase in GDP per capita.

On the global level, the coefficient was positive (0.128) and statistically significant. Thus, the effects of the two are linked and differ depending on the position of the country in terms of income and the amount of renewable energy they consume. The coefficient indicates that growth in renewable energy consumption in less developed countries reduces CO_2 emissions more than in high income countries. Furthermore, the result indicates that economic growth has a greater effect on emissions in high renewable energy consuming countries than in countries with low levels of renewable energy. York and Mcgee (2017) found a similar relationship between renewable electricity production and carbon emissions per capita.

In regard to the subsamples, the coefficient is zero for high income countries. This result indicates that the effect of both GDP per capita and renewable energy consumption is constant across high income countries, i.e., the slope of each measure does not change as the other variable changes. However, in upper-middle income countries, the coefficient is positive (0.146) and statistically significant. Thus, the slopes of renewable energy and economic growth change relative to the value of the other variable. This result indicates that renewable energy has a greater suppressing effect on carbon emissions in poorer countries in the group (Jordan and Tunisia) than in the wealthier countries in the group (Hungary and Venezuela). For lower-middle income countries, the coefficient for the interaction between GDP per capita and renewable energy consumption is zero, signifying that the effect of both measures is constant across the country group. Lastly, the continuous interaction term for low-income countries is the largest of all country

groups (1.404). This finding indicates that increases in renewable energy consumption has its greatest impact on emissions in the least developed countries.

These results by country group are interesting in that they indicate that not only does renewable energy have an unequal affect across developed countries and less developed countries, but the effect also differs within country groups. For example, the slope of GDP per capita and renewable energy consumption remains constant across high income countries even though there is a wide distribution of income in this cohort. The effect is also constant across lower-middle income countries, which is less surprising because most of the countries have a similar GDP per capita, roughly between $1,000 and $3,500. However, the largest unequal effect occurs in the low income group, suggesting that the negative impact of renewable energy on CO_2 emissions is significantly greater for the poorest low income countries compared to the slightly wealthier low income countries.

Table 3. Slope Coefficients of GDP per Capita and Renewable Energy Consumption

Share of Energy Consumption from Renewables	Slope of GDP per Capita	GDP per Capita	Slope of Renewable Energy Consumption
0.29%	0.016 (0.055)	$208	-0.745*** (0.033)
8.33%	0.447*** (0.028)	$976	-0.547*** (0.019)
28.19%	0.603*** (0.023)	$3,585	-0.380*** (0.010)
64.52%	0.709*** (0.023)	$11,322	-0.233*** (0.013)
96.96%	0.762*** (0.024)	$67,829	-0.003 (0.028)

Panel Corrected Standard Errors are in parentheses.

* $P < .05$

** $P < .01$.

*** $P < .001$.

Table 3 presents an alternative way to interpret the continuous interaction between renewable energy and GDP per capita.[7] The table provides the slope coefficients for GDP per capita at the 1st, 25th, 50th, 75th, and 99th percentiles of renewable energy consumption, and the slope coefficients for renewable energy consumption at the 1st, 25th, 50th, 75th, and 99th percentiles of GDP per capita. The slope coefficients indicate that the effect of GDP per capita intensifies as renewable energy consumption increases, and the negative effect of renewable energy consumption lessens as GDP

[7] These slope coefficients were derived using the *Margins* command in STATA.

per capita increases. The GDP per capita slope coefficients suggest that growth becomes increasingly coupled with total CO_2 emissions at high levels of renewable energy consumption. Similarly, renewable energy consumption relatively couples with total carbon emissions at high levels of GDP per capita, i.e., the effect of renewable energy becomes less negative and approaches zero.

Table 4. Nation's Carbon Emissions Expected at 2st, 25th, 50th, 75th, and 99th Percentile Using World Sample

	Average Nation's Carbon Dioxide Emissions at 1st, 25th, 50th, 75th, and 99th Percentiles				
	Share of Energy Consumption from Renewables				
GDP Per Capita	0.29%	8.33%	28.19%	64.52%	96.96%
$208	111.3 $MtCO_2$	9.1 $MtCO_2$	3.7 $MtCO_2$	2.0 $MtCO_2$	1.5 $MtCO_2$
$976	114.2 $MtCO_2$	18.2 $MtCO_2$	9.3 $MtCO_2$	5.9 $MtCO_2$	4.7 $MtCO_2$
$3,585	116.6 $MtCO_2$	32.5 $MtCO_2$	20.5 $MtCO_2$	14.9 $MtCO_2$	12.8 $MtCO_2$
$11,322	118.8 $MtCO_2$	54.4 $MtCO_2$	40.9 $MtCO_2$	33.8 $MtCO_2$	30.7 $MtCO_2$
$67,829	122.3 $MtCO_2$	121 $MtCO_2$	120.5 $MtCO_2$	120.2 $MtCO_2$	120.1 $MtCO_2$

Note: Carbon emissions are measured in Million Metric Tons of CO_2. None of the predicted values for $67,829 are statistically different from each other. The standard errors of each estimate and the pairwise comparisons of estimates are available upon request.

Table 4 presents the expected CO2 emissions of a nation at the 1st, 25th, 50th, 75th, and 99th percentiles for the percentage of renewable energy consumption and GDP per capita.[8] In this sample, the 1st percentile for renewable energy consumption is 0.29%, the 25th is 8.33%, the 50th is 28.19%, the 75th is 64.52%, and the 99th is 96.96%. The 1st percentile for GDP per capita is $208, the 25th is $976, the 50th is $3,585, the 75th is $12,322, and the 99th is $67,829. The table is a cross-tabulation in which reading across a row provides the expected value of total carbon emissions for that income level at various renewable energy consumption levels. In contrast, reading down a column provides the expected value for a fixed renewable energy level varying by income. The other variables included in the model are held constant at population averages. The table illustrates that renewable energy has a substantial effect on developing countries, but it does not decouple economic growth from carbon emissions at high levels of GDP per capita. In fact,

[8] These expected values were also calculated using the *Margins* command in STATA. *Margins* calculates the average value of the dependent variable and assumes all the countries in the sample had that specific level of renewable energy consumption or GDP per capita (STATA, n.d.)

none of the expected carbon emission values for a country with a GDP per capita of $67,414 are statistically different from one another, reaffirming the results from Table 3.

Table 5. Unstandardized Coefficients for the Regression of Carbon Dioxide Emissions per unit of GDP, 1990-2013: PW Regression Model Estimates with PCSE and an AR (1) Correction

	World		High		Upper-Middle		Lower-Middle		Low	
	Model 1	**Model 2**	**Model 1**	**Model 2**	**Model 1**	**Model 2**	**Model 1**	**Model 2**	**Model 1**	**Model 2**
% Renewable Energy of Total Final Energy Consumption	-0.291*** (28.32)	-1.432*** (17.27)	-0.123*** (8.95)	-0.228 (1.06)	-0.281*** (14.20)	-1.478*** (7.56)	-0.598*** (15.86)	-0.298 (1.12)	-2.327*** (23.71)	-11.821*** (10.79)
% Renewable Energy * GDP per capita		0.129*** (13.26)		0.010 (0.49)		0.146*** (6.22)		-0.041 (1.11)		1.404*** (8.67)
GDP per Capita	-0.416*** (14.91)	-0.820*** (18.16)	-0.436*** (6.81)	-0.448*** (9.66)	-0.462*** (7.61)	-0.814*** (9.76)	-0.664*** (8.12)	-0.553*** (5.04)	-0.562*** (15.12)	-6.708*** (9.52)
Population	0.521*** (6.86)	0.435*** (6.71)	0.363*** (4.36)	0.388*** (3.62)	0.231 (1.87)	0.407*** (3.24)	0.426** (2.66)	0.417** (2.81)	0.546** (2.63)	0.470* (2.42)
% Urban	0.660*** (10.38)	0.452*** (6.71)	0.470* (1.97)	0.461 (1.92)	0.424*** (3.90)	0.160 (1.39)	0.874*** (6.76)	0.947*** (5.98)	0.198 (1.17)	0.449*** (4.08)
Trade Openness	0.055*** (4.26)	0.044** (3.11)	0.065* (2.38)	0.067* (2.47)	0.022 (0.88)	0.017 (0.69)	0.053*** (3.29)	0.057*** (3.50)	0.045 (1.82)	0.044* (2.05)
% Industry	0.066*** (3.20)	0.077*** (4.08)	0.029 (0.41)	0.028 (0.41)	0.029 (0.65)	0.045 (1.13)	0.068 (1.72)	0.066 (1.11)	0.057* (2.53)	0.044 (1.94)
R^2	.997	.997	.999	.999	.998	.998	.995	.995	.997	.998
N	2,832	2,832	799	799	801	801	693	693	539	539
Estimated Coefficients	158	159	66	67	64	65	61	62	54	55

Absolute values of *z*-ratios are in parentheses; unit-specific and period-specific intercepts are unreported.
* $P < .05$
** $P < .01$
*** $P < .001$

Table 5 reports the results for CO_2 emissions per unit of GDP (carbon efficiency), and their relationship to the share of renewable energy as a percentage of total final energy consumption for the entire sample and subsamples by country types. Several of the measures included (% urban, trade openness, and % industry) have similar coefficients to the results from total carbon dioxide emissions (Table 2). The renewable energy consumption coefficient also remained nearly identical to the results found in Table 2, suggesting that the effect of renewable energy is similar on total CO_2 emissions and CO_2 emissions per unit of GDP. The most significant difference between the results of the two is the effect of GDP per capita. Unlike for total CO_2 emissions, the effect of GDP per capita is negative and statistically significant for carbon efficiency. This finding indicates that

economic growth does result in carbon efficiency improvements, which is consistent with previous studies (Jorgenson and Clark 2012; Roberts, Grimes, and Manale 2003).

In Model 2, the interaction term (% renewable energy consumption * GDP per capita) coefficients are nearly indistinguishable from those found for total CO_2 emissions. However, the interpretation of the term changes because the coefficients for GDP per capita are negative. Thus, the negative effect of GDP per capita on CO_2 emissions per unit of GDP trends toward zero as the level of renewable energy consumption increases, i.e., a relative coupling occurs between GDP per capita and total CO_2 emissions per unit of GDP as renewable energy increases. Similar to the results for total CO_2 emissions, these findings indicate that increases in renewable energy consumption in poorer countries leads to larger improvements in carbon efficiency than in high income countries.

The same unequal effects of GDP per capita and renewable energy persist within country groups for carbon emissions per unit of GDP. The slopes of both variables are constant for high income and lower-middle income countries, whereas the slopes change relative to each other in upper-middle and low income countries. In upper-middle and low income countries, the poorest countries in each group gain the greatest improvements in carbon efficiency from increases in renewable energy.

Similar to Table 3 for total CO_2 emissions, Table 6 provides an alternative way to interpret the coefficient slopes for CO_2 emissions per unit of GDP.

Table 6: Slope Coefficients of GDP per Capita and Renewable Energy Consumption

Share of Energy Consumption from Renewables	Slope of GDP per Capita	GDP per Capita	Slope of Renewable Energy Consumption
0.29%	-0.979*** (0.056)	$208	-0.746*** (0.032)
8.33%	-0.547*** (0.030)	$976	-0.547*** (0.018)
28.19%	-0.391*** (0.024)	$3,585	-0.380*** (0.010)
64.52%	-0.284*** (0.024)	$11,322	-0.232*** (0.013)
96.96%	-0.232*** (0.024)	$67,829	-0.002 (0.027)

Panel Corrected Standard Errors are in parentheses.
* $P < .05$
** $P < .01$.
*** $P < .001$.

The slope of GDP per capita trends closer to zero as renewable energy consumption increases, and the slope of renewable energy also trends toward zero as GDP per capita increases. Thus, both variables become relatively coupled with CO_2 per unit of GDP as the other increases.

Presenting the expected carbon efficiencies for countries as was conducted in Table 6 for total CO_2 emissions would be useful for visualization purposes, but the numbers are too small to be expressed in readable form. For a country with a GDP per capita of $208 with 0.29% of their energy coming from renewables, their expected hundred metric tons of CO_2 per unit of GDP would be 0.00004, whereas at 96.96% renewable energy consumption, the same country would increase its efficiency to 0.0000005 hundred metric tons of CO_2 per unit of GDP.[9] Thus, moving from 0.29% to 96.96% renewable energy results in a 98.75% ((0.0000005-0.00004)/0.00004)) increase in carbon efficiency. For a country with a GDP per capita of $67,829 with 0.29% of their energy coming from renewables, their expected hundred metric tons of CO_2 per unit of GDP would be 0.0000001, indicating that wealthier countries are more efficient than low-income countries at the same level of renewable energy. However, this efficiency remains constant at 96.96% renewable energy, indicating no improvement in efficiency for high income countries as renewable energy is deployed. Thus, at high levels of renewable energy, less developed and developed country's carbon efficiencies would converge due to increases in efficiencies in less developed countries and efficiency stagnation in developed countries.

Policy Implications

The results of this study indicate that renewable energy has an asymmetric effect on total CO_2 emissions and carbon efficiency varying by economic position of a country in the global economy. These findings suggest that climate and energy policy should differ depending on the development level of a country. Specifically, developed countries should replace all fossil fuels with renewable energy, but deployment of renewables must be tied to additional non- to de-growth strategies. In contrast, deploying renewable energy, accompanied with low-carbon intensive growth that provides individuals with a sufficient standard of living should be the focus of climate change and development policy in less-developed countries. However, what specific policy options could developed and less-developed countries pursue? The following section offers several policies to consider for both types of countries.

1) Implement high carbon and income taxes. Developed countries need to take the lead on implementing a high carbon tax to mitigate CO_2 emissions. However, there is considerable uncertainty about measuring the social cost of carbon. For example, Ackerman and Stanton (2012) found that the social cost of carbon could be as high as $900/t$CO_2$. In contrast, the Environmental

[9] Million metric tons were converted to hundreds to make the numbers larger and easier to read and comprehend.

Protection Agency (EPA) assumes the social cost of carbon to be between $11 and $105 (EPA 2017). Given the drastic need to curtail carbon dioxide emissions, countries should err on the side of implementing a tax that is too high rather than too low.

Rather than using accrued tax revenue to fund governmental programs in general, the revenue could be distributed back to the public, which is also known as "tax and dividend." A carbon tax and dividend approach could be a way to attract individuals to the pro-environmental movement by linking economic well-being of the working class and climate change together (Schor 2015: 533). Re-distributing the tax revenue on a need basis could provide individuals with additional income, reduce inequality, and galvanize support for climate change and de-growth policies. Along with carbon taxes, income and investment income taxes (e.g. capital gains) could be significantly increased to curb capital accumulation and conspicuous consumption, simultaneously providing another mechanism to re-distribute income. A substantial re-distribution program could provide citizens, particularly the poor and most marginalized, a basic income that could allow them to reduce their working hours, which could lead to further reductions in carbon dioxide emissions (Knight, Rosa, and Schor 2013). Reducing growth while simultaneously redistributing wealth could tie economic and environmental concerns together, and make the transition to a steady state or de-growth economy easier.

2) Create, subsidize, and provide special privileges to national, regional and local programs and initiatives for new collective forms of production and living. Along with attempts to decarbonize economies and re-distribute incomes, new forms and measures of prosperity and development need to be advanced in developed and less-developed countries alike. New forms of organization will need to be collective in nature. For example, worker-owned cooperatives, or what economist Richard Wolff refers to as worker self-directed enterprises, will need to be an essential aspect of any macro de-growth, steady state, or low carbon growth policy. Wolff (2012) argues that worker self-directed enterprises would place ownership of the workplace at the site of production, i.e., the workers own the means of production, which contrasts with the traditional top-down hierarchy of the private or state capitalist firm (Wolff 2012: 134). If workers live where they work and own and operate the firms in which they work, environmental considerations could increase in production processes. However, this is assumption is contingent upon workers living in close proximity to their workplace, and given the processes of urban sprawl, gentrification and dispossession that is common place in the developed and developing world, new forms of housing and spatial relations will need to be created as well. Creating collective housing programs like housing cooperatives and developing well-designed public transit systems, will lessen the effect that urbanization and growth have on carbon emissions, while concurrently building community and connections between spaces.

3) Supplant GDP as a measure of progress with new indicators that measure well-being, equity, and sustainability. GDP should be replaced by new economic and ecological measures that concentrate on maximizing human development and the preservation of environmental resources. Several alternatives to GDP have been proposed in the past. One example is the Index of Sustainable Economic Welfare (ISEW). As presented in Daly and Cobb (1989: 418-419), the equation is as follows:

> +Household labor + consumer durables + streets and highways + Public expenditures on health and education – expenditures on consumer durables – private expenditures on health and education – private expenditures on advertising – costs of commuting – cost of urbanization – cost of auto accidents – costs of water, air and noise pollution – loss of wetlands – loss of farmland – depletion of non-renewable resources – long term environmental damage + net capital growth + change in net intergenerational position.

Using a measure like ISEW would provide a useful starting point for developing new national accounting systems that addressed both human and environmental well-being and sustainability. Countries could also incorporate a planetary boundaries approach into their national accounting systems (Rockström et al. 2009). This measure would indicate how well a country was living within their environmental "budget," providing a means for countries to track and adjust their economic and environmental policies as needed to meet sustainability goals. For climate change specifically, a "greenhouse gas budget" would need to be created. Such a budget could be developed on multiple scales, from municipally to globally. Budgeting could be a way for countries to globally plan and facilitate climate change policy in cohesion.

4) New forms of currency and finance. New mediums of exchange like time banking have been proposed as alternatives to market-based exchanges. Time banking uses hours as currency, earning "time" as one provides services and expending them to receive services (Dubois, Schor, and Carfagna 2014). Exchange mechanisms like time banks are inherently egalitarian because each person's time is assumed to be equal in value (Dubois, Schor, and Carfagna 2014). Furthermore, the localized nature of time banks can help build local, sustainable economies, keeping production and consumption local (Kallis, Kerschner, and Martinez-Alier 2012).

Substantial changes to the organization of current financial systems can also lead to more equitable and sustainable economies. For example, socializing the financial sector could help smoothen the transition to a de-growth economy. Public banking would shift the financial sector from being profit-driven to public interest oriented. It would help facilitate investment from carbon intensive production and consumption into collective economic activities like recreation and education. Additionally, it could enable development in less-developed countries built on renewable energy deployment and collective forms of living. Given the negative economic and environmental consequences associated with foreign investment dependence and the transnational

organization of production (Chase-Dunn 1975; Jorgenson 2006; Jorgenson 2009; Kentor and Grimes 2006), a democratized, public-oriented financial sector would help shift the economic and political power of core countries and corporations to local democratic processes.

Conclusion

Two study limitations should be kept in mind when interpreting the findings presented here. First, the temporal range of the study extends back only to 1990. Thus, the pattern of associations identified here cannot be presumed to exist before that time. Second, this study did not attempt to calculate the effect of individual renewable energies, i.e., the slope coefficients for wind, solar, geothermal, etc. It is possible that solar or wind energies have a different interaction with economic growth than do other energies like biofuels. Future research should examine this possibility. However, most countries will likely have an amalgam of renewable energies going forward.

Overall, this paper makes two significant contributions to the literature: First, the study results suggest the existence of a "renewable energy paradox." Second, the findings indicate that the development level of countries and their position in the world economic system affects the responsiveness of their national carbon emissions to renewable energy. The renewable energy paradox is two-fold. First, though renewable energy is widely perceived to decouple economic growth from carbon emissions, it does the opposite. Economic growth becomes increasingly *coupled* with carbon emissions at high levels of renewable energy, i.e. economic growth has a larger, positive effect on carbon emissions at high levels of renewable energy compared to low levels. Second, the negative effect of economic growth on carbon efficiency diminishes as renewable energy increases. This results in a situation where economic growth has its largest, positive effect on total carbon emissions in high income countries, while simultaneously having its weakest, negative effect on carbon efficiency in these same countries. Thus, climate policy focused primarily on renewable energy deployment may lead to a convergence of carbon efficiencies between less developed and developed countries, but it may also result in a *divergence* of total carbon emissions between these countries.

The second contribution of this paper is that the effect of renewable energy is asymmetric across and within country types, which is likely tied to the paradoxical relationship found between renewable energy and economic growth for several reasons. First, production processes and energy use tend to be dirtier and less efficient in less-developed countries (Jorgenson 2006). Thus, the large negative effect that renewable energy consumption has on carbon emissions, particularly in lower-middle and low income countries, may be due to renewable energy emitting less CO_2 than fossil fuels, but also renewable energy technologies being more eco-efficient and up-to-date compared to the common technologies employed in these countries. There may be less of a negative effect in high income countries because they tend to already be more eco-efficient than

less-developed countries, and the potential mitigating effect of renewable energy is neutralized by further increases in affluence. Therefore, the large negative effect of renewable energy may be primarily tied to efficiency increases, but as efficiency diminishes with increases in income, growth outpaces any decrease in carbon emissions made by deploying renewable energy.

This paradox has significant ramifications regarding climate justice. Extensive renewable energy deployment would not significantly impact carbon emissions in high income countries, even though they are historically responsible for the majority of carbon emissions and developed by burning fossil fuels. In contrast, less developed countries who are responsible for an inconsequential amount of emissions, would disproportionately bear the mitigation of carbon emissions. Low income countries would significantly reduce their emissions with renewable energy in a relative sense, whereas a substantial deployment of renewables in high income countries would keep their emission levels seemingly constant if their economies continued to grow; leading to an increase in the inequality of total carbon emissions between developed and less-developed countries.

The findings of this study and the development of the renewable energy paradox contribute to the growing body of economic/environmental decoupling literature. It seems increasingly unlikely that economic growth and affluence will lead to a decoupling between growth and carbon emissions as posited by the ecological modernization and environmental Kuznets curve theories. Furthermore, the results of this study support assertions made by proponents of the treadmill of production that posit that economic growth leads to increases in environmental degradation. Particularly in high income countries, renewable energy appears to have little influence on negating the treadmill. Instead, growth becomes coupled with carbon emissions at high levels of renewable energy. Renewable energy does seem to be able to mitigate emissions associated with growth in less-developed countries. However, Table 4 shows that CO_2 emissions still grow as affluence increases.

The results also indicate that examining the effect of the global organization of production on environmental outcomes from a world-systems or quasi-world systems perspective is a useful tool for investigating the differences between country types in the world economic system. Technologies like renewable energies are often assumed to have the same effect across all economies, but the findings here suggest that their mitigation potential is associated with larger macro-power structures tied to the world system. Overall, this study finds that purely technical solutions will likely be insufficient to appropriately mitigate climate change. A larger restructuring of power relations from the individual firm to the world-system will have to be undertaken, and new forms of prosperity that challenge the axiom of economic growth are critical to overcoming the perpetual environmental degradation associated with global capitalism.

About Author

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Disclosure Statement

Any conflicts of interest are reported in the acknowledge section of the article's text. Otherwise, author has indicated that she has no conflict of interests upon submission of the article to the journal.

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Appendix A

Table A1: Descriptive Statistics for All Countries, High Income, Upper-Middle Income, and Lower-Middle and Low Income Countries

	All ***N* = 3,096**		**High** ***N* = 888**		**Upper- Middle** ***N* = 840**		**Lower-Middle N = 768**		**Low N = 600**	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Total CO_2	3.02	2.23	4.54	1.62	3.76	1.68	2.60	1.81	0.27	1.33
CO_2 per GDP	-21.57	0.82	-21.85	0.69	-21.17	0.66	-21.28	0.85	-22.10	0.73
GDP per Capita	8.20	1.56	10.13	0.67	8.53	0.51	7.29	0.55	6.13	0.41
Total Population	16.37	1.42	16.27	1.41	16.39	1.50	16.57	1.54	16.24	1.12
Urban Population %	3.88	0.52	4.25	0.37	4.12	0.25	3.73	0.34	3.22	0.47
Trade as % of GDP	4.18	0.61	4.30	0.54	4.23	0.53	4.15	0.82	3.98	0.42
% Industry	3.33	0.38	3.40	0.24	3.50	0.28	3.40	0.32	2.92	0.42
% Renewable Energy	2.94	1.53	1.93	1.65	2.48	1.20	3.46	1.17	4.41	0.19

All variables are logged.

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A Festschrift in Honor of Christopher K. Chase-Dunn

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This is a festschrift in honor of Christopher K. Chase-Dunn, an homage richly deserved. We celebrate a career spanning more than four decades that includes (so far) some 19 books and 60 articles with over 10,000 citations,[1] five National Science Foundation Grants, election to the American Academy for the Advancement of Science, an Institute, and a legacy of social scientists he mentored along with scores of others influenced by his scholarship. Particularly noteworthy is the breadth of Chase-Dunn's scholarship, which spans a broad swath of disciplines including economics, international relations, anthropology, history, geography, and archaeology, with articles published in journals such as the *Annals of the American Academy of Political and Social Science*, *Current Anthropology*, *International Studies Quarterly*, *Political Geography Quarterly*, *Journal of Archaeological Research*, *Social Evolution and History*, and *American Indian Culture and Research Journal*. And it is indeed fitting for this collection to be published in the *Journal of World-Systems Research*, a journal created by Chase-Dunn in 1995.

[1] *Global Formation* alone has been cited more than 1300 times.

I won't go into detail about Chase-Dunn's career, which is well documented in a video interview at the University of California, Riverside, in June, 2017, shepherded by Andrew Jorgenson and myself.[2] This conversation touches on Chase-Dun's passionate involvement in the radicalism of the 1960s, his graduate school years at Stanford, the evolution of his scholarship at Johns Hopkins and the University of California-Riverside, his colleagues, his current work, and his own homage to John W. Meyer, whom he credits with saving his life. There are also lots of personal anecdotes along the way. It's vintage Chase-Dunn and well worth watching (a podcast is also available). The link to watch is accessible under supplementary files.

The Contributions

This special issue is the outgrowth of an ASA panel I organized in 2015 as a critical assessment of Chase-Dunn's work, which included many of the authors in this issue. Most of the contributors have long standing relationships with him, many that span decades. John W. Meyer was Chris' mentor at Stanford, and Albert Bergesen was a fellow graduate student. Andrew Jorgenson, Peter Grimes, and I were all his graduate student advisees, and Mike Timberlake was his post-doc at Johns Hopkins. Ho-Fung Hung and Jon Turner were colleagues, at Johns Hopkins and University of California-Riverside, respectively. And Jennifer Bair and Valentine Moghadam have both worked with Chris on various projects and institutional settings. In reading these essays, the high regard and appreciation with which these contributors (including myself) hold their personal, as well as scholarly relationships with Chris' becomes evident.

There are nine contributions, organized broadly into three sections. The first section covers Chase-Dunn's early years as a graduate student at Stanford. It begins with a short letter from **John W. Meyer**, who recounts how Chris got started at Stanford, how he stepped out of the program for several years to pursue his activist interests, and his (successful) return. The second article is written by **Albert Bergesen**, who provides insights into the genesis of Chase-Dunn's most well-known work, the 1975 ASR article on the impact of foreign capital dependence on economic growth and inequality. Bergesen reminds us that the now-commonplace ways of thinking about and empirically analyzing theoretical relationships in macro-comparative sociology were unknown when he and Chris were in graduate school. He outlines what he refers to as "the perfect storm" at Stanford, a confluence of three new sociologists on the Stanford faculty (Joseph P. Berger, John Meyer, and Michael Hannan) and their novel perspectives on theory construction, data analysis, and theory testing, which provided Chase-Dunn with new tools for his ground breaking article. (As an aside, Chase-Dunn recounts in his interview a personal episode with Bergesen that involves a cup flying past Al's head and through a glass window. Don't miss it.)

[2]Our thanks to Siddiq Siddiqui-Ali and colleagues at the University of California-Riverside for filming this interview.

The second group of papers details the ways in which Chase-Dunn's scholarship has influenced their own research. **Andrew Jorgenson**, co-editor of this special issue, provides a mix of personal reflections on Chase-Dunn, along with a brief outline of how Chase-Dunn's work has influenced the development of Jorgenson's field of environmental sociology, a linkage not widely recognized. **Mike Timberlake** addresses Chase-Dunn's contributions to comparative urban sociology and urban studies, broadly considered, including his theorizations and empirical work on global city systems. Timberlake locates Chase-Dunn's work within the broad urbanization literature, which provides an excellent overview of this field. **Jennifer Bair and Marion Werner** offer a wide ranging discussion that connects and expands upon Chase-Dunn's work on uneven development as expressed in his most highly acclaimed book, *Global Formation*, and its relationship to their own work on global commodity chains. **Valentine Moghadam** addresses another central aspect of Chase-Dunn's work found in *Global Formation*, his conceptualization of the semi-periphery, and its relationship to her own scholarship on revolutions and rebellions, focusing on Tunisia. **Ho-fung Hung** highlights Chase-Dunn's work on premodern world-systems and how it expands our understanding of the modern world-system, by broadening the number of cases available for comparison.

In the final section, two contributors use Chase-Dunn's works as a starting point for the development of new theorizations on the underlying dynamics of social evolution. **Jon Turner** proffers the only critical assessment of the World-Systems paradigm to be found in this issue, suggesting that it no longer reflects today's realities, particularly as expressed in Wallerstein's core concept of a global division of labor (core, semi-periphery and periphery). Turner provides what he considers a broader conceptualization of social evolution based on "inter-societal systems." In the last contribution, **Peter Grimes** offers a sweeping theoretical treatise that attempts to merge World-Systems theory and Complexity Theory, with the goal of creating a general theory of human evolution.

The concluding essay is written by Chase-Dunn, who begins by tracing the evolution of his career, followed by detailed comments on the preceding contributions along with some personal comments about the authors.

Foreign Capital Dependence, Economic Growth, and Inequality

I'd like to follow-up briefly on Bergesen's piece about Chase-Dunn's 1975 ASR article on the impact of foreign capital dependence on economic growth and inequality. As Bergesen points out, this was ground-breaking research that moved this debate from discourse (and polemic) to empirical study, and in so doing laid the groundwork for literally hundreds of empirical studies examining the impact of foreign capital dependence on a variety of outcomes (including much of my work), or including this measure as a control variable in associated studies. This article, along

with a follow-up piece by Chris and his long-time colleague, Volker Bornschier (Bornschier and Chase-Dunn 1985), initiated the often recounted debate on the impact of foreign investment dependence on development (see Kentor and Boswell 2003) that's continued for more than 40 years. The impact of foreign capital dependence on economic growth continues to be assessed today (Mahutga and Bandelj 2008), and the scope of these studies has broadened to include outcomes such as the environment (i.e. Jorgenson et al 2007), international migration (i.e. Sanderson and Kentor 2009), and political corruption (Choi and Woo 2011) among many others.

And Finally, A Story

Let me close on a personal note with a story about Chris, one that I relate every year to our incoming graduate students – for reasons that will become apparent.

This event took place during my graduate student days at Johns Hopkins, with Chris as my advisor. I had just received an editorial decision from *Social Forces* of "revise and resubmit" on a manuscript I had recently submitted. One of the anonymous reviewers had written something like "this is pretty good for World-Systems research, but we all know that this is a failed paradigm." Totally outraged, I showed Chris this review and asked him how I should handle it. Chris was equally incensed, and directed me to write back to the editor, insist that there was no place in the academy for this kind of pejorative commentary, and demand that this review not be included in the editor's evaluation of my manuscript. I wrote the editor as Chris instructed, and received a quick reply. The editor first apologized for the reviewer's comments, and indicated that, as I requested, he would drop this review from consideration. He went on to say, however, that this reviewer was the only one in favor of a "revise and resubmit" – the other two had both recommended an outright rejection. Therefore, since both remaining reviews were negative, he was rejecting my manuscript. The editor closed by suggesting that I needn't bother submitting any future manuscripts to *Social Forces* while he was editor. Aghast, I returned to Chris' office, stammering about how I had written to the editor as discussed, and how my manuscript had been rejected, along with any future possibility of publishing in this journal. Chris replied - without any hesitation, "oh yeah, you should never do that."

I should also point out that Chris is the reason I'm a sociologist. He encouraged and facilitated my return to Johns Hopkins to finish my dissertation after I had stepped out of academia for a decade. And he's been a resource, colleague, and friend ever since. I know many others who share these sentiments.

Chase-Dunn's legacy? It's not yet written. Chris concludes his interview by telling us that the best is yet to come. He's now working on "the answer" to human social-cultural evolution, which he hopes to complete before his retirement in 2020. We hope so, too.

About the Author

Jeffrey Kentor is Professor and Chair of the Sociology Department at Wayne State University. Kentor's research focuses on long term macro-level social change, from an international political economy perspective. His work explores the economic and military dynamics that shape relationships between countries, and how these processes impact economic development, income inequality, migration, health, and the environment.

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Christopher K. Chase-Dunn Circa 1970

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I'm glad to have the opportunity to comment for this celebration of the work of Christopher Chase-Dunn. I go back a long way with him, and it has all been very rewarding.

Chris began doctoral work at Stanford in the fall of 1966—the same time I arrived there. He came reasonably well prepared, and quite politicized, from his undergraduate years at Berkeley. He had completed his academic work there, although on the political side, as I recall, he still had to complete (on weekends) a jail term.

The Stanford sociology department was an unlikely choice for him. It was very much committed to an apolitical view of sociology as scientific, and was quite critical of the field in general as lacking in formal theory and clear methodology. Chris Chase-Dunn got along much better than one might expect: his own academic background left him comfortable with explicit theorizing and quantitative methods. And the departmental culture was fairly tolerant of radical politics, so long as these were kept distinct from scientific work. So Chris made good academic progress, with few difficulties.

The Stanford department tolerated him, but he had doubts about the relevance of its sort of academic work (or perhaps any academic work) to the disordered real world. So after a few quarters, he left to contribute more directly to the political transformations he saw as urgently needed. He gave a dramatic picture of his rationales to the Stanford community, and his objections

to the irrelevance of mandarin academic work, but his indictments were less offensive to the local culture than it might now sound. After all, he agreed with the Stanford sociological idea of a divide between "science as a vocation" and "politics as a vocation," as central to departmental culture. He was simply making that choice.

I think at my suggestion, rather than simply withdrawing from Stanford, he took a formal leave of absence—an easy thing to do, since he was in very good standing academically. Nobody involved objected.

I lost track of Chris for a while, and don't know the subsequent unfolding, but obviously his efforts at producing political transformation (I think he may have used the term revolution) did not go well. I recall that some of the time he may have been in Panama. In any event, after some time, he found himself back in the Bay Area, at loose ends with his political mission gone sour. I suggested he might consider returning to Stanford—research work and a stipend would be readily available. And in the interim the department culture had broadened, so there would be projects and peers not so far removed from his substantive interests (seen as political sociology or political economy rather than politics).

So Chris returned to the doctoral program, and got involved in a number of projects. One of these, especially relevant to him, involved quantitative macro-sociological analyses of relationships between large-scale (i.e., national) political and economic and educational systems. The work was interesting, and he had both skill at it and taste for it.

The technical work got more exciting as it came together with Chris' developing theoretical interests. A number of elements were involved. But one was especially relevant. Immanuel Wallerstein, an old colleague and friend of mine from Columbia days, was spending some time at the Center for Advanced Study (adjacent to Stanford), and was developing the line of "world systems" argument for which he has become renowned. He gave an informal talk on the line of argument at our research workshop, and Chris made a real intellectual connection.

In due time, that produced Chris' doctoral dissertation—a clear and dramatic quantitative statement of core ideas in world systems argumentation, with striking empirical support for what to other lines of thought would be counter-intuitive ideas about the effects of foreign investment. This work, and the various follow-ups, have led to ideas and research—pro and con—that continue to this day. A bibliography would run to dozens of pages.

There is no need for me to recount the subsequent history—impressive and well-recognized work on a coherent research program covering more than forty years, involving a large set of students and colleagues. Many of the relationships involved are very personal— Chris has a very wide circle of caring and appreciating friends. I don't need to describe my own long-term personal friendship. I'd rather make another point: it is very rewarding to have students who make their way successfully in the academic world. Chris Chase-Dunn has certainly been dramatically

successful over a long career, and that is extremely rewarding for those of us who have participated along the way.

About the Author

John W. Meyer is Professor of Sociology, emeritus, at Stanford University. He has contributed to organizational theory, the sociology of education, and the study of globalization, developing sociological institutional theory.

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Stanford's Perfect Storm

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It was the 1960s. Chase-Dunn was an undergraduate at Berkeley and crossed the bay to get his Ph.D. at Stanford. It was a perfect storm: Berkeley moral imperative bleeds into quantitative Stanford research training. The result was Chase-Dunn's dissertation, published as "The effects of international economic dependence and inequality: a cross-national study," *American Sociological Review*. 1975. 40:720-738. There was nothing quite like it; data, statistics and causal modeling all pressed into service to demonstrate what had been suggested since at least Hobson and Lenin, that a developing country's economic dependence upon a developed country had detrimental effects. No longer was this just an argument over how imperialism or colonialism might work, but it was now an empirical finding that had to be recognized. And recognized it was, setting off a huge literature of quantitative research on dependency effects and their generalization into hierarchal world-system core-periphery effects. One could now be radical and do normal science. There was nothing quite like it.

Standing on the shoulders of giants is one way of acknowledging the contributions of others to a piece of scientific research like this, but another way to acknowledge the influence of others is to think of it as a perfect storm. That is, a confluence of a number of situational factors that contributed to the research outcome. I will try and identify a few.

1960s Zeitgeist

The Vietnam War raised the whole question of colonialism, imperialism, the independence, and not, of the developing world, and with that America's role as the global hegemon. Among a generation of doctoral students this led to both protest activity of a demonstration and a mental sort. For radical graduate students this often appeared as the question of how to be both true to theoretical claims of radical theorists, from Marx through Latin American *dependencia* theorists, and at the same time seriously engage with the methods of modern social science. What would come to be known as world-system analysis, with its focus upon core-periphery relations between the underdeveloped South and developed North was largely one of heavy theoretical assertion with supplemental historical evidence. One thinks here of Andre Gunder Frank and Immanuel Wallerstein who's work, while very important, didn't directly engage with the empirical and statistical thrust of mainline social science. The issue for many, then, was how to combine a radicality of theoretical thrust with advanced statistical techniques.

To many this was an impossible combination. Chase-Dunn, though, pressed normal science into service to address radical hypotheses. And while this is standard practice today it must be remembered that close to half a century ago merging high-end theory with high-end statistical techniques was a first for its time. If the larger geopolitical culture of the time set the stage for research into questions raised by Hobson, Lenin, R. Prebisch, A.G. Frank, I. Wallerstein and others, there were also more immediate contributing factors located within the Stanford sociology department. There were no doubt many of course, but at least three can be identified.

Theory Construction

Stanford Sociology had recently hired three Harvard Ph.D.'s (Joseph "Joe" Berger, Morris "Buzz" Zelditch, and Bernard P. "Bernie" Cohen) who brought with them an emphasis upon theory construction and whose own research was of the more micro interactional sort, legitimated by claims to having explanatory power of a broader sort. Professor Berger taught a required theory course for all new graduate students, which would include Chase-Dunn. The key here is that this wasn't theory in the sense of reading everyone, hence knowing what they said, and thereby becoming a Weberian, Durkheimian, or Marxist, but more in the sense of theory construction, e.g. how to assemble your own testable theory. The task was easier when the object was internal structures of small task oriented groups, or highly stylized models of actor/other status relations as this didn't involve challenging Marx, Weber, or Durkheim. Chase-Dunn, though, had a larger explanatory target in mind—underdevelopment itself—and through that the essential North/South hierarchal structure produced by the political economy of the modern world-system. It remains somewhat ironic that the moral impetus to construct your own theory

originated with researchers of the most micro of social contexts but it was most successfully applied to the most macro of social relations, North South dependency relations. When theory is but explanans and explanandums, which anyone can propose and test, it can emancipatory as it was for Chase-Dunn, who could now test hypotheses to assess the validity of radical theories of economic development.

The Language of Social Research

A graduate student empowered to hypothesize as he sees fit is one thing; finding a way to unravel theoretical ideas and match them up with specific lines of data that assesses the theoretical assertion, is another altogether. The contribution here would come from another Stanford sociology professor, John W. Meyer. He was a student of Paul Lazersfeld, the great social research methodologist at Columbia University. Meyer brought with him Columbia's distinctive approach to argument and data analysis. Broadly speaking Columbia sociology held a middle ground between the descriptive particularism of the University of Chicago's urban ethnographies and the broader more abstract general theorizing of Harvard. The Columbia focus was neither interacting individuals on street corners nor abstract social systems, but institutional analysis which lay between the two. It was here that the Columbia mind worked worked best, for data was not discovered facts on the ground revealed by the astute Chicago trained ethnographer but marshaled evidence to support, or not, operational logics of institutional processes. Institutional analysis as something half way up a social system puts it too crudely, but in some sense captures the distinctiveness of the Columbia approach.

In this regard Meyer's gift was to preach finding indictors for the operational specifics of some social structure, process, or cultural template. In Meyer's worldview there was nothing that didn't leave a trace, and that trace could be counted, coded, or reflected in the patterns of already existing data sets. The mantra for generations of Stanford graduate students was simple: find the thing of interest, understand what it was supposed to do, and then see if that was so by finding indicators of its purported operation. Period. That was it. If element one in Chase-Dunn's perfect storm dissertation was the freedom to test, challenge, reformulate classic theories from Marx to neo-classical economics, element two was a similar opened approach to organizing a test of what said self-constructed theory proposed. From Berger the torch was passed to Meyer.

Should dependency effects exist, out there in the real world, there should be indicators, and it should be possible to link purported causal relations with these indicators. That's all that's required. Again, no sense of fealty to any particular perspective. Just propose, x, y, or z. Then marshal evidence in a systematic way such that the causal linkages in question can be directly measured and their effects determined. Again, the genius of the Columbia half/theory half/data method, where data movement is, at one and the same time, theory movement. It isn't just a

separate peek at the world from which one then re-thinks some picture of how the world is to work, but peeking at the model's coefficient is a peek at the very movement of the world, hence, a theory/data statement at one and the same time.

That the theoretical model in question had radical roots, or was a study of imperialism or colonialism, or a critique of the West or American foreign policy and investment decisions, didn't matter. If you can operationalize it, measure it, show it is correlated with other things, then, well, it's supported as a fact about the natural world of international economic relations; radical origins or not.

Panel Analysis/Multiple Regression

The third ingredient into Chase-Dunn's perfect storm came from another Stanford Professor, Mike Hannan, who brought from the University of North Carolina a working knowledge of panel analysis and a dexterity with multiple regression. This was the final straw; the necessary statistical tools to carry out the research program of Meyer. Chase-Dunn could not only study dependency effects, but statistically control for alternative theoretical accounts of third world underdevelopment. So, yes, it was a quantitative analysis, but its intricacy in statistically controlling for other factors enabled Chase-Dunn to conduct a theoretical argument through regression analysis. His results showed dependency had negative economic results contrary to free trade and other theoretical perspectives.

Appreciating a Research Article

Triply armed with Berger's conception of theory construction, Meyer's data orientation within a shop context, and Hannon's statistical technology, Chase-Dunn was set to provide a normal science proof of radical theorists such as the Hobson/Lenin thesis of Imperialism and Latin American ideas of core-periphery dependence relations. His research design allowed the effect of each variable to be identified. Yes, of course, this is the essence of multiple regression, and something we take for granted. But at the time and for the processes it was assessing, it was truly a break with past radical analysis, which was largely discursive supplemented with historical examples and strength of moral argument.

With Chase-Dunn the voice of the argument was now data, numbers, and statistical coefficients. And while an argument could be made about losing something in an analysis of imperialism devoid of overtones of explicit moral judgment, it was more than compensated for by transforming the debate over origins economic backwardness not only into one of the development of underdevelopment, but also of grounding its existence into strength of coefficient rather than strength of argument. It also importantly blurred the lines between radical analysis and normal social science. In effect, if there are detrimental dependency effects then

there is no reason why they can't be objectively observed and statistically linked to theorized causes. For the first time some of the most statistically advanced normal science techniques could be harnessed in the cause of unveiling damages done by rich countries to poorer ones.

This possibility opened the door for others to follow up Chase-Dunn's original research, and a rich literature on dependence, then generalized as world-systemic effects of the core-periphery structure, followed. Since 1975 there has been a continuous literature of cross-national quantitative research on the effects of direct foreign investment, trade and export dependence and a variety of other indicators of dependent economic relations between countries. The range of dependent variables has dramatically widened as well, moving beyond the economic to consider almost any property of a society or polity or the natural environment itself, as a potential dependent variable to be put into the dependency model.

At some point all of this became normal science; just a matter of adding one more variable to the basic model. It is going on half a century since this article first appeared and it is natural that it is taken for granted. But as with all things institutionalized, from Cubism in art to free form expression in jazz, it must always be remembered that there was a time when those models didn't exist and someone had to make the first step and do what hadn't been done before. For quantitative research into dependency effects generated by the core-periphery hierarchy of the capitalist world-system that first step was taken by Chris Chase-Dunn. Few are the scholars who make important contributions to a literature; fewer still are those who create that literature in the first place.

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Reflections on Christopher Chase-Dunn as a Mentor and His Influence on Global Environmental Sociology

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When I was finishing my undergraduate degree in sociology at the University of Utah, Jeffrey Kentor (Jeff) and Thomas Burns (Tom) took me under their wings. I had taken an environmental sociology course from Tom, and I was hired to teach the labs for Jeff's statistics course for sociology majors. I had a growing interest in both environmental sociology and political economy, and I was fascinated by the ways in which macrosociologists were doing cross-national research, including the two of them. They sat me down in front of a computer and taught me how to build cross-national datasets and how to analyze such macro-level data with various regression techniques. And they had me read a lot of stuff.

One day Jeff suggested I read *Global Formation: Structures of the World Economy*, a book authored by Christopher Chase-Dunn (Chris). I knew that Chris had been Jeff's advisor in graduate school at Johns Hopkins University (JHU). Jeff made it clear that I should order the book. Checking it out from the university's library wasn't a good idea. "Trust me" he said. So I ordered the book, and I'm glad I did. By the time I finished reading the first two chapters I knew that I wanted to be Chris' student. I read the book twice in a row, cover to cover. Since then I've read it multiple other times. My original copy is full of highlighted text and the pages are worn.

Jeff contacted Chris and told him about me. I don't know the exact details of their conversation. Neither of them will give me straight answers, even after all these years. At some

point shortly after their conversation, I spoke with Chris, and I expressed my interest in being his student. He encouraged me to apply to the Sociology PhD program at UC Riverside (UCR). He had recently moved to UCR from JHU and started his new center, the Institute for Research on World-Systems (IROWS).

Before applying to UCR, my fiancée, Katrina, and I took a road trip to visit UCR and meet with Chris. It was summertime so campus was pretty quiet. We met in Watkins Hall, where the Sociology Department is located. Chris wanted to show us IROWS, which involved a short walk across part of campus. Right after getting outside Watkins Hall, Chris stopped and looked closely at something on the ground. There was some type of large insect, and it had caught his attention. He studied it for a few minutes, and then cracked a joke about it being an escapee from the Entomology Department. The rest of our short visit was just as fascinating and enjoyable. I was even more convinced that I wanted to be Chris' student. So I applied, and was accepted into the Sociology PhD program at UCR. Fortunately, Chris offered to fund me as his research assistant (RA) at IROWS. I moved to Riverside and started the graduate program in January of 2001.

There was a small kitchen between my office and Chris' office at IROWS. Many unplanned conversations took place in that kitchen over coffee. This is where much of my learning took place. We would discuss all sorts of ideas. Even though he was endlessly busy, Chris always took the time to talk and he never rushed our conversations. Side note: a rather large and completely harmless snake lived right outside the exit door in the kitchen at IROWS. My first encounter with it was late at night while leaving for home. While exiting the building I might have accidently stepped on part of its tail. But the snake stuck around and we'd see it quite often and it was a common topic of conversation. It even found its way inside once or twice.

There were (and still are) many research projects taking place at IROWS. As Chris' RA I spent much of my time working with him on his NSF funded structural globalization project. He had already completed the trade portion of the project, which was published in the *American Sociological Review* in 2000. (If you haven't read this paper lately, give it another read. It is simply brilliant.) We were attempting to apply the same methodology to investment globalization that Chris had developed and used for the trade globalization study. The investment globalization study proved to be quite challenging. Along with his other graduate student RAs, especially Carolina Bank Munoz and Shoon Lio, we sought out and coded historical data on foreign investment spanning close to two centuries. Chris always formulated solutions for the challenges that arose, and we were able to finish the project as well as many others, including a quantitative study of hegemonic cycles and conceptual work on regions and interaction networks.

Besides working as Chris' RA at IROWS, he invited me to assist him with the *Journal of World-Systems Research*. The experience was invaluable and enjoyable. Early on, I made a lot of

mistakes, but Chris was incredibly patient. He encouraged me to guest edit a special issue on a topic of my choosing, even though I was just a graduate student. With my growing interest in global environmental sociology, I ended up guest coediting an issue with Edward Kick on "Globalization and the Environment" that was published in the journal in 2003. (Coincidently, Edward and I ended up serving as co-editors of the journal from 2007 – 2011, which was the period of time in which Chris' efforts for JWSR to become the official journal for the PEWS section of ASA proved to be successful!)

Chris provided me unconditional support for pursuing MA and PhD projects on the political economy of global environmental change, and his unconditional support has continued throughout my career. For example, during my first individual presentation at an ASA conference in graduate school, another very senior scholar was rather hostile and dismissive towards the preliminary research I was presenting, and he interrupted me multiple times. Chris defended me and my work and did it in a way that was firm yet collegial. Months later when I learned that a paper out of my MA research had been accepted for publication in one of our discipline's flagship journals, Chris had me over for a group dinner, and he toasted my achievement.

Chris' influence on my research is without question. Just a casual glance of any of my published work is all that is needed to see this. My research on international inequality and environmental degradation, ecologically unequal exchange, and foreign investment and the environment all rest on the shoulders of his foundational scholarship concerning the stratified interstate system and his path breaking theoretical and empirical work on investment dependence and trade dependence. My longitudinal research that focuses on how the environmental impacts of various political-economic and demographic factors change through time, and how such changing relationships differ for nations in various structural and spatial contexts is inspired by his propositions about constants, cycles and trends in the modern world-system that he outlines in chapter 2 of *Global Formation*. My recent collaborative research, which focuses on facility-level carbon emissions for all of the world's fossil fuel power plants, is influenced by Chris' fundamental assertions about nestedness, particularly the relevance of what occurs at smaller scales and how smaller-scale occurrences are shaped by broader conditions of power and inequality in the core-periphery hierarchy.

At the ASA meetings in 2015, I had the privilege of speaking on a panel to celebrate Chris' contributions to world-systems perspectives and other areas of theory and research. I intended to make one simple point: his influence on the field of global environmental sociology is substantial and hugely significant, and is growing as the area itself continues to evolve. This is obvious to anyone familiar with the field. I read statements written by many of the world's most well-known global environmental social scientists that underscored this point (e.g., Brett Clark,

Thomas Dietz, Alf Hornborg), and I outlined how Chris' work has influenced everything I've done throughout my career. Chris responded by politely telling the audience that he didn't believe me (us). Well, the evidence is abundantly clear, and we collectively stand by our message!

I'd like to conclude by sharing two short stories that illustrate Chris' sense of humor and adventure, both of which I admire greatly and are part of what make him such a wonderful mentor and scholar.

1. My wife and I were eating dinner with Chris and his family at their home on a springtime evening in 2003. At the time they had a small adorable dog named Maddie that was quite a character. While this dog was about the size of a large pigeon, it would try and stick up to coyotes, other much larger dogs, and it would get very close to their horses. Maddie thought she was in charge and was constantly getting into mischief. On this springtime evening, we were all sitting out on their back patio enjoying good food, wine and excellent conversation. Maddie trotted by with a sense of urgency. Chris glanced in her direction and then glanced in my direction and stated "how would you like to live your entire life as a joke?" I laughed so hard I fell off the bench I was sitting on.

2. During my first year as an assistant professor at Washington State University (2004-2005), I was encouraged by my department chair to invite Chris to come up to Pullman and give a talk in our seminar series. Chris kindly agreed. His talk was excellent. It turned out that he had spent time during his childhood on a relative's farm just outside of Washtucna (about 70 miles from Pullman), a bustling metropolis with a population of slightly over 200. Chris was keen on the idea of visiting this farm. We drove around the area on a few different state highways and many farm roads. After a while he found it. The farm hadn't been in operation for quite some time, and the buildings were dilapidated. We walked around the property and explored the old farm house. Some excellent pictures of Chris and the farm were taken. Then we decided it was time to head back to Pullman since we were having dinner with my dear colleague Gene Rosa, who was cooking for us at his home.

About halfway back to Pullman, I looked down and noticed a tick on my leg. I pulled over and removed it from my body and car before it could burrow into my skin. When we arrived at my house in Pullman, we were greeted outside by Katrina, who noticed multiple ticks and fleas on the back of my shirt. Then she noticed a few ticks and fleas on Chris as well. The next thing I know, Chris is undressing on our front lawn and he suggested I do the same. He asked Katrina if she could grab the garden hose. In a matter of seconds we had stripped down to our undergarments, checked each other and ourselves for ticks and fleas, and then Katrina had the pleasure of hosing us down, on the front lawn, and with the neighbors across the street watching.

We had a great laugh, put on some dry clothes, and went off and had a lovely time at Gene's that evening.

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Chase-Dunn's Scholarship on Cities and Urbanization

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This essay is intended to be a hybrid scholarly and personal review of Christopher Chase-Dunn's contributions to urban sociology and urban studies more broadly. The essay points out that these contributions have been significant, and they have often been indirect via his influence on students and other of his professional associates. That I have been among those influenced by his work and by my association with him contributes to the personal tone of the essay. We will see that Chase-Dunn's research featuring cities is strikingly expansive, both in terms the huge swathes of human history that it covers as well as its eagerness to embrace multiple academic disciplines—e.g., sociology, archeology, history, and urban studies—for both theoretical and empirical fuel for his scholarship. And, we will see that his scholarship on cities was fundamentally global long before "globalization" became understood as a ubiquitous organizing principle for human affairs.

Globalizing the Study of Cities in Relation to "Development"

Today, in 2017, it seems commonplace for urban studies scholars to take into account global processes and structures when their attention is focused on understanding urbanization and contemporary urban problems, such as gentrification, urban informality, social and spatial polarization—particularly by class, and race/ethnicity, slums and poverty, and urban economic

development. However, for much of the twentieth century, with a tiny number of exceptions, sociologists as well as urban studies scholars in other disciplines who were engaged in this enterprise assumed urban social phenomenon to be influenced by actors and institutions confined to national boundaries at the broadest, if not to even narrower boundaries such as cities or metropolitan areas. For example, in the comparative study of urbanization in the 1960s and 70s, sociological research often concerned urban patterns and processes in the global South, viewing them in relation to "modernization." Scholars, particularly American sociologists perhaps, regarded as "abnormal" the rapid growth of large cities and the sudden shift of the share of national populations from country to cities in the absence of industrial development (e.g., Breese 1969). Their theories attributed such imbalances to policies favoring urban elites that made cities more attractive superficially to non-elite potential migrants, many of whom left behind rural villages only to end up unemployed or working in the underground economies and slums of Third Word cities (e.g., Gugler and Flanagan 1977). While field research in such countries usually provided more nuanced perspectives (e.g., Peattie 1968), the take-away for much of the assigned reading on cities and development in graduate curricula of the 1960s and 1970s was that urban problems outside of Western Europe and the white settler colonies stemmed from poor governing practices in Third World countries, cultural backwardness, and demographic factors.

When urban studies scholars more generally focused their attention on American cities, they were usually unlikely to look for explanations for what caught their attention that went beyond city hall, the board rooms of cities' dominant firms, or the allegedly dysfunctional cultures of the residents of slums and ethnic neighborhoods (e.g., Banfield 1970). Again, ethnographic research often challenged the dominant sociological positions on these issues (e.g., Gans 1962), and some of these critiques indeed did make it onto the graduate reading lists of those of us in doctoral programs in the 1970s.

In the late 1970s and 80s in American sociology, a number of emerging sociologists began exploring the ways in which urbanization processes and urban social structures might be related systematically with socioeconomic processes operating "cross-nationally" (as we may have put it in those days). Moreover, many of us found it useful to deploy critical structural analytical categories—often Marxist and neo-Marxist—in this pursuit even as we oftened utilized quantitative strategies befitting mainstream American sociology (and our own training) but unlike the critical, heavily theoretical—and often historical—work that may have inspired us (e.g., Frank 1966, Carodoso 1972, Walton 1977, Wallerstein 1974). The titles of our dissertations are telling: *Economic Dependence, Internal Urban and Labor Force Structure and Problems of Development: A Quantitative Cross-National Study* (Timberlake 1979); *Urbanization in the World Economy: A Cross-National and Historical Structural Approach* (Smith 1984); *Urbanization and Economic Expansion in Post-Independence Kenya* (Bradshaw 1987), for example.

Many of us who were working in this vein at this time were influenced directly or indirectly by Christopher Chase-Dunn's pioneering scholarship combining a careful analysis of macro-comparative theory with systematic, often quantitative, analyses exploring and testing the implications of his interpretations of these theories. His 1975 article in the *American Sociological Review*, estimating the statistical effects of national-level dependence on foreign capital on economic growth and income inequality became a model for how to begin operationalizing critical political economy theory in relation to issues of comparative international development to many of us. I am sure this paper will be covered in more detail in other chapters in this volume. The importance of it for this essay is that it served as a critical and crucial strategy template that many "coming of age" sociologists began to use for deploying critical development theory to analyze pressing issues of the day in a manner that the guardians for the scientific rigor of the discipline's flagship journals had to take seriously. This is not to suggest that Chase-Dunn or those others of us who adopted this strategy were somehow insincere in our efforts. We have proven ourselves to be just as effective at insisting on methodological rigor as the earlier generations, even as we are often more eclectic in terms of theory.

Before moving away entirely from this brief reference to his 1975 article, let me add an autobiographical note that is relevant to the issue of how Chase-Dunn has influenced research in urban studies. At the annual meeting of the American Sociological Association in Montreal (1974), I attended the session in which Chase-Dunn presented an early version of this article. At the end of the session, I made a point to introduce myself to him and let him know that I was working on testing the effects of relative economic dependence of low income countries on various "problems" related to urbanization but was having trouble finding different indicators of dependence. By the end of the conversation, he generously agreed to send me his data which then provided me with one of the two key measures of my independent variable in my subsequent dissertation research, along with other measures.

Chase-Dunn's work became increasingly informed by the world-system perspective which Immanuel Wallerstein introduced and as modified and elaborated by, among many others, Wallerstein himself, Andre Gunder Frank, and Chase-Dunn (culminating, but not ending with his book, *Global Formation*, published in 1989). Simultaneously, he began turning his attention to urbanization patterns and city formation in relation to the structure and dynamics of, first, the capitalist world-system and increasingly in relation to historical world-systems more broadly.

Cities, Urbanization, and City-Systems in Chase-Dunn's Research

In the remainder of this essay, I will, first, discuss a few exemplars of Chase-Dunn's urban-related research in some detail. I will then argue that his research has not had a large, direct impact on urban studies scholarship. Instead, it has had an indirect effect on urban studies via the work of those of us whom he has influenced and inspired. Next, I will also note that there are two broad reasons why his direct impact has been minimal on urban studies. One is that this interdisciplinary area tends to be devoted to contemporary issues affecting individual cities or groups of cities within regions to the exclusion of the long historical sweep with which Chase-Dunn's work is consumed. The second reason is that he uses data on cities and urbanization patterns to test hypotheses about the causal processes at work in shaping world-systems, or civilizations. This has been Chase-Dunn's fundamental project for many years, and it is one which raises a set of concerns that are far beyond "the urban." I will then conclude with a discussion of the considerable indirect effects on comparative urban studies Chase-Dunn has had through his influence on those of us who study world cities/global cities, urbanization, and global city networks.

Chase-Dunn is not primarily an urban sociologist. He is a macro-comparative social scientist whose career has been dedicated to theorizing and empirically exploring basic features and processes of historical world-systems: how they are organized, how they reproduce, how they change, how they cease to be. One recurring subject in his research has been exploring how properties and processes of world-systems shape various features of human settlements and their interrelationships. His scholarship is characterized by a commitment to marshal systematic, often quantitative data, that allow him and his collaborators, who are often students, to evaluate hypotheses related to this theoretical problematic. An early effort to that end was Chase-Dunn's National Science Foundation-funded project housed in the Social Relations Department of Johns Hopkins University in the early 1980s.[1] A chief aim of this project was to collect estimates of the world's cities' population sizes for various time points from 800 to 1975 or 1980. He and his students used these data to evaluate a number of hypotheses relating his understanding of Wallerstein's world-system perspective to urbanization patterns. Along the way, he identified and made contact with other scholars who were beginning similar endeavors.[2]

He is clear about this approach in proposing a strategy for studying urbanization in relation to the capitalist world-system in a 1983 article that is related to the NSF project. While acknowledging the pioneering work of Marxist urban scholars, such as Castells (e.g. 1977) for

[1] As a postdoctoral fellow in the department from 1980-82 I benefitted from participating with the team he assembled for the project, which included Jeffrey Kentor, Jeff Lunday, Joan Sokolovsky, and Pamela Walters, all of whom were doctoral students in the department at that time.

[2] A book that I edited (Timberlake 1985) is collection of research papers authored by several of these people and is a product of my time working with Chase-Dunn as a postdoctoral fellow.

arguing that national urbanization processes needed to be understood as part of the social, cultural and political contexts in which they were embedded (i.e., capitalism), Chase-Dunn argues that those contexts are too often restricted to national boundaries. This is too limiting. The Dependency School begins to offer a broader perspective by understanding urbanization patterns in dependent countries as a manifestation of their economic and political subordination to the Western nations and transnational firms. Chase-Dunn advocates an even broader perspective by adopting Wallerstein's world-system perspective which includes understanding "dependency" as an enduring feature of the capitalist world-system. Such a core-periphery division of labor has been a central feature of this world-system since it emerged in 15th and 16th centuries. Thus, he proposed that connections between urbanization patterns such as national-level primate city size distributions be examined in relation to regular features of the world-system: the core-periphery division of labor, cycles of hegemony, state formation, and so on. Another structural feature of this world-system, he notes, is its political multicentricity (in contrast to world-empires), suggesting that "…there are several world cities at any point in time and these are separate contending sources of economic and political power" (1983: 44). And he also suggests that examining the world city size distribution itself might well reveal changing patterns over time that "…are related to cycles or trends of the capitalist world-economy" (44). This is quite prescient of more recent studies of "world cities" and "global cities," and a few of these recent studies have noted the rise of some Asian cities (in China especially) within the overall global hierarchy of cities (e.g., Alderson, et al. 2010; Mahutga et al. 2010) which can be related to the development dynamics of upwardly mobile semiperipheries.

In a 1985 article, Chase-Dunn (1985a) begins to show how he will go about answering such questions on the basis of evidence. He deploys some of the city size data gathered in the course of his NSF project to address the question of why Latin American countries seemed have unusually primate city size distributions. It is important to note that, in doing so, he does not fetishize city systems' population size distributions. He makes it clear that population size is an imperfect indicator of more fundamental urban network properties, for example commodity flows or power relationships, for which no data exist. Of course, there was already a considerable body of theory and research on city systems in general, and urban primacy in particular. In this piece he compares the shape of national city systems in about 20 Latin American countries to those in about 15 "developed" countries of the West, and he does so over a considerably longer period of time than previous studies of urban primacy. Using Walters' SPI Index (1985) as a measure of the degree of primacy, he shows that from 1800 to 1975, urban primacy became more extreme in Latin American countries, in general, but much of the increase occurred in the 1930s and 1940s. During the same 150 years, Western countries' city systems became, first, more primate, and then less primate in the last couple of decades of that time period, overall, than they had been in the middle

decades, and they were far less primate in 1975 than the Latin American countries. In the urban primacy literature this suggests that these core countries (in terms of the world-system perspective) had balanced distributions of cities, indicting more spatially even development patterns, whereas the Latin American countries had uneven development. In making this two-fold comparison—over time and across zones of the world-economy—Chase-Dunn is able to evaluate—and reject—several hypotheses that had been advanced in the literature on Latin American urban primacy, including that it was primarily an outcome of colonialism and that it stems from import substitution industrialization during global stagnation of the 1930s. While this analysis is preliminary, he concludes that "contextual world-system properties…may be responsible" for the observed patterns (1985a: 28).

In the same year that this article was published, the edited volume, *Urbanization in the World-Economy* was published (Timberlake 1985). This volume was largely the result of Chase-Dunn's research group at Johns Hopkins and his efforts to make connections with other scholars whose research conceived of urbanization processes as having transnational concomitants. He contributed a chapter—one that the editor inexplicably buried near the end of the volume—which extended his analysis of city systems to world economies. Using the data on city sizes developed in his project, he calculated urban primacy scores based on the West's ten largest cities at 200- to 50-year intervals beginning in 800 AD, and with additional calculations for cities in the Roman Empire in 100 and 350 AD. Again, these scores are estimates of the extent to which the population sizes of cities are ordered hierarchically (with a steep gradient from the most populous to the smallest) versus "flat" (with an absence of large differences in city sizes). And, again, population size rankings of cities in national territories have been long argued theoretically to provide rough indicators of the degree to which the cities are integrated into a single system. His purpose in this piece is to investigate

> ….the extent to which it is fruitful to view the cities of the capitalist world-economy as participating in a single interactive spatial system, albeit one that differs substantially from those most usually found within nation states. Is there a system of world cities that exhibits regular tendencies of hierarchy and specialization analogous to those found in smaller areas? I argue that the correct specification of the boundaries of the capitalist world-economy, and an understanding of its political and economic structures and processes can be used to explain the nature and varying features of the system of world cities (Chase-Dunn 1985b: 269).

Though McKenzie (1926) hinted at such a global system of cities, Chase-Dunn's evocation of the notion here maybe the first time it was explicitly suggested (but also see Friedmann and Wolf 1982 and Cohen 1981). Today, there is a large literature on the global system of cities and there have been methodological advances in mapping them and studying them (e.g., Taylor 1997; Derudder and Witlox 2008; Smith and Timberlake 1995). But is Chase-Dunn's conceptualization of such a system similar to these latter advances? Undoubtedly it is. Asking the reader to imagine a map of the world in 1900 without national boundaries but with the names and locations of cities, he goes on to write, "Now draw lines that indicate the commodity exchanges among the cities and towns of the world-system….What can now be observed is an exchange network among cities that has differential densities within it indicating various national and regional sub-systems, but that also exhibits a transnational structure similar in appearance to a familiar airline route map" (1985b: 271). He then asks the reader to further imagine color coding the lines on the map to indicate differences in the flows of highly processed commodities vs. raw materials, the locations of high level services functions such as "international banking" and headquarters and subsidiaries of transnational firms, and so on. Today, we have studies of the global system of cities that are based on some of these very sorts of indicators, including international air passenger flows between city pairs (Smith and Timberlake 1995a), business class air passenger flows between cities (Derudder and Witlox 2008), the world's top service firms and their back offices (Taylor 2001), Fortune 500 headquarter-subsidiary city linkages (Alderson and Beckfield 2004), financial linkages (Bassens et al 2009) and other direct measures of city-to-city linkages globally.[3] In the end of the imaginary map exercise, Chase-Dunn asks the reader to draw the national boundaries back on this map of flows in recognition of the fact that states are fundamental to the operation of the capitalist world-system. Geopolitical competition and even warfare are endogenous to the world-system. This is an important distinction between Chase-Dunn's conceptualization of global city systems and some other, later conceptualizations, such as Sassen's suggestion that global city formation is indicative of the "deterritorialization" of the state (e.g. 2009).

Returning to the actual research reported in Chase-Dunn's chapter that is under discussion, he interprets changes in the index scores that he reports in light of long term changes in the political and economic organization of Europe and the West more broadly as, first, the Roman Empire gives way to feudalism, and then capitalism spreads, rapidly becoming constituted as a world-system. Without attempting to present the complex interpretation of the findings presented in the chapter, the "…general overview [of the observed patterns of changes] can be interpreted in terms of the

[3] A list of papers and various global city network mapping exercises found at the website for the Globalization and World City Network can be found on the internet at http://www.lboro.ac.uk/gawc/. Founded by geographer Peter Taylor, this network has drawn together scholars and scholarship of which Chase-Dunn foreshadows in this 1985 piece.

demise of the Roman city system into European feudalism, the rise of the capitalist cities and administrative cities of the European nation-states, and then the cycle of core competition (the rise and fall of hegemonic core powers and their world cities)" (1985b: 282). Thus Chase-Dunn finds the shifts in the degree of hierarchy of city system are in line with shifts from a world empire, its devolution and decentralization, and the rise of the capitalist world-system (and its attendant nation states) and then cyclical features of that world-system.

Chase-Dunn's has revisited cities and city systems in relation to very long run processes and macro socioeconomic and political structures, producing several published and unpublished papers since 1990. In recent years (since 2001), many of these can be found at the website for the Institute for Research on World-Sytems (IROWS, http://www.irows.ucr.edu/) which he founded and coordinates at the University of California Riverside. Some of them can only be found there, making them both very accessible, in that this site is open access, and at the same time rather obscure because one must know about it and peek into it from time to time. But other pieces have been published, and are either archived at IROWS or reincarnated as Chase-Dunn and his collaborators revise and extend particular pieces on the basis of new analysis, new data, and new theorization. An example of this is his piece, "The Changing Role of Cities in World-Systems" (IROWS v. 8-2-04 2004) which is a revised version of a book chapter that appeared in an edited volume in 1991 (Bornschier and Lengyel). Here (and elsewhere many times since), he engages literatures that go far beyond my own scope of experience and expertise, into debates amongst economic historians, archeologists, anthropologists and scholars of civilizations. He engages these by making the argument that world-systems analysis can be fruitfully extended to pre-capitalist modes of production and, more to the point of this piece, that "the analysis of the growth of cities and systems of cities is germane to the many issues which these contending perspectives raise" (2004: 3). Even nomadic peoples, he notes, wander systematically and develop collective settlement sites that are used recurrently, and they develop relationships with other groups, settled or not. Moreover, this observation invites investigations into hierarchical relations among such groups, raising the possibility of core-periphery relations and unequal exchange.

From the late 1990s through the first decades of the present century, Chase-Dunn and his collaborators have returned repeatedly to an analysis of settlement sizes and city size hierarchies within various territorially bounded areas such as regions, nations, empires, and world-systems. The purpose is always more than descriptive exercise. Rather it is to answer questions and evaluate hypotheses about the processes that seem fundamental to large social systems, looking for regularities and "synchronicities" across time and across such territorial units with an eye toward nailing down the causes of change and stability and evaluating claims about from where in the world the chief forces of change originate. Within this body of work are studies of city sizes and the territorial sizes of empires showing that distant, regional interaction systems have experienced

synchronous cycles of expansion and contraction, with shifts in city size hierarchy and absolute sizes of cities mirrored by the territorial size of empires (e.g., Chase, Dunn, et al. 2000; Chase-Dunn et al. 2006; Chase-Dunn et al. 2015).

City-like settlements appear in both complex chiefdoms and then in early state-based systems, both of which evince hierarchical relationships among both classes and spatially, across settlements (Chase-Dunn et al. 2000). He and his co-authors note that the first cities appear in Mesopotamia as nodes in hierarchical settlement systems, and in the context of city-states. Increasing population densities require more intensified production efforts and logically leads to competition "…for land and other resources, which increases the prevalence of warfare." This piece goes on to develop arguments about the role of cities in empires and, with the increasing prevalence of commodification, then emerge specialized, capitalized city-states operating within (or between) empires, and finally the increasing preponderance in Europe of capitalist relations along with the success of capitalist interests in assuming state power and the rise of the nation state. "Now national states and capitalist firms became the main players in a world-system in which the logic of capitalist accumulation had become predominant over other logics of accumulation." At this point in this piece, Chase-Dunn et al. acknowledge the extensive research on cities and city systems in the context of the relatedly contemporary capitalist world-system, but he uses his foray into the role of cites across the millennia to make the point that this other work is myopic. For example, he suggests that many of the changing urbanization patterns that social scientists find unique today are quite similar to changes in settlement patterns during other periods of hegemonic decline. He ends the piece with a hopeful (but possibly Pollyannaish) suggestion that perhaps cities can regain their prominence as sites of progressive agency:

> …the role of cities has changed with the rise and fall of different logics of accumulation. Early city-states were protagonists of the tributary mode of production. They developed the techniques of power that made empire formation by conquest possible. Later, in the context of already-formed tributary empires, a few city-states in the semiperiphery became protagonists of the capitalist mode of production. When the capitalist mode became predominant, national states and firms pushed cities out of the transformational role. Is it possible for cities to become important protagonists of socialism?

Citing arguments by Harvey (1985) and Alger (1990) and adding his own twist, Chase-Dunn answers in the positive this rhetorical question. He envisages international inter-urban associations and alliances of social movements for justice, the environment, and mutual aid. "Municipal networks are one form of organization that such movements should utilize."

In another paper involving huge comparisons over stupendous periods of time, Chase-Dunn and Willard (1993) exam changing hierarchical patterns across cities in relation to cycles of political centralization-decentralization of world-systems, comparing eight (Mesopatamian, Egyptian, Mesoamerican, West African, Indic, Far Eastern, Japanese, and the Central world-system "…which eventually engulfed all the others") across nearly 4000 years, hypothesizing that "…city systems will become more hierarchical—that is the largest cities will be much larger than other cities in the same network—when political/military power is more centralized." Carefully using estimates of cities' population sizes, they compute the degree to which city systems of each world-system are hierarchical versus flat at different points in time. They compute the standardized primacy index (SPI), developed by Walters (1985) in Chase-Dunn's NSF project mentioned above, for a number of time points. They then use other scholars' (e.g., Wilkinson [1987], Elvin [1973], Frank [1992]) discussions related largely to historical shifts in concentrations of economic, political, and military power, trade networks, and so on, to interpret shifts in urban populations and city size hierarchy within world-systems over time. They conclude, with considerable caution and nuance, that indeed hierarchical city size distributions do indeed correspond with concentrations of what we would call geopolitical power and, indeed, hegemony within world-systems. This paper is a typical example of meticulous, systematic empirical research brought to bear on otherwise very speculative interpretations of archeological and historical data drawing conclusions about the rise of "civilizations," their expansion/contraction, coherence, and decline.

Chase-Dunn and Manning (2010 [2004]) provide another fine example of using changes in regions' city sizes and city hierarchies to track synchronicities across regions in an effort to challenge or support contentious claims about shifts in the locus of political-economic power in the world over time. Their analysis of data on city sizes and distributions across East Asia, West Asia-North Africa, Europe and South Asia reveal remarkable synchronicity in patterns between the first two regions over the huge swath of time between 1360BCE and 1600 CE. They also show concurrence over more recent time (1400CE to 1850CE), with their data revealing patterns that are consistent with the increasing economic prominence of Europe relative to the other regions. On the basis of these findings, they draw conclusions about some of Frank's arguments about the relative prominence of China and Europe over the history of civilizations (1998). In *ReORIENT*, Frank contends that, before the abrupt ascendance of capitalist Europe, it was a periphery to the core West Asia and North Africa empires of the ancient world, a relationship that was disrupted by the rise of Greece and then Rome, but one which was reestablished with Rome's decline. Analyses of their city data permit Chase-Dunn and Manning to allow Frank this claim. And, the synchronicity in the city size trends across regions, also supports the Frank and Gills (1994) argument that "…an integrated Afro-Eurasian world system [existed] much earlier than most historians and civilizationists suppose" (2010: 113). However, their city data analysis also

challenge Frank's argument that the rise of Europe was permitted primarily by a "…developmental crisis in China. The city population data indicate that an important renewed core formation process had been emerging within Europe since at least the 14th century" (2010: 113). Contrary to Frank, the data indicate a long and relatively gradual increase in the centrality of Europe rather than the rather sudden explosive rise of Europe caused by the conjuntion of intensified capitalism in Europe and the crisis in the East. Once again, Chase-Dunn and his collaborators marshal quantitative data on population changes in all the world's cities over huge spans of time in order to both evaluate existing claims about the nature of long term social change as well as to discern patterns of regularity and difference that might suggest alternative explanations of historical change as well as the underlying causal forces behind shifting loci of power and control in world-systems. Chase-Dunn and Manning conclude this paper by noting that the rise of Europe and success of its capitalist world-system has by now led to the incorporation of the entire globe within it. Their data on urban populations show that in recent years, East Asian cities have regained their prominence amongst the world cities, and they note that other research on other sorts of global urban hierarchies also indicates the rise of Asian cities in recent years (e.g., Shin and Timberlake 2000, Ma and Timberlake 2013). But, this is indicative of increasing competition for core power within a single world-system.

Chase-Dunn's interest in cities is mainly tied to what information about their relative sizes, locations, preponderance, and linkages with each other and other territorial units indicate about key structural features and processes of world-systems, which for him is, essentially human history. The framework he and his collaborators use has been elaborated in several books and articles. For example, he and Jorgenson (2003) write, "This theoretical framework deploys what has been called the comparative world-systems approach to bounding social systems. Rather than comparing societies with one another, we compare systems of human societies (or intersocietal systems) and these are empirically bounded in space as interaction networks—bilateral or multilateral regularized exchanges of materials, obligations, threats, and information" (2003: 1). In the papers reviewed above, large cities in terms of population size indicate loci of power; they are found within territories whose inhabitants have been successful in organizing relationships that facilitate the accumulation of resources in these particular places. This is accomplished through the operation of the above mentioned interaction networks. Tracking the relative size of cities located within different, relatively independent systems of human societies and comparing this to how the historical and archeological records have been interpreted by scholars of civilizations has allowed him to confirm or challenge their understandings about the relative success of these different systems as well as mark prominent points of change in their "life cycles." And, tracking their sizes and relative sizes over time has allowed him to evaluate claims about the extent and timing in how societal systems are flourishing or struggling. Moreover, examining information on

population size hierarchies of cities within interacting societal systems can help settle debates about the timing of expansions and contractions of systems and about hegemonic cycles within the core of world-systems.

One of Chase-Dunn's foremost goals exhibited throughout his body of work is explicit in the paper with Jorgenson: "We want to explain expansions, evolutionary changes in system logic, and collapses. This is the point of comparing world-systems" (Chase-Dunn and Jorgenson 2003:9; see also Chase-Dunn and Hall 1997). His research deploying data over long periods of time on the world's cities' populations and their population size hierarchies has been one strategy he has used to accomplish this ambitious goal. So, while his work has not been aimed at contributing to urban studies research per se, he has prominently featured cities, city systems, and urbanization in his research, and he has contributed indirectly to urban studies through his influence on many of us who have worked with him as students and collaborators.

Chase-Dunn's Legacy in Urban Studies?

Although my own research is much more limited in score, perhaps falling into "…the shallow presentism of most social science …[that] needs to be denounced at every opportunity" (Chase-Dunn and Jorgenson 2003: 10), Chase-Dunn has influenced it tremendously. While I had already begun linking urbanization and urban social structure to transnational socioeconomic processes and structures in my dissertation work at Brown University under Peter Evans, I was able to sharpen and refine my theoretical understanding about how these linkages operated by working with him and his team at Johns Hopkins in the early 1980s. This experience also gave me an appreciation for the hard work necessary for locating, recording, organizing and analyzing data that would be useful in evaluating the claims that we and others were making about how large, human social systems are organized and change—their rise and demise, their cycles, and their fundamental structures. It was at this time that Chase-Dunn was working on *Global Formation* (1989; see Bair and Werner, in this volume). During my postdoctoral fellowship with him, I was exposed to and involved in many of the theoretical ideas he was honing for this book, and it has shaped my work tremendously. But I was also working with a group of doctoral students that he supported with his NSF grant on urbanization and the world-system.

This research and a resulting edited book, *Urbanization and the World-Economy* (Timberlake 1985) are mentioned above, and some of the contributions in the book are important to mention again here. Many of them are prescient of some of the ways in which scholarship in urban studies became increasingly concerned with connecting urban issues with global currents. The contributors to the book include those who worked with him on the NSF project as well as other scholars whom he located and to whom he reached out who were working on similar issues at the same time. I have already discussed Chase-Dunn's own contribution on the world-system's city

city, a piece that resonates with Friedmann's influential work on "world cities," Saskia Sassen's work on "global cities," and Peter Taylor's work on the "world system's city-system," much of which would appear within the next few years (e.g., Friedmann 1986; Sassen 1991; Knox and Taylor 1995).

Other contributions to my 1985 edited book include a conceptual piece by Kentor on economic development in relation to the global division of labor in which he discusses and schematically presents the notion of territorially nested hierarchies of cities, regions, and zones (core, periphery, semiperiphery) of the world-economy, prescient of the "nested network approach" that Chase-Dunn uses in his work comparing world-systems, especially with Hall (e.g. 1997). Kentor went on to produce several published pieces in which cities and urbanization are the focus, including fascinating research in which he uses interlocking Fortune 500 boards of directors to signal linkages in global city networks (Kentor et al. 2011; see also Kentor 1981; Timberlake and Kentor 1983; and Kentor and Jang 2004). It is in another chapter of this book that one of the project's team, Pamela Walters (1985), develops the measures of urban primacy (SPI), versions of which Chase-Dunn uses throughout much of the work discussed above in which urban hierarchy is featured. All of his project's team members who contributed to the book were deeply influenced by Chase-Dunn's theoretical understanding of the world-system which he elaborates in *Global Formation* (1989) and which I am sure is discussed in more detail elsewhere in this special issue. Moreover, those of us who have brought Chase-Dunn's version of the world-system perspective directly to our understanding of cities and urbanization have collaborated with colleagues and our own students, deploying Chase-Dunn's understandings of the capitalist world-system's chief structures and processes in our research on global and world city networks.

Contributions in the book from scholars to whom Chase-Dunn reached out to find include a piece by Alejandro Portes reprising earlier work he did on the role of the urban informal sector in unequal core-periphery exchange. Of course Portes has written extensively about Latin American cities and urbanization (e.g. 1989). Bruce London, whose later published work contributes to understanding "overurbanization" in low income countries (e.g., London and Smith 1988) contributed a chapter on the international context of problematic city-hinterland relationships in Thailand (London 1985). And, significantly, Saskia Sassen contributed a chapter (Sassen-Koob 1985) on capital mobility and migration in "core cities" that foreshadows her widely read and acclaimed work on "global cities" (e.g. 1991).

David Smith, with Roger Nemeth, also contributed to this edited volume with a piece comparing urban hierarchies in South Korea and the Philippines and explaining their differences through the lens of world-systems analysis. It was in working with Smith as he helped to prepare this chapter for publication in the book that initiated a long collaboration between him and me. We have collaboratively authored about ten urban-related journal articles or book chapters (e.g.,1995

2002 to list two examples) as well as developed a funded National Science Foundation project (with Kentor). With Smith and other collaborators, I have narrowed much of my own focus to conceptually and empirically mapping the present world-system's city system (e.g., Smith and Timberlake 2001) and in research about how a city's location in global city systems and the world-system influence social structure within cities (e.g., Timberlake et al. 2012; Sanderson et al. 2015). Aside from the 1985 edited book, much of the work cited immediately above has appeared in journals squarely in the interdisciplinary area of urban studies, including *Urban Studies*, *Cities and Community*, *Journal of Urban Affairs*, and *Cities*. Other examples of urban studies scholarship conducted by those under Chase-Dunn's direct or inherited influence include work on measuring world city centrality (Boyd, et al. 2013), the likelihood of overurbanization in post-Maoist China (Song and Timberlake 1996), Asia's rising world cities (Ma and Timberlake 2008), and testing world-system effects on the size of countries' informal labor sector (Roberts 2014). While Chase-Dunn's influence was directly personal in some cases—as a mentor and/or collaborator, in other cases it was not. Nevertheless, his theoretical work and his efforts to create networks of scholars who share similar interests stimulated considerable scholarship on urbanization and cities that has had a direct impact on urban studies even as his own research has not.

Conclusion

In this essay I have focused on that portion of Chase-Dunn's research that has featured cities and patterns of urbanization. We have seen that he has often used measures of the world's cities' population sizes and measures of the extent of hierarchy among interacting cities to challenge claims about how civilizations, world-systems, and other territorial human interaction systems have, over the course of the archaeological and historical record, expanded and contracted and become more or less powerful. I have asserted that his research has not directly contributed to urban studies, and the reason it has not is that he has never intended for it to do so. Nevertheless, I have argued that he has indirectly influenced urban studies scholarship significantly in the course of his career. He has done so by developing powerful theoretical tools that many scholars have used to describe and understand changes in urbanization patterns and cities' global interrelationships. He has done so through his work and influence over those with whom he has worked directly, such as doctoral students and various collaborators, and he has done so by bringing together those whose scholarship is concerned with how global forces articulate with local social settings, manifest in the size and social structure of cities and in the ways in which cities are networked with each other and with other territorially organized populations.

Finally, I would argue that urban studies scholarship today is fixated on rather short run and territorially limited "urban problems," missing the opportunity to encourage scholarship on how cities and urbanization are related to long run historical processes. One needs only to thumb

through recent issues of the chief urban studies journals to appreciate the extent of the myopic "presentism" of this interdisciplinary field. One exception has been the burgeoning area of research of global/world city networks. Research on this subject has boomed in urban studies since the tail end of the 20th Century, and although citation searches using those key words will not generate many references to Chase-Dunn, they will turn up scores of authors whose scholarship in this area has been fundamentally shaped by his vision.

About Author

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New Geographies of Uneven Development in *Global Formation*: Thinking with Chase-Dunn

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> The scientific task, as well as the political, is not to give a finished definition to an unfinished process, but to follow all its stages, separate its progressive from its reactionary tendencies, expose their mutual relations, foresee possible variants of development, and find in this foresight a basis for action.
> -Leon Trotsky (cited in Burawoy 1989: 786)

From Uneven and Combined Development to *"Global Formation"*

In his well-known essay comparing Skocpol and Trotsky, Michael Burawoy considers how Leon Trotsky's theory of uneven and combined development extends the Marxist research program. As Burawoy explains, Trotsky's efforts to defend the core tenets of historical materialism led him to reject Marx's oft-cited claim from the opening pages of *Capital* that "the country that is more developed industrially only shows, to the less developed, the image of its own future." This is not

[1] This paper is a collaborative endeavor. Authors are listed alphabetically.

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correct, Trotsky argued, because the very fact that industrial development has occurred elsewhere alters the historical path, creating both new constraints and new opportunities for those that follow.[2] Uneven and combined development is the theory that explains this non-linear unfolding of capitalism in world historical time.

The theory of uneven and combined development, as elaborated in Trotsky's History of the Russian Revolution, centers on "how the development of capitalism on a world scale creates a different balance of class forces in different nations" (Burawoy 1989: 782). Capitalism "continually expands and transplants itself onto foreign soils and combines with different social structures to produce different constellations of class forces…," with the consequence "that revolutionary changes take on distinctive national characters" (ibid: 783).

We chose Trotsky's words as an epigraph for our contribution to this festschrift because the theory of uneven and combined development tackles some of the same concerns that occupy Christopher Chase-Dunn in his book Global Formation: the spatial dynamics of capitalism, the articulation of different modes of production, and the centrality of class forces for understanding social transformation. Like Trotsky, Chase-Dunn is concerned with tasks both "scientific and political" (and he pointedly notes in the introduction that these "are certainly not the same activities"), including the careful analysis of social currents and forms of resistance in order to distinguish "the progressive from the reactionary."

While Chase-Dunn's direct references to Trotsky in Global Formation are few, his 1988 article "Comparing World-Systems: Toward a Theory of Semiperipheral Development" offers a more extended discussion of Trotsky's work. There, he cites perhaps the most famous passage from History of the Russian Revolution, in which Trotsky explains that the unevenness of capitalism's expansion across space and time means that its development in "the backward countries" will feature "a drawing together of the different stages of the journey, a combining of separate steps, an amalgam of archaic with more contemporary forms" (Trotsky 1977: 27). Chase-Dunn goes on to draw a connection between Trotsky's argument about the "privilege of historic backwardness" and his own hypothesis about the transformative potential of the semiperiphery.

Yet in this same article, Chase-Dunn also notes the weakness of Trotsky's theory of uneven development from a world-systems perspective—namely, that it ignores the "the hierarchical and structural aspects of relations among more and less developed societies" (1988: 35). It is not enough to acknowledge the possibility of different trajectories; what must be rejected is the assumption that these lead to a common destination. Put differently, while Trotsky's notion of uneven and combined development disrupts a linear imaginary of capitalist development in which

[2] Marx later revised this sentence in the French edition to make clear that he was comparing England to the European continent, and not making the case for worldwide uni-linear capitalist development (see Anderson 2010: 176-178).

less advanced countries are simply at an earlier point on the path blazed by those ahead of them, world-systems theory shifts the frame of reference by rejecting any notion of generalized development tout court. The reason that the developed country does not present the developing country with the "image of its future" is because the relationship between them is one of ongoing exploitation rather than temporal succession.

Global Formation offers, among many other things, a particularly keen and exhaustive analysis of the reproduction of global hierarchy into core, semi-periphery, and periphery positions. What we find particularly valuable in this book, and in Chase-Dunn's discussion of uneven development from a world-systems perspective especially, is the opening it provides for thinking about the relationship between spatial and social difference across the landscape of capitalism. This is an agenda we have been pursuing in our work on "disarticulations," which we define, in the broadest sense, as an approach to commodity production through the lens of the reproduction of geographies of uneven development (Werner and Bair 2011; Bair and Werner 2011; Bair, Berndt, Boeckler and Werner 2013). The disarticulations agenda emerged from our critique of the "inclusionary bias" of network approaches to global development, including some that trace their origins to Hopkins and Wallerstein's concept of commodity chains. Based on our own empirical research on export production in Mexico and the circum-Caribbean, we were struck by the tendency of much research on global value chains and global production networks to focus on the effects of incorporation into transnational circuits of production, particularly the degree to which participation in such networks enables "industrial upgrading."

This narrow focus on incorporation and the upgrading implications therein, while not unimportant, tended to leave unexamined other questions which we have come to believe are critical for understanding what commodity chains can tell us about the nature of the world-system. For example, how and with what consequences do regions and actors become disconnected or expulsed from commodity chains in times of restructuring and/or crisis? Perhaps even more fundamentally, how do the everyday dynamics of such chains express, mobilize, and reproduce the sociospatial difference that is the condition of their possibility? Disarticulations is the term we coined to describe these analytical concerns.

One of the challenges for us was finding a way to develop the claim that forms of social difference underwrite capital accumulation—for example, by shaping the contours of commodity chains—without implying that the logic of capital is sufficient for understanding such difference. We found Stuart Hall's (1980) essay, "Race, articulation and societies structured in dominance," particularly helpful in this regard. Hall reinterprets debates on colonial capitalism, and specifically the relationship between race, class, and capital accumulation, through the concept of articulation, which he understands as the material and ideological work that connects relations of production and complexly structured social formations. For example, rather than reduce race to class or

theorize race outside of material relations, Hall urges us to "start… from the concrete historical "work" which racism accomplishes under specific historical conditions—as a set of economic, political and ideological practices…concretely articulated with other practices in a social formation" (338). In developing this notion of articulation as a linking together of social and structural difference via material and ideological practices, Hall draws on Althusser's concept of the social formation to intervene in what was, at the time, one of the most contested issues within Marxist thought: the "mode of production" debate (Foster-Carter 1978).

Global Formation similarly draws inspiration from Althusserian thought. In reviewing the mode of production controversy, Chase-Dunn differentiates his position from Wallerstein's "totality assumption," which maintains that a single mode of production—capitalism—has characterized the entirety of the world-system since its emergence. Instead, Chase-Dunn acknowledges the possibility that a world-system might accommodate multiple modes of production, and that recognizing this possibility, and the conflict and competition occurring between modes of production, might be helpful for understanding the possibilities for social transformation that are present in a given place and time. In elaborating this position, Chase-Dunn notes the distinction that Althusser and Balibar introduce in Reading Capital between "the mode of production (the basic essence of capitalism as a system) and the social formation (the concretely existing set of social institutions which contain historical survivals of earlier modes of production and nascent elements of modes of production of the future" (1998: 27). Chase-Dunn extends the concept of social formation from that of a national society to that of the world-system, and takes this reformulation—the global formation—as the title of his book.

Chase-Dunn's analysis of core-periphery hierarchy as a global formation remains generative for our understanding of contemporary dynamics of uneven and combined development. The central question Chase-Dunn is pursuing in this work is not what effect uneven development has on particular nation-states and their fortunes, but rather by what mechanisms global hierarchy is reproduced. We see an affinity between this formulation and the kind of intervention we aim to make with the disarticulations approach—that is, we are asking not how incorporation into a commodity chain might enable a particular region to develop, but rather how commodity chains articulate—in the Althusserian sense—sociospatial difference.

In the remainder of this brief essay, we discuss how Global Formation informs and resonates with our own efforts to understand the problematic of uneven development. We are especially interested in thinking about how Chase-Dunn's analysis of core/periphery reproduction at the height of what was commonly called the "New International Division of Labor" (NIDL) might help us make sense of more recent patterns of sociospatial fragmentation. To be sure, the specific cartography of the world system has been redrawn since the initial round of offshoring that sparked the NIDL formulation (Fröbel, Heinrichs and Kreye 1978), as East Asian countries moved into the

semi-periphery. Yet, these shifts have not closed the gap between the North and South. Instead, the dynamics of uneven development at the regional and national level have accelerated, as have corresponding "efforts to draw 'boundaries' delineating who will be 'cut in' and who will be 'left out'" from the benefits of ongoing accumulation (Silver 2003: 21). Developing a rigorous analytical framework to parse these boundaries and their political and economic implications could not be more timely, as we navigate the hangover precipitated by the 2007-8 financial crisis centered in the global North, the darkening clouds over the much celebrated BRICS, and the wave of populist politics breaking across the countries of the core. Below, we proceed by discussing three ways that Global Formation sheds light on the reproduction of global hierarchy in the contemporary period: new geographies of South-South uneven development; the uneven commodification of labor and the dynamics of the world class structure; and the new politics of uneven development in the global North.

Boundary-Drawing and the New Geographies of South-South Uneven Development

Several insights from Chase-Dunn can aid us in the analytical task of assessing the relationship between particular geographies of uneven development and the general structure of global hierarchy. First, in *Global Formation*, Chase-Dunn uses the work of Marxist geographer Neil Smith (1984) to foreground the multiple scales at which uneven development operates. He draws out the connection between the dynamics of uneven development at the global level—those which produce "core" and "peripheral" countries and zones—and processes of class formation and class politics as these occur within countries.

Chase-Dunn's insistence on "the region" as the territorial unit of "coreness and peripherality" (208) through which uneven development can be grasped is particularly fruitful for understanding capitalism's shifting geographies. The region here signals an intentionally ambiguous spatial unit of analysis, potentially indicating sub- and supra-national, and network, formations. This ambiguity is analytically useful since it obviates the sort of unit presuppositions that plague much analysis of development, especially the assumption of "national development." The analyst must instead ask what territorial form uneven development is taking, and how core and periphery are produced in a given instance. In Chase-Dunn's formulation, regions form "nested" hierarchies, including national and global city network hierarchies, continental/supra-national hierarchies and subnational regional hierarchies. While "nesting" is a misleading descriptor,[3] the main point is that core and periphery operate at multiple, intersecting levels constituting a "complex unity," that is, the global formation.

[3] For example, "nesting" can imply aggregation as opposed to inter-relation (see e.g., Collinge 2006).

Chase-Dunn's insights on the reproduction of global hierarchy, the connection between global hierarchy and class relations, and his engagement with the NIDL debates offer key tools for interpreting the shifting terrain of uneven development in the global South. The celebrated rise of the so-called BRICS—Brazil, Russia, India, China and South Africa—reflects the contemporary dynamics of peripheral to semi-peripheral shifts in the world-system, as well as their limits. For Chase-Dunn, the semi-periphery is a key axis of global hierarchy. In economic terms, these locations—states, cities, regions—concentrate either a mix of capital- and labor-intensive activities or intermediate activities (see especially pages 204-214). This composition, and the position of nation-states that encompass such a mix, have important political implications for class conflict, the political form of semi-peripheral states, and the reproduction of global hierarchy on the whole. As Chase-Dunn notes, semi-peripheral states have posed the most significant challenges to core power and have been the primary sites of socialist experimentation. Echoing insights from Giovanni Arrighi, Chase-Dunn's focus on the semi-periphery is highly suggestive of a reworking of Marx's observation: perhaps the semi-periphery shows the core the image of its own future.

In the current conjuncture, we are struck by a generalized turn in analysis of the BRICS and other so-called emerging economies from sites of challenge to global capitalism (e.g., the New International Economic Order), to exhibits of global neoliberal governance (e.g., the debt regime), to motors of neoliberal deepening and refashioning. Harvey argues that the BRICS in particular served as absorbers of surplus from the core, a spatial fix for its crisis of overproduction. These 'emerging markets' soon became centers of capital accumulation that "sought out systematic spatio-temporal fixes for [their] own surplus capital by defining territorial spheres of influence" (Harvey 2003). South-South flows of investment and finance have created cascading patterns of uneven development, opening hinterlands to capitalist exploitation and facilitating surplus flows from (re)new(ed) peripheries to regional (i.e., Southern semi-periphery) and eventually Northern (i.e., core) destinations. Bond (2015) argues that the BRICS primarily lubricate and legitimize global capital, extending and deepening neoliberalization. This reading (perhaps intentionally) downplays the complexity of this process, for as Bond acknowledges, the processes of outward investment and financing are diverse amongst these countries (e.g., state-owned enterprises in China and state-financed private multinationals in Brazil). Moreover, few would suggest that China is simply a channel for neoliberal political economy. Nonetheless, the dynamic of South-South uneven development is highly significant. Its concrete character is explored in several areas, for example, in the "neoextractivist" tendencies of Chinese investment in South America (Svampa 2015; Ciccantell and Patten 2016) and Chinese and Brazilian investment in resource rich zones of continental Africa (Carmody 2011; Power et al. 2016).

Global value chain and global production network analyses are meso-level heuristic devices that make the study of uneven development tractable. Recent studies note that the terms for

inclusion in global production networks have become increasingly complex, and often more restrictive—indications of heightened competition at different nodes in the chain. While the empirical literature has turned to analyzing the possibilities for firm inclusion in global networks under these conditions, we instead have argued that the contemporary restructuring of commodity circuits reflects both long-standing and emerging forms of territorial and social unevenness in the global economy, especially amongst and within global South countries.

We can consider this restructuring through the lens of two processes: firm-level efforts to defer capital devaluation and regional disinvestment. The first process has been explored through studies of "downgrading"—that is, proactive or defensive strategies to defer devaluation by shifting to new products or activities. Downgrading strategies in some cases reflect the heightened power of core-based multinational corporations that block the possibilities for functional upgrading by producers in the periphery and semi-periphery (e.g., Gibbon and Ponte 2005; Neilson 2014). This dynamic reflects a reproduction of core-periphery hierarchy along well-worn pathways. In other cases, however, emerging South-South differences are creating new contours of uneven development through firm-level downgrading. Kaplinsky et al. (2011), for example, document the functional downgrading of Thai cassava and Gabonese timber firms that abandon value-added processing to meet the demands of Chinese buyers who seek less transformed goods. The limits to demand in the global North, and the dynamics of global production networks oriented towards the semi-periphery, were particularly evident in the wake of the 2008 financial crisis. As Smith et al. note, "global value chains and global production networks highlight the heightened interdependencies in the world economy and have become transmission belts for the economic crisis" (2014: 126; see also Pickles and Smith 2016). Indeed, the material limits to core markets, together with emerging market constraints in the current context of low commodity prices, and capital outflows and increasing debt in China, suggest the complexity of interactions between periphery, semi-periphery and core zones.

Analysts have noted the intensification of the second process, regional disinvestment, reflecting heightened intra-network competition, the shortening of the FDI lifecycle, and the increasing number of mergers and acquisitions (MacKinnon 2012). The possibility to resolve capitalism's overaccumulation problem through "switching crises" depends upon intra-national uneven development combined with relatively weak territorial alliances.[4] Chase-Dunn offers a lucid and important review of these debates, in dialogue with Cardoso's thesis of "dependent development." His insights are as salient now as they were when first offered. In China since the 1990s, for example, regional competition for Taiwanese investment in computer production has

[4] See Harvey (1999 [1982]) for a key discussion on the limits of such switching crises. The more "locked-in" capital becomes to its regional spatial formation, the more violent the switching crisis, including dramatic re-making of local alliances (of which fascism can be an outcome), technical mixes, and social and physical infrastructures (pp. 428-9).

driven the redistribution of these activities from the Pearl River Delta to the Yangtze River Delta (Yang 2009). While the Pearl River Delta remains the preferred site of export production, efforts by the Chinese government to reorient the economy towards the domestic market, coupled with growing labor unrest spurring wage increases and labor law improvements in the Pearl River region, is leading first-tier suppliers such as Foxconn to move their major production facilities inland (or abroad) in search of lower wages, laxer enforcement, and cheaper land (Chan 2014; Yang 2013).

The restructuring of production networks intra-nationally gained pace in Mexico in the late 1990s as well, where garment and auto parts plants extended their networks from the border and northern region of the country to central and southern states as a strategy to allay global competition (Collins 2003; Plankey-Videla 2012; Alvarez-Medina and Carrillo 2014). In the auto industry, this trend appears to have intensified in the wake of the 2008 financial crisis (Alvarez-Medina and Carrillo 2014). Such intra-national shifts often entail changes in the exploitable workforce. In the Turkish garment industry, for example, as production shifted from Istanbul to the southeast, the composition of the workforce also changed, from male and female urban immigrants in Istanbul to "factory daughters" in the southeast (Dedeoglu 2013). In sum, these micro- and meso-scale studies of production network restructuring remind us of the usefulness of Chase-Dunn's unit of analysis for uneven development. It is precisely the interaction of accumulation and disinvestment at multiple scales that both propels and remakes the global formation.

The Uneven Commodification of Labor and the World Class Structure

In the first chapter of *Global Formation*, in which Chase-Dunn lays out the main elements in his theory of the "deep structure" of "real capitalism," he distances himself from a view of capitalism that insists on the exploitation of wage labor as its defining characteristic. Specifically, Chase-Dunn cautions against an overly simplistic view of labor commodification as something that is either present or absent. Rather, if commodification is "the process by which formerly non-market-mediated activities come to take the commodity form" (18), then labor commodification can be thought of as a continuum on which different societies (or different sectors or spheres of activity within those societies) might be arrayed. To make a rough analogy to the language of statistical analysis, commodification is not a dichotomous, but rather a continuous variable. This view of labor commodification as a spectrum, in turn, is bound up with how we understand capitalism's scope, since from a world-systems perspective, locations that occupy intermediate positions on this spectrum are still within the structure of the capitalist world-economy: "Both Marx and Wallerstein see commodity production as necessary to capitalism, but Marx argued that "fully

formed" capitalism can only be based on wage labor, while Wallerstein argues that peripheral capitalism can be based on less commodified forms of labor control" (18-19).

This understanding of labor commodification as a spectrum is critical for how the world class structure and its spatial expression in the hierarchical world-system is conceptualized in *Global Formation*. As Chase-Dunn explains, the "world class system may be understood as *a continuum from protected labor through wage labor to coerced labor* which roughly corresponds to the core/periphery hierarchy" (39-40, emphasis in the original). Core and periphery each encompass a particular mix of labor forms along the continuum, with the former concentrating more commodified and protected labor than the latter. Certainly, Chase-Dunn would not dispute that all forms of labor along the continuum may be found in the different zones of the global hierarchy, but it is the particular combinations—and the prevalence of a given form—that illuminate the "rough correspondence" between class relations and core/periphery position (or the global formation). This revised theory of capitalism's deep structure allows us to appreciate the variable but patterned worldwide geography of commodification: "The world-systems perspective encourages us…to notice how control institutions (relations of production) are structured beyond the point of production, in states, and, indeed, are institutionalized in the core/periphery hierarchy" (23).

Chase-Dunn's formulation of commodified labor as a continuum offers a relational understanding of the global division of labor, an understanding that is particularly salient as we consider contemporary economic restructuring. Central to this understanding must be an analysis of how capital reproduces the hierarchical value of labor through forms of social difference not entirely of its own making. Feminist scholars have long observed how strategies to shift the mix of relative and absolute surplus value, for example, depend upon forms of "masculinizing" and feminizing" workforces.

In circuits of global production, for example, the sorts of competitive dynamics we discussed above that are rearticulating north-south and south-south networks are also shifting the mix of labor commodification, forms of power (e.g., exploitation or domination), and social difference at the heart of surplus extraction. As suppliers in the global South respond to pressures to incorporate more complex functions, processes or higher value products for markets in the global North, they have created more fine-grained stratification amongst workers. Full package garment firms in the global South (i.e., firms that coordinate the main functions of production), for example, navigate the quality, cost, and lead time demands of "fast fashion" by employing a mixed workforce of permanent, better remunerated workers, on the one hand, and temporary, poorly paid workers, on the other. The temporary workforce concentrates structurally devalued labor, such as immigrants, and, in some sectors, also relies upon a gendered hierarchy of labor (Plank, Rossi and Staritz 2012; Rossi 2013).

These patterns can also be found in the nodes of global production networks generally concentrated in the global North. In the case of integrated warehousing and distribution centers in the U.S., for example, firms secure their position through subcontracting chains that facilitate an accordion-like proliferation of categories of temporary work, tiered by length of employment contract (from months to weeks to single shifts). In this industry, workers are made precarious by their gendered and racialized social location, reinforced by the criminal justice system (Gutelius 2015). Following Chase-Dunn, scholars must consider the implications for class politics of this kind of fragmentation of paid labor that mobilizes broader mixes of commodified labor along the spectrum in the different zones of the global hierarchy, and what this signals for the sorts of interactions that are taking placing between core and periphery regions.

In Global Formation, Chase-Dunn points out that, "it is not the operation of a perfect labor market which determines proletarian status, but the subjection of labor to the logic of profit making, and this is accomplished by a wide variety of institutional means" (41). We could not agree more. The challenge for contemporary analysis is to reconcile this observation with the mounting evidence that much labor simply cannot be exploited directly by capital; the colloquial notion of unemployment is of course an approximation of the condition of labor's non-value or waste vis-à-vis capital. As Marx wrote "the relative surplus population is… the background against which the law of demand and supply of labor does its work" (1976: 792). Our contention is not that today's "reserve army" is an absolute outside to capital; rather, at the margins, capital appears to operate through the iterative inclusion and exclusion of vast populations, reworking colonial legacies, "remnants" in Chase-Dunn's global formation, in contemporary times. As Gidwani and Wainwright observe, "the modal condition of work within postcolonial capitalism is not absolute expulsion of vulnerable populations from capital's "reserve army" but rather, the spatio-temporal flux in and, hence, tenuousness of, capital's embrace" (2014: 45). Chase-Dunn is keenly aware of these tensions, and the political possibilities and perils they create (Boswell and Chase-Dunn 2000), including, as we discuss briefly in our concluding section, in the core of the world-system.

Boundary-Drawing and the New Politics of Uneven Development in the North

Global Formation not only provides an exhaustive review of the ways in which the hierarchy between the (relatively) more commodified/more protected core and the (relatively) less commodified/less protected periphery is structurally maintained; Chase-Dunn also explains why the maintenance of this hierarchy is necessary—namely, because "of the political effects which exploitation of the periphery has in the core" (244). Here, Chase-Dunn draws out the connection between the dynamics of uneven development at the global level—those which produce "core" and "peripheral" countries—with those occurring *within* countries. From the perspective of the world-system, the surplus that is extracted from the periphery fuels capital accumulation in a

number of ways, but one important way that it does so is by "promoting a relative harmony between capital and important sectors of labor in the core" (42). Uneven development is, in this sense, an ongoing form of global redistribution from periphery to core, which attenuates class conflict in the latter by sharing a portion of the system's rewards with privileged workers (predominantly white and male under Fordism) in core countries.

In revisiting *Global Formation* during the 2016 U.S. presidential campaign, and in the immediate post-election period, we were struck by the way in which Chase-Dunn's analysis of the world class system speaks to the recent surge in populist politics in core countries (though not only). We make this observation with some trepidation, since these political developments are varied, complex and emergent. Nevertheless, we were particularly intrigued by Chase-Dunn's observation that because "class harmony" in the core is based, in part, on the benefits that core workers derive from the exploitation of the periphery (42), changes in the core-periphery dynamic are likely to impact, potentially dramatically, class relations within the core.

Here, Beverly Silver's generative framing of boundary-drawing can be put into fruitful conversation with Chase-Dunn's formulation of interacting class relations, the spectrum of labor, and core and periphery arrangements. The notion of boundary-drawing as a modality of class relations crystallizes the relationship between spatial and social difference that we take to be the beating heart of uneven development. While world-systems theory has tended to focus on the core-periphery hierarchy as the central boundary delineating those who are "cut in" from those who are "left out," we must also focus on the boundary-drawing that is occurring within the core, where race, ethnicity, gender, sexuality and other forms of social difference become discursively mobilized lines of demarcation, intended to separate those entitled to lay claim to a piece of the shrinking pie from those who are not.

In an article written some twenty years ago, Immanuel Wallerstein gestured towards this kind of boundary-drawing when he reflected on the "counterattack" then being waged under the sign of neoliberalism. This counterattack was, first and foremost, about resisting the costs associated with redistributive demands coming from two quarters: the Western working classes, which sought to preserve and extend the elevated standard of living they had experienced in the post-War period, and the citizens of the global South, who were increasingly seeking the rights and privileges that had already been extended to the working classes of the core. In the 1970s, in the content of decolonization, newly independent countries in Asia and Africa clamored to be cut in on the "global New Deal" undergirding U.S. hegemony (Arrighi 1994; 2000). But rather than the realization of the New International Economic Order sought by the G-77, the 1980s brought the ascendancy of Reagan and Thatcher, whose policies "signaled a major reversal of strategy by the privileged classes… a return to the pre-1848 strategy of handling workers' discontent by

indifference plus repression" (Wallerstein 1995: 26). Writing in 1995, Wallerstein imagines the state of politics a few decades hence and predicts the following:

> We will have social structures in Europe and North America…in which the 'working class' will be disproportionately composed of non-White workers, probably outside the trade-union structures, and even more probably without basic political and social rights. At the same time, the children and grandchildren of today's union members will be 'middle class'—maybe unionized, some doing well, and others less well (and there-upon more likely to be engaged in right-wing politics). Looked at from outside, we will have returned to the pre-1848 situation, in which, within the traditional loci of the liberal state (Western Europe and North America), the 'workers' will be poorly paid and outside the realm of political and social rights. Western workers will once again have changed, and the class struggle will be a race struggle. The problem of the twenty-first century will be the problem of the color line" (26-27; emphasis original).[5]

Wallerstein is imagining a political moment in which racialized resentment and similar forms of boundary-drawing articulate a desire to get "cut back in" at others' expense, to recover the privileges long associated with being on the right side of the world-system boundary separating the haves from the have nots. In short, we read Wallerstein's formulation of the twenty-first century color line as an effort to understand how social and structural difference are linked via material and ideological practice within the global formation that Chase-Dunn's work has done so much to illuminate.

By way of closing, we would acknowledge how deeply our reading (and re-reading) of *Global Formation* has been influenced not just by the particular set of theoretical and empirical concerns that we are pursuing in our work, but also by our own interdisciplinary collaboration, which aims to put critical, and especially feminist, economic geography in conversation with structural political economy in order to understand the nature of uneven development. Undoubtedly, other readers will draw very different insights and inspiration from Chase-Dunn's rich and wide-ranging inquiry into the nature of the world-system. For us, Chase-Dunn's work has been, and continues to be, an important resource to draw on in working towards a deeper understanding of what Jamie Peck (2016: 318) has described as the promise of uneven development: "The true potential of

[5] Arrighi and Silver cite this same passage from Wallerstein in their own highly prescient discussion of the political perils posed by an increasingly financialized world economy: "Even the most enthusiastic supporters of interstate competition in globally integrated financial markets have begun to fear that financial globalization is turning into a brakeless train wreaking havoc. They worry about a mounting backlash against the effects of such a destructive force, first and foremost the rise of a new brand of populist politicians fostered by the mood of helplessness and anxiety that is taking hold even of wealthy countries" (2001: 273).

theories of uneven development, in this respect, is not to fold difference into some singular and enveloping logic of systemic reproduction, but to gather difference in a manner that is constitutive but never closed, understood as an engine of transformative change with the ever-present potential to disrupt, remake, and reformat "from below," and therefore displaying parametric patterns while retaining the capacity to break (out of) them."

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The Semi-Periphery, World Revolution, and the Arab Spring:
Reflections on Tunisia

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Global Formation: Structures of the World-Economy (1989, 1998) is Chase-Dunn's celebrated book, and students in the political economy course I have taught over the years have found this theoretical book as challenging but instructive as I did when I first read it. This is where I learned about Kondratieff waves, as well as the relationship of economic cycles and war. But it is the elaboration of the semi-periphery that I found most illuminating. Indeed, in my judgment, theorization of the semi-periphery is one of the most significant conceptual contributions to our understanding of both the global economy and cycles of contention. Coined by Immanuel Wallerstein, it has been extended historically and further elaborated by Chase-Dunn and his colleagues and students. Analyses of the newly-industrializing countries (NICs), the group of countries known as BRICs (Brazil, Russia, India, and China, with South Africa sometimes included), and the Latin American "pink tide" that began in the early 21st century—as well as debates on the rise and fall of hegemons—have been enriched by application of the concept of semi-peripheral development.

What I find especially interesting is the correlation of semi-peripheral development with both the evolution of capitalism and the emergence of revolutions and rebellions. As Chase-Dunn explains in *Global Formation* and elsewhere, the semi-periphery is the weak link in the world-

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system. This notion helped me to better understand and explain the Arab Spring protests. In this paper, I draw on Chase-Dunn's writings on the semi-periphery and world revolution to reflect on Tunisia's role in the Arab Spring protests and the world-systemic constraints that it has faced in the years since. I end with some comments on female labor in the world-economy and on Chase-Dunn's approach to culture in the world-system.

Semi-Peripheral Development

In two papers produced in 2012 and 2013 that focused on Latin America in the world-system, Chase-Dunn and his colleagues draw on Jeffrey Kentor's (2008) classification to include a group of small and large countries alike in the semi-periphery, among them Indonesia, Mexico, Brazil, India, China, Taiwan, South Korea, South Africa, and Israel. Of the countries of the Middle East, Turkey and two Arab countries—Egypt and Saudi Arabia—are included (Chase-Dunn and Morosin 2013, Fig. 2; see also Chase-Dunn, Garita, and Pugh 2012).[1] Earlier, in comparative work conducted with Thomas Hall, Chase-Dunn's concept of *semi-peripheral development* posited that attention should be paid to the emergence of social movements as well as to distinctive national regimes within the semi-periphery. Scholarship and the historical record alike confirm the importance of the semi-periphery in world-systemic changes (Chase-Dunn and Hall 1997). But also important is the role of certain peripheral countries in challenging the world-system's logic and especially the power of the hegemon (e.g., Vietnam in the 1970s, Iran 1979, Nicaragua in the early 1980s), as was documented in Terry Boswell's edited volume on revolution in the world-system (Boswell 1989). I would add that attention is due to smaller countries that lie perhaps at the nexus of periphery and semi-periphery. One such country is Tunisia, which launched the Arab Spring protests in December 2010 and which—some six years on—remains the one "success story" of that series of mass social protests. The challenges and constraints that the Tunisian experiment faces, however, are formidable. Here I reflect on Tunisia's relatively successful political revolution and its prospects in the context of other developments in the wider MENA region, the apparent waning of the Latin American pink tide, and the rightward shift across Europe.

The Arab Spring in the Context of World Revolutions

The Arab Spring occurred in what appeared to be global conditions propitious for major transformation. The 2008 Global Recession, which had begun the previous year with the subprime

[1] I would argue that Iran should be included in the semi-periphery, given the size of its territory and educated population, its GDP, military strength, and growing influence in regional politics and international affairs. According to data from the UNDP's 2015 Human Development Report, Iran's GDP is $1.371 trillion; its population is 77 million, of which 70% are urban dwellers; it has an electrification rate of 98%; its tertiary enrollment rate is 55% and total fertility rate is 1.9; and it has a taxation regime despite its oil wealth. Its military spending, on the other hand, is much lower than that of Saudi Arabia or Israel.

mortgage meltdown in the United States, spread throughout the financial markets of the core countries and eventually enveloped the Global South countries. Ordinary citizens experienced food and fuel price increases, along with job, income, and housing losses, while banks and corporations were provided with bailouts by their governments. To deal with the crisis, governments instituted austerity measures. A number of studies had already analyzed growing income inequality in the core countries, and especially in the United States, and some had sought to show the advantages of greater social equality (*e.g.*, Wilkinson and Pickett 2009). Processes associated with neoliberal capitalist globalization culminated in the Arab Spring protests of early 2011, the anti-austerity protests in Europe that summer, and Occupy Wall Street in the United States that fall. There followed much public debate concerning the future of capitalism (see, *e.g.*, Foroohar 2016; Ostry *et al.* 2016) and the rise of new anti-globalization political parties on the left as well as the right.

The revolts that emerged in various Arab countries in early 2011—in Tunisia, Egypt, Morocco, Bahrain, Libya, Syria, and Yemen—were rooted to some degree in the world-systemic developments mentioned above, although each had its own specific grievances, objectives, and tactics. Socio-economic grievances were most prominent in the slogans, banners, and public demands of Tunisia and Morocco, and to a lesser degree Egypt. In those countries, too, the protesters engaged in non-violent collective action.[2] And yet, when the Arab Spring gained momentum in 2011, some scholars argued that it had come as a complete shock and surprise and that the downfall of such authoritarian regimes was thoroughly unexpected and unpredicted.[3] This may have been because of the research approaches many scholars had taken. Some had devoted considerable time to ethnographies of everyday life. Others had been studying the "moderation" and parliamentary turn of Islamist movements. Yet other scholars had been preoccupied with analyzing "state robustness" and "authoritarian resilience". Many such studies, while elucidating important aspects of societies and polities in the Middle East and North Africa, rarely examined either the activities of civil society and oppositional movements (other than the afore-mentioned Islamist movements) or the world-system's pressures on Arab states and societies. Analyses of "social non-movements" and "authoritarian resilience" seemed to overlook the successful social revolution in Iran in 1979, the labor protests that occurred periodically in Egypt and Tunisia, and the role of the U.S. and U.K. in the 2003 invasion and occupation of Iraq and the downfall of the Saddam regime. They also elided the anti-authoritarian social movements of Latin America that had peacefully overthrown brutal military dictatorships and ushered in democratic transitions in

[2] There was some violence in Egyptian towns, where protesters attacked police stations, and assaults on women protesters in Tahrir Square.

[3] The conference on "Seasons of the Arab Spring", held at the University of Pittsburgh on 28-20 March 2012, included three speakers who emphasized the "unexpected" nature of the protests and the regime changes in Egypt and Tunisia.

the 1980s and 1990s. Contrary to the aforementioned approaches, it was in fact just a matter of time before Arab countries would produce pro-democracy movements.

Chase-Dunn has pointed out that instead of the sort of violent revolutions or coups that predominated in the past, the new global left movements have preferred peaceful protests and the ballot box. We witnessed that in Latin America in the early part of this century, where the coming to power of left-wing governments in the wake of strong social movements raised the hopes of many across the globe. We also witnessed peaceful protests during the Arab Spring and a preference for the ballot box afterwards, especially in Tunisia and Morocco.[4]

The widespread protests, the regime changes in Tunisia and Egypt, and the *mouvement 20 fèvrier* in Morocco generated emotions of joy and hope among citizens and many interntional supporters. In particular, Tunisia's "Jasmine" or "Dignity" revolution of 2011 quickly established procedures for its democratic transition. To paraphrase Chase-Dunn, there was both motivation and opportunity for semi-peripheral democratic socialism in Tunisia. Moreover, Tunisians' demand for dignity during their revolution could inspire people around the world mired in precarious or exploitative conditions, yearning not only for material needs but for a redefinition of the public good and of what it means to be human together. In my own work, I hypothesized that the Arab Spring—along with the World Social Forum, Occupy Wall Street, the European anti-austerity protests, and the many transnational advocacy and activist networks that had constituted global civil society—could constitute a fourth wave of democracy. I had borrowed the notion of "democracy waves" from Samuel Huntington's work (1992) but was also cognizant of the socialist nature of various revolutions across time and space as well as the role of imperialism in failed revolutions. I thus constructed a table, which Chase-Dunn kindly commented on, that highlighted successful and failed democratic revolutions, along with the relevant "external impositions" (Moghadam 2013, Table 3.1, pp. 72-73). Though hopeful about the Arab Spring, I also had reservations and concerns, which are discussed below.

Could the Arab Spring have been part of what Chase-Dunn and his colleagues have called the "spiral of capitalism and socialism", their conceptual alternative to Karl Polanyi's double-movement? The coming of the new millennium seemed to feature "the New Global Left" and the possibility for "the World Revolution of 20xx" (Chase-Dunn and Morosin 2013). World revolutions are time-bound clusters of local, national, "and transnational struggles. Their relationship to the evolution of capitalism and its institutions has been elaborated in a number of publications (Boswell and Chase-Dunn 2000; Chase-Dunn 2010; Smith, Karides et al 2014) as well as in the many working papers on the UC-Riverside website. Chase-Dunn notes that the world

[4] Morocco had been experiencing a very gradual form of democratization since 1998, when a progressive political party came to power, though it lost in subsequent elections.

revolution of 20xx has been primarily a reaction against the neoliberal globalization project. It began with the anti-IMF riots that broke out in the 1980s when the Structural Adjustment Programs caused prices of food and transportation to rise in many of the cities of the Global South. It re-emerged with the 1994 Zapatista revolt, and in the new century continued with the Latin American pink tide, the World Social Forum, the transnational social movements against globalization, and the anti-austerity protests of 2011.

How does this align with earlier world-systems analyses of revolution? Arrighi, Hopkins and Wallerstein (1989: 19) wrote of "two *world* revolutions" (emphasis in the original)—1848 and 1968—both of which failed but also transformed the world. As they point out, "the bubble of popular enthusiasm and radical innovations was burst within a relatively short period" (20). The 1848 revolution, they write, institutionalized the Old Left and was a dress rehearsal for the Paris Commune and the Bolshevik Revolution; 1968 institutionalized the new social movements but Arrighi, Hopkins, and Wallerstein leave open the question of what it prefigured. They acknowledge the new social movements' priorities and identities, including gender, generation, ethnicity, race, disability, sexuality. But they assert that "the contradiction between labor and capital, given both the increasing centralization of capital and the increasing marginalization of large sectors of the labor force, will remain elemental" (28). In light of what we know about income inequalities, obscene CEO compensation, stagnating wages, and precarious forms of employment, this prescient comment is even more applicable to today's world.

The Arrighi, Hopkins, and Wallerstein paper was written prior to the collapse of the Soviet Union and communist parties in Eastern Europe, and in my judgment, it is doubtful that the great student and anti-imperialist uprisings of 1968 were a dress rehearsal for the revival of liberal capitalism in the former communist bloc. It seems more appropriate to call 1968 a dress rehearsal for the events of the new century—the anti-globalization protests, the World Social Forum, and the Latin American pink tide starting in 2001; and in 2011, the Arab Spring, the European anti-austerity summer, and the American Occupy Wall Street encampments—what I referred to as democracy's possible fourth wave and what Chase-Dunn refers to as the world revolution of 20xx.

At the same time, I was aware of the limitations of the Arab protest movements and so-called revolutions. In 2011 and 2012, the role of Islamists in Egypt, Libya, and Syria seemed to foreclose any progressive outcome, and as I had written earlier, Islamist movements have no quarrel with capitalism or even its neoliberal version. Apart from the open calls in Morocco and Tunisia for decent work, better education and healthcare, and more equality, none of the protest movements advanced anything like a program for social and economic justice. A turn similar to the Latin American pink tide of the early part of the century, therefore, seemed unlikely (Moghadam 2012).

In fact, not all Arab countries could produce effective pro-democracy movements, revolutions, or democratic transitions. Past scholarship has identified certain prerequisites,

including a level of economic and societal modernization, pre-existing repertoires of collective action, and a mobilizing ideology (Foran 1997; Hadenius and Teorell 2005; Moghadam 2003; Pzeworski et al. 2000; Welzel 2006). As such, and given the political, economic, and societal diversity across the Arab region as well as countries' varied locations and logics within the capitalist world-economy, some countries more than others would be better able to sustain a pro-democracy movement, revolution, and transition. Those countries with large educated middle classes, historic left-wing political parties, established feminist groups, and modern political institutions—countries with populations that could be part of what Chase-Dunn and others called the New Global Left—were best placed to effect progressive social change. Most of the Arab countries involved in or affected by the Arab Spring protests could not experience such progressive social chage, as a result of both endogenous and exogenous factors and forces.

In Bahrain, the disenfranchised Shia majority protested its second-class citizenship, and that particular social movement was repressed with the assistance of Saudi Arabia's military intervention. In Libya and Syria, demands for regime change were met with state repression and quickly escalated into violent contention. Following a flawed Security Council resolution, NATO helped crush the Qaddafi regime, but what followed were chaos, terrorism, and a failed state. The same core countries that had been behind the Libyan fiasco—the U.S., U.K., and France, along with their regional allies among the Gulf states and Turkey—then began to support the anti-Assad rebels. The Syrian state, however, has proven to be rather more difficult to crush than the Libyan state. In Yemen, complicated internal tribal politics opened the way for Saudi military intervention. Yemen, too, is now a failed state, while Saudi Arabia, the ally of the major core countries, has not faced the opprobrium of the world's governments for its relentless bombardment of Yemen.[5]

Initially, there were great hopes for Egypt. But that country lacked the necessary prerequisites for a successful democratic revolution, much less a women-friendly one: its largest political party was a conservative Islamist party that wanted to impose Islamic law; its military had always been strong and interventionist; its civil society had not been allowed to flourish; too many citizens looked to the military for solutions; it did not have the kind of robust feminist movements that had developed in Morocco and Tunisia; and poverty and illiteracy, along with crony capitalism and state repression, had precluded the diffusion of democratic values among the population. In Libya, Syria, and Yemen, too, violence and chaos seemed to be the preferred strategies, and those countries lacked both a strong female presence in the public sphere and prominent feminist

[5] In what can only be described as a craven gesture, particularly in light of Saudi Arabia's destructive air assaults on Yemen, UN Secretary-General Ban Ki Moon agreed to remove Saudi Arabia from the list of countries whose armies harm and kill children, admitting he did so after the oil-rich kingdom threatened to withdraw funding from various UN projects. See http://www.nytimes.com/2016/06/10/world/middleeast/saudi-arabia-yemen-children-ban-ki-moon.html?_r=0

movements (Moghadam 2017). To summarize, apart from Tunisia and Morocco, the other experiments of the Arab Spring were met by fierce repression and authoritarian reversals (Bahrain, Egypt), descended into failed states (Libya, Yemen), or morphed into internationalized civil conflicts through pernicious external intervention (Syria, Yemen).

Was this the end of what one scholar called *The New Arab Revolutions that Shook the World* (Khosrokhavar 2012)? Or was the Arab Spring "the end of postcolonialism" (Dabashi 2012) and the beginning of a protracted revolutionary process (Achcar 2013)? With their successful appeals for Western help, the rebels in Libya and Syria could hardly be called harbingers of the end of postcoloniality or the agents of an open-ended, permanent revolution. And the Arab world has not so much shaken the world as it has been profoundly shaken by hegemonic interventions. The chaos in Libya, Syria, and Yemen are the result not only of domestic divisions but also of world-systemic factors such as the significance of particular countries in the global oil market and the assertion or reassertion of core influence and hegemonic power. One need only recall the 2003 invasion and occupation of Iraq, but also wonder at the repetition of such violations of state sovereignty and of international law: the NATO role in the collapse of Ghaddafi's Libya; the unilateral decision by the governments of France, the UK, and US that Syria's "Assad must go"; the impunity of the West's regional ally Saudi Arabia in death, destruction, and famine in Yemen. All of this has created a vacuum for the growth and spread of Islamist terrorists such as ISIS/ISIL/Daesh.

In 2011-12, of all the Arab Spring "revolutions," only Tunisia's could be considered part of the contemporary world revolution. But what kind of a democracy was to be crafted in Tunisia? That was the big question of 2011-14. On matters other than respect for religion, most Tunisians would be on the left side of the political continuum, certainly on matters of social rights, a welfare state, and the responsibility of government toward its citizens, as well as the array of democratic rights. As a small country, its geopolitical isolation and lack of oil had saved it from the untoward attention of U.S. governments and NATO. Over the decades, Tunisia had seen the emergence of a committed left community, often underground but quite resilient, as well as a strong trade union and a small but incredibly vibrant feminist movement. Those socio-political forces had constituted various waves of democratic and popular struggles, finally succeeding in leading a political revolution in January 2011 and organizing a peaceful democratic transition culminating in a new constitution in January 2014 and elections in the fall of that year. The convening of two World Social Forums in Tunisia—in 2013 and 2015—were important signs of global solidarity as well as a way of connecting Tunisian progressives more deeply and extensively with the wider struggles for global justice.[6] During that period, Tunisian secularists, leftists, and feminists mobilized to

[6] Immediately after the political revolution in Tunisia, I contacted Chase-Dunn to urge him to ask his contacts within the International Council (IC) to hold the next meeting of the World Social Forum in Tunisia. The IC did so, twice.

ensure that the parliamentary and presidential elections of fall 2014 would bring about a secular, pro-feminist, and left-leaning government. A coalition party called Nidaa Tounès won the most seats.

Tunisia's democratic republic is now home to many political parties, and its new parliamentary system is dramatically different from the pre-revolutionary era. The downside, however, is that multiple parties and a tendency toward "political party nomadism" (Labidi 2014) likely split the left-leaning vote in 2014, ensuring a larger number of parliamentary seats for Ennahda than progressives and feminists had hoped for. Some of the progressives from the 2011-2014 National Constituent Assembly, including a number of impressive women deputies, lost their seats in the fall 2014 parliamentary election, although the far- left Front Populaire had a strong showing, winning a respectable 15 seats in the new parliament.

Whither Tunisia?

Despite what initially appeared to be cracks in the viability of the capitalist world-system and conditions propitious for major transformations, the social protests of 2011 were not able to undermine the neoliberal global order. Nor were the powerful core countries willing to allow the Arab Spring protests to run their course organically and without external interference. Moreover, the one Arab country that peacefully overthrew its government and sought to establish a viable social democracy—Tunisia—has struggled ever since.

Tunisia was affected by the world-economy in ways that make its democratic transition not only challenging but susceptible to neoliberal impositions. In the 1980s and 1990s, manufacturing was by far the most female-intensive sector of the economy and the labor force, and by the mid-1990s, the expansion of light assembly-type manufacturing had drawn in large numbers of women into employment (Moghadam 1998: 68). Production of garments in Tunisia had close links with enterprises abroad through foreign direct investment, foreign contracting and localization in export-processing zones. As in other countries, such firms employed a relatively high share of women workers. The success of the Tunisian garments industry was, however, contingent on special trade policies giving it preferential access to the European Union (EU) market. With the end of the Multi-Fiber Agreement and the integration of Eastern Europe into the EU, Tunisia lost its privileged position and the performance of the garments industry gradually deteriorated. Tunisia continued to rely on EU markets, but then the Great Recession took a toll, mainly because of the garment sector's dependence on southern EU markets. The total share of women in the total industrial workforce declined thereafter, though women continued to make up a large proportion of what had become a low-wage, low-value manufacturing work force.

The Great Recession and closure of plants contributed to both unemployment and the "discouraged worker" effect, but so did the turn to "flexible" labor markets. In the years leading

up to Tunisia's revolution, flexibilization had resulted in the proliferation of short-term contracts and working conditions in the private sector that set it apart from, and far less attractive than, public sector employment. Educated young people faced private-sector demand for low-wage, low-skill, replaceable labor, which they preferred to avoid. The unemployment rate, which had begun to rise in the 1990s, took on alarming proportions in the new century, especially among the country's youth and women.

Tunisia's 2011 revolution raised hopes for new political and economic directions. But subsequent political upheavals, combined with the global recession, have created deteriorating economic conditions. In the wake of the revolution, and in the context of the region's political instability, investments sharply declined in almost all sectors; FDI flows decreased by 29% in 2011 and 182 foreign firms—Italian, French, and German—closed, leading to the loss of 10,930 jobs (Ayadi and Mattoussi 2014: 6). The decline of FDI was also severe in the tourism sector. Tunisia is heavily reliant on travel and tourism, but tourism receipts plummeted after 2011, especially following the two spectacular terrorist attacks on tourists in 2013. To get a sense of the tourism sector's importance, despite its contraction after 2011 and the loss of some 72,000 jobs since the high point of tourism-related employment in 2008, the sector accounted for 11.5% of jobs and 12.6% of GDP in 2015.[7]

An analysis of Tunisian responses from the 6th wave (2010-2014) of the World Values Survey, a 2015 Pew Research Center survey, and the 2016 Tunisian Social Observatory shows that the socio-economic frustrations of Tunisian citizens, along with declining confidence in institutions and numerous strikes across the country, are threatening to derail Tunisia's democratic transition. Young people in particular are disillusioned by the high rates of unemployment (15% total, 31% for recent higher-education graduates) and 80% of them surveyed reported that they did not vote in the 2014 parliamentary elections. The majority of Tunisians surveyed (62%) say that their country needs a stable political system, even if there is a risk it will not be fully democratic (Yahya 2016). My own interviews, conducted annually since 2012, reveal great pride in the new freedoms of expression and association but also dismay at continued economic difficulties. They also confirm that the qualities Tunisians seek in a democracy are a mixed economy, state aid to reduce unemployment, choice in leadership, women's rights protection, redistribution through taxation, mixed public/private ownership of businesses, and civil rights protection (Yahya 2016).

In early 2016, the Tunisian government was compelled to turn to the IMF, reaching an agreement for a $2.8 billion bailout to cope with economic and political transitions and to help

[7] For details, see World Travel and Tourism Council http://www.wttc.org/datagateway/; see also http://www3.weforum.org/docs/TT15/WEF_Global_Travel&Tourism_Report_2015.pdf.

fund its new 2016-2020 Development Plan (République Tunisienne 2016). The Plan, endorsed by the IMF, sets a number of goals for the productive capacity of the economy. The main ones are to:

- Promote modern agriculture, food processing and food security
- Protect natural resources
- Promote the knowledge economy, including transforming 50% of universities into STEM (science, technology, engineering and math) institutions
- Promote tourism, including cultural and health tourism
- Expand the health sector, with emphasis on preventative medicine, regional hospital poles and medical research
- Increase the size of the social care sector (kindergarten enrollments to rise from 35% in 2015 to 53% in 2020), child protection, sports and home-care support provision
- Support culture and media production

The goals are admirable, and it is notable that the Plan is the product of a wide-ranging social dialogue that included the UGTT. This is a testament to the ongoing efforts at genuine democratization in Tunisia. In addition to acknowledging the significance of the social care sector, Tunisia's government recognizes the important role that women play in economic and social development, and thus plans to increase the female share of the labor force to 35 percent by 2020. But it is as yet unclear as to how the goals will be carried out, under what labor market conditions, and how far the IMF bailout will revive Tunisia's economy. At a time when progressive political parties and movements are struggling in Europe, Latin America, the U.S., and the Middle East, what kind of global environment can support and sustain Tunisia's democratic transition, not to mention more expansive social transformation? This much seems clear: Tunisia's predicament confirms the argument of dependency theorists regarding the adverse effects of foreign investment on long-term national economic development and growth (Chase-Dunn 1998: 67-68). It also confirms Chase-Dunn's argument that peripheral dependence on equity investment and through debt serves to reproduce global capitalism and the core/periphery hierarchy (*ibid*: 255).

The Middle East and North Africa is not the only region with political turmoil, economic difficulties, deadly conflicts and the outpouring of refugees fleeing war or unemployment. Youth unemployment remains very high in southern Europe, and many Europeans have turned against the massive waves of migration from sub-Saharan Africa and Afghanistan as well as from Arab countries, just as many Americans oppose the continued migration into the U.S. from Mexico and Central America. Globalization may be under attack by populist movements but neoliberal capitalism remains intact. The BRIC countries seem to have lost some of the economic dynamism for which they had become known, and the Latin American pink tide seems to have receded with the rightward turn in Argentina and Brazil, the implosion of Venezuela, and the endorsement by

Chile, Mexico, and Peru of the Trans-Pacific Partnership (see Bello 2016). Instead of progressive semi-peripheral countries with international clout, we have Saudi Arabia.

These new developments raise a fundamental question: At a time of violent conflict and economic failures in so many parts of the world—in the Middle East, sub-Saharan Africa, Central America, and the inner cities and isolated small towns across the U.S.—what is the future of the contemporary capitalist world-system? Here Chase-Dunn has given us a number of alternative futures: continued U.S. hegemony, global collapse, or global democracy. Each of these possibilities can realistically come to pass, though I would most definitely prefer the third option (actually, a socialist global democracy).

And this is why attention to countries like Tunisia is important. What Tunisia is going through is a microcosm of the travails of the world-system and the three possibilities that Chase-Dunn has laid out. The organized terrorism that revealed itself at the start of this century, when 19 young men—15 of them Saudi citizens—attacked the United States, only escalated after the invasion of Iraq, the overthrow of Ghadafi and the destabilization of the Syrian state. As noted, Tunisia has suffered several terrorist attacks, two of them on foreign tourists, thus undermining the tourism industry. On the economic front, Tunisia remains dependent on the core. Without financial assistance from the capitalist West, it could collapse under the weight of economic difficulties, along with the demands and actions of the poor, unemployed, and marginalized.

Conversely (and in keeping with Chase-Dunn's third option), Tunisia's government, its civil society, and its progressive political parties could receive international solidarity and support from other forward-looking semi-peripheral countries and of course from progressives everywhere in order to keep it safe from both imperialism and Islamism, part of the Global Left, and a successful participant in the 21st century world revolution. As Chase-Dunn rightly notes, the combination of the resources of the semi-periphery and the transnational social movements is structurally advantaged to take the lead in the movement toward global democracy, which would include a world-economy of a new type. And yet, with the rightward shift in so many European countries and with the apparent demise of this century's Latin American experiment with social democracy and progressive politics, this outcome seems unlikely in the foreseeable future.

On Female Labor and Women's Mobilizations in the World-System

I would be remiss if I did not turn to one important dimension of the semi-periphery and the world revolution that is sometimes neglected in world-systems analyses, which is the role of female labor and women's mobilization. To his credit, Chase-Dunn does include feminist political economy in the various projects that he launches, including my own (see, e.g., Chase-Dunn and Babones 2006), and in *Global Formation* he discusses the implications of Kathryn Ward's research on the effects of investment dependence on the status of women and fertility rates. Moreover, the book by

Boswell and Chase-Dunn (2000) acknowledges the progressive nature of the women's movement, although it does not elaborate on its character, activities or demands. Global accumulation may run along the axes of core, periphery, and semi-periphery, but as many feminist social scientists have pointed out, it also depends crucially on divisions of gender and class and race/ethnicity. In particular, the varied forms of female labor—situated as they are along the many nodes of global commodity chains—contribute significantly to the world's surplus value (Bair 2010; Dunaway 2001, 2014). Equally important is the rising of feminist consciousness and political activism in the semi-periphery and the more advanced periphery. Again, Tunisia is an example. The absence of oil or other natural resources was both a curse and a blessing. The downside was that Tunisia could not become a rich or high-income semi-peripheral country. But the blessing was that it had to diversify its economy and rely on female labor to produce growth and development—which in turn created a strong and committed educated female middle class that formed or joined feminist organizations and members of the proletariat who became unionized. By international standards its female labor force participation rate is not high, but the large proportion of women in leading industrial sectors (notably export manufacturing) and in key domains such as the arts, medicine, the judiciary, and academia is impressive. It is precisely that female population which has been leading the movement for genuine democracy in Tunisia. And at the global level, too, employed women, whether in production or in the professions, can be relied upon to be the most consistent proponents of a left social democracy (Walby 2009).

Uniquely, female labor is situated in both production and reproduction spheres. Mainstream economics, and much popular thinking, tend to separate the market economy (the financial market and the "real economy") from social and natural reproduction. What is therefore overlooked is the hierarchical relationship between paid labor (performed by men and women alike) and unpaid care work (provided mainly by women). Whereas the financial market and real economy are defined as productive and value-adding institutions, it is assumed that care work is unproductive and extra-economic and does not create value. To some extent this parallels the distinction between surplus value and use value in Marxian theory. As such, theory and conventional wisdom project capitalism—whether industrial or financial—as *dis-embedded* from social relations, a point made by Marx and later by Karl Polanyi. In actual fact, the sphere of social reproduction is intimately tied to the sphere of production and to value creation in at least two ways. First, care work—such as childcare and elder care—subsidizes the reproduction of labor power and provides a kind of cushion for surplus-value creation. It also absorbs the effects of cuts in social spending or the absence of social provisioning. Secondly, capital accumulation processes appropriate care work either without remuneration or by underpaying those who provide personal or social services such as childcare and elder care. Let us note that childcare is provided by mothers or female kin, migrant nannies, and low-paid minders, and that elder care is usually performed by a female family member

or a low-paid immigrant or minority worker. In this way, capitalism is very much embedded in the social relations of gender, class, and ethnicity.

Female labor has been central to the making of the capitalist world-system's semi-periphery, and women's political mobilizations will play a similar role in our future global democracy, just as women's mobilizations in Tunisia helped ensure a relatively smooth democratic transition. As in Wilma Dunaway's work, we need to consider the fundamental role of gender in global commodity chains, identifying the crucial role that social reproduction plays in production, declaring the household as an important site of production, and affirming the importance of women's work in global production.

The World-Economy and Cultural Contestations

Christopher Chase-Dunn's contributions to sociology, to world-systems theorizing, and to progressive thought are far-reaching. In *Global Formation*, his chapter on culture is brilliant, and his argument there was solidly confirmed by my experience and observations at UNESCO, the United Nations Educational, Scientific, and Cultural Organization.

I have twice worked for the UN, and at my second UN job, this time with UNESCO in Paris, I was privy to a set of deliberations by member-states attempting to protect their cultural heritage, products, and expressions in an era of free trade. A new convention was in the making, and I decided to do something that a UN staff person is not supposed to do—take notes and publish a paper on the subject of the deliberations. Actually, it was after I had left UNESCO that the paper was finalized and published (see Moghadam and Elveren 2008), but while I was still in Paris I sent Chase-Dunn an email about my intention and asked for suggestions. Chase-Dunn suggested that I pay attention to what the semi-peripheral states were doing and saying. I had already started to do that, through interviews with members of the national delegations and a review of the votes cast. I found that the semi-peripheral countries were key to the isolation of the US and Israel—the only two member-states to vote against the proposed convention—and to the success of the convention. Of course, *la francophonie* (led by France) was at the center of the protectionist camp, but so were semi-peripheral countries such as India, Brazil, Iran, Venezuela, Russia, and Mexico. My work at UNESCO—the UN agency that most emphasizes universal values—and my observation of the deliberations on the culture convention did confirm the presence of what world culture theorists argue is a kind of "shared modernity," or institutionalized norms that account for the stability of the interstate system.

However, the UNESCO convention delegated to the WTO any mediation over violations to the convention. Toward the end of the lengthy deliberations, it became clear to me that the neoliberal world order would trump the protection of cultural expressions and products—despite the passionate speeches made by many delegates about the importance of their tangible and

intangible cultural heritage and the pitfalls of commodification. The making of the convention confirmed the presence of a hierarchy among the institutions of global governance that mirrors that of the world-system of markets and states—a hierarchy that is sometimes contested in important ways but typically accepted by the semi-peripheral states. Chapter 5 of *Global Formation* is entitled "World Culture, Normative Integration and Community." While paying tribute to John Meyer, his former professor and the intellectual founder of the world society perspective, Chase-Dunn takes issue with some of the theory's postulates regarding culture and world society. He concedes the presence of a world culture but argues that normative rules are not as strong and binding as Meyer and his colleagues have argued. Instead, "the capitalist world-system is integrated more by political-military power and market interdependence than by normative consensus" (88). My experience at UNESCO, and especially my observations of the deliberations around the convention on cultural protection and the final transfer of decision-making power to the WTO confirmed Chase-Dunn's assertion that normative and value-based consensus does not play a strong integrative role in the dynamics of the contemporary world-system (104).

Let me end by saying how much I appreciate Chase-Dunn's optimism. Given my own, more pessimistic disposition, I find his historical approach to waves of capitalist accumulation and popular struggles and his hopeful view of a future global social democracy to be a breath of fresh air. As he writes at the end of *Global Formation*:

Socialism is not the utopian end of history. It is simply the next progressive step, as was capitalism. Socialism is not inevitable or perfect, and neither is it immutable. But it is certainly preferable to the current system of violent conflict, uneven development, and exploitation.

To which I can only add, indeed it is.

About Author

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Hegemonic Crisis, Comparative World-Systems, and the Future of Pax Americana

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World-System analysis came into being in the 1970s, when U.S. global power was being challenged seriously in the aftermath of its Vietnam War defeat and the run on the dollar following the dissolution of the Bretton Woods gold standard. In this context, the analysis of hegemonic decline in the capitalist world-system became a core theme of discussion among leading world system analysts. In the classical Wallersteinian formulation, capitalist world-system differed from premodern world empires in that the core of the system is divided among competitive states, and one of these states performed a hegemonic role at a given time period. Sixteenth-century Dutch, nineteenth-century UK, and twentieth-century US were the hegemonic states of the respective periods, enjoying commercial, political and military primacies and setting the rule of the game for other states to follow. These primacies, nevertheless, were destined to decline after they peaked, and the world-system would be pushed into a period of inter-core rivalry in which competing core states competed to become the next hegemon. To the world-systemists, the challenges that the US faced in the 1970s signaled the beginning of the decline of the US hegemony, which emerged amidst the chaos of the two world wars (Wallerstein 1984; 1974).

To Wallerstein, the capitalist world-system has reached its limit of expansion, and the crisis of U.S. hegemony is equivalent to the crisis of the system itself, and such crisis will ultimately lead to the end of the capitalist system as we know it. (Wallerstein 1979) Others who loosely follow a world-system perspective, on the other hand, assume the contest for the throne of new hegemony would proceed as usual, and they are keen to look for candidates of the next hegemon, with Germany (Europe), Japan, and China as the favorite at different times. Likewise, according to more recent works by Arrighi (1994; 2007) and Arrighi and Silver (1999), the trajectory of the end of American hegemony will likely depart from earlier hegemonic declines, and the world-system is likely to face one of the three scenarios: the dawn of protracted systemic chaos and warfare, the rise of a more egalitarian world market society let by emerging powers in Asia, and the rise of a coercive US-centered global empire.

In the theorization of the current transition and prediction of what may happen in the future of the world-system, most discussion were constrained by the limited number of cases of hegemony and hegemonic transitions. With the Dutch and UK hegemonies as the only two precedents from which we could generalize, our imagination about what is happening and what will happen amidst U.S. hegemonic decline is seriously limited. In this regard, Christopher Chase-Dunn's discovery of a wide range of premodern world-systems that follow similar dynamics of core-periphery division of labor and interstate competition or integration is a significant contribution to the debate. Itvastly expands the number of cases available for comparison, therefore leading us to a whole new range of possibilities to ponder at. At the same time, Chase-Dunn and his team's efforts to look for quantitative indicators to measure the development and cycle of world-system empirically also complement the narrative-based analysis of most other world-systemists, enabling us to decipher past patterns, even within our current capitalist world-system, that has been overlooked before.

Semi-periphery Marcher State or Second Hegemony of the Hegemon?

In Chase-Dunn's works on premodern world systems, he outlines the different formations of world-systems that coexisted and were linked to one another at different extents and levels – e.g. politico-military interaction and prestige goods trading – fall short of full-scale integration into one singular system. Sharing the common feature of a core-periphery division of labor, the core region of these system might be governed by a single imperial state, or it may be divided into competing core states. The modern capitalist world-system is no more than a special, globally encompassing case of these world-systems, and all these systems follow some similar fundamental dynamics. (see Chase-Dunn and Hall 1997) As such, Chase-Dunn and his collaborators have elevated world-system analysis to a new level, allowing us to transgress within-system comparison based on a singular system and move on to theorize over comparison between a large number of

world-systems that have ever existed. It instantly broadens our horizon in the projection of the current trajectory of world transformation and its future.

For example, Chase-Dunn and his collaborators observe that in many premodern world-systems, transformation of the system came by through the take-over by some semiperipheral or peripheral marcher state. Such take-over could be transformative, changing the fundamental structure of the world-systems involved. One prominent example is the Mongolian nomadic state in the thirteenth century. It occupied a peripheral or semiperipheral position in the steppe and managed to invade the core zones of most regional world-systems in the medieval times. Such invasion ended the fragmentation of trade routes across Eurasia and integrated different regional systems into a thirteenth-century Eurasian world-system. (Abu-Lughod 1989) Another example is the rise of the sixteenth- and seventeenth-century Manchu semi-nomadic states that invaded the Ming dynasty at the center of the Asian tribute-trade system, establishing the Qing empire that doubled the size of the Ming empire and created a more commercialized economy within the empire and throughout East Asia.

To draw from the insights of these pre-modern pattern of semiperipheral states' transformative takeover of the system, we could ask whether a similar process would emerge at the contemporary capitalist world-system. There have been works suggesting many political and institutional innovations in the modern world-system – such as universal suffrage for women, unpropertied citizens, and minorities – usually first emerged in the semiperiphery before they were adopted in the core and periphery. (Markoff 1996) More recently, increasing attention is paid to the BRICS countries, including Brazil, Russia, India, China, and South Africa, which not only command an increasing share of world GDP, but also become more active and conscious in collaborating with one another to form a power bloc shaping global governance. Besides the regular BRICS summits that started in 2009, these countries also built a multilateral BRICS Development Bank, later known as the New Development Bank, aimed at financing development projects in the Global South. Some other works find that the BRICS group has been taking the lead in transforming the many multilateral institutions they participated in, such as the WTO, by blocking or reshaping the organizations' imperatives dictated by rich countries. (Hopewell 2016). In the meantime, others argue that the BRICS countries are becoming sub-imperial powers that started their colonizing inroad into other peripheral zones like Africa, outcompeting traditional core powers (Bond 2013). Provided that the BRICS countries are not only economic powerhouses but also politico-military heavyweights mostly independent from the U.S. military umbrella, it is not far fletched to imagine that the BRICS countries will dominate world politics in unison eventually, creating another instance of semiperiphery transformative take-over, or at least overshadowing, of the core. Among the BRICS countries, China is the most economically dynamic one, and it has been a long-time autonomous and formidable military power in Asia too.

It is natural that the thinking about a BRICS takeover of the world-system would be seen as more or less equivalent to a rising Chinese domination of the system.

Another new horizon that Chase-Dunn's works open and illuminate regarding possible scenarios about the future of the world-system is the thesis about self-succession of hegemony. Built on the careful observations and data of his collaborators, Chase-Dunn points out that historically, there was not one but two British hegemonies. The first round of British hegemony was in the mid-eighteenth century, when the American colonies supported Britain's global ambition. After the fall of the eighteenth-century British hegemony following its loss of the American colonies to the settler revolutionaries, Britain expanded its colonial control of India and turned it into a new resource base supporting Britain's global hegemony. As such, the British managed to recover from its first hegemonic decline in the late eighteenth century. It successfully renewed its hegemonic power status grounded on the military manpower drawn from and economic advantage gained from British India. Based upon these insights, one could ask whether the United States could recover from its hegemonic decline since the 1970s and renew its global domination to attain a second-round hegemony. (see Chase-Dunn et al 2010; Chase-Dunn and Lawrence 2011)

As such, we are confronted with two possible scenarios of the world-system future: a semi-periphery transformative takeover of the system and a round-two hegemony of the US. Whether these scenarios could become reality depends a great deal on the evolving role of China in the world-system, as China is the single most dynamic and assertive state among the BRICS in the semiperiphery. It is also a state believed by many to be capable of leading the effort to topple U.S. global domination.

China and BRICS: Semiperipheral Challengers to the U.S. Hegemony?

Accompanying the recent economic rise of China, many have purported that the global political center of gravity has been shifting from West to East and from developed countries to developing ones. The book by British writer Martin Jacques, *When China Rules the World*, is just an example. Roger Altman, a veteran investment banker and former Deputy Secretary of Treasury of the US, published "The Great Crash, 2008: The Geopolitical Setback for the West" in *Foreign Affairs* in the wake of the global financial crisis, arguing that the financial distress of the West and the continuous robust economic performance of China is accelerating the wane of American's global power and wax of China's. Journalist Fareed Zakaria even titled his 2009 bestseller *The Post-American World*, seeing the rise of China at the expense of the United States as a global power shift comparable to the rise of the West during the Renaissance and rise of the United States in the twentieth century. Many see China as the most powerful BRICS country that has the actual

capability of leading other emerging powers to topple U.S. domination and foster a new and more egalitarian order.

But unfortunately, that talk about falling U.S. global power and the rise of China as a new superpower leading humanity out of Pax Americana is greatly exaggerated, just as how the talk of the rise of Germany and Japan as challengers to the United States back in the 1970s and 1980s was exaggerated. The decline of U.S. dominance in world politics, while true, has been slowed and delayed. U.S. share of global GDP has been stably above 20 percent and it continues to be the world's largest economy with comfortable lead, as measured in current U.S. dollar. The United States also continues to be the world's leading military power with all other military powers trailing far behind.[1]

The persisting economic and military power of the United States is attributable largely to the ongoing status of the U.S. dollar as the most widely used reserve currency and international transaction currency in the world during the last thirty years. The internationally dominant status of the dollar, which many refer to as the "dollar standard," allows the United States to borrow internationally at low interest rates and print money to repay its debt as the last resort. This capability to borrow in its own currency has been allowing the United States to solve many of its domestic economic malaises and maintain the most enormous, active war machine in the world through external indebtedness, while avoiding the kind of debt crises that have wreaked havoc on many developing economies having borrowed in creditors' currency. Ironically, the persistence of the dollar standard is now being maintained by the rise of China as the biggest foreign holder of US-dollar–dominated assets, mainly in the form of U.S. Treasury bonds.

The Dollar Standard and Pax Americana

The post–World War II global hegemonic role of the dollar was sealed in the Bretton Woods Conference of 1944, which established the gold convertibility of the dollar under the promised rate of thirty-five dollars for one ounce of gold. The stability of the resulting global monetary order in the 1950s and 1960s was warranted by America's sizable gold reserve, current account surpluses, and its unparalleled competitiveness in the world economy.

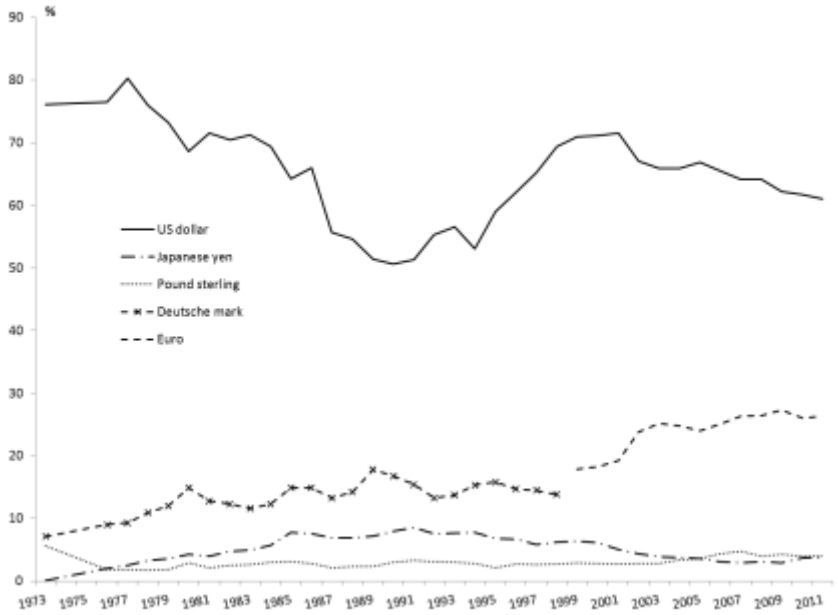
The collapse of this Bretton Woods order in 1971 can be traced back to the rising productivity of Europe, West Germany in particular, and Japan following their full recovery from the world war in the late 1960s. Increasing international competition, coupled with the rising wage demand of domestic organized labor and the escalating fiscal and current account deficits incurred by the US's troubled involvement in Vietnam, led to a run on the dollar and the outflow of gold reserves from the US. It left Nixon with few choices but to suspend the gold convertibility of the dollar in

[1] For more thorough discussion, see Hung (2015)

1971, forcing other major capitalist economies to undo their currencies' peg from the dollar. The abolition of gold convertibility allowed the United States to attempt reducing its current account deficit and reviving its economic competitiveness through dollar devaluation.

Upon the collapse of the Bretton Woods system, many predicted the end of dollar hegemony and the rise of a multipolar global economic order grounded on more or less even domination of multiple major currencies such as the yen and Deutsche mark. What is puzzling is that this predicted multipolar moment never came, and the dollar hegemony continued for four more decades until today. Even with the formation of the euro as a competitor, the dollar remains the most widely used reserve currency in the world.

Figure 1. Shares of Currencies in Identified Official Holdings of Foreign Exchange in the World, 1976-2011



Source: IMF COFER dataset

The same can be said regarding the use of the dollar in international transactions. While the dollar hegemony under the Bretton Woods system was a manifestation of US's overwhelming economic might, the lingering dollar hegemony after the Bretton Woods collapse was the most significant lifeline that the United States relied on to slow its economic decline. The post–Bretton Woods continuation of the hegemony of the dollar, as a fiat money since 1971, lasted even longer than the dollar hegemony under Bretton Woods.

Table 1. Currency distribution of global foreign exchange market turnover (percentage, total=200)

	1998	2001	2004	2007	2010	2013
US dollar	86.8	89.9	88.0	85.6	84.9	87.0
Pounds sterling	11.0	13.0	16.5	14.9	12.9	11.8
Deutsche mark	30.5	--	--	--	--	--
French franc	5.0	--	--	--	--	--
Japanese yen	21.7	23.5	20.8	17.2	19.0	23.0
Euro	--	37.9	37.4	37.0	39.1	33.4
Mexican peso	0.5	0.8	1.1	1.3	1.3	2.5
Chinese yuan/RMB	0.0	0.0	0.1	0.5	0.9	2.2

Source: BIS Triennial Central Bank Survey

The dollar's lasting prowess was first made possible by the exchange between the United States and its military allies during the Cold War period, when the former provided a security umbrella and weapons in exchange for the latter's support of the use of dollars in trade and foreign-exchange reserves. The role of U.S. global military domination in warranting the dollar standard was well illustrated by numerous episodes at the height of the Cold War, when governments of America's European allies were requested to support the dollars by increasing their purchase of dollar instruments and U.S. military supplies, paid in dollars, under the explicit threat of reduction of U.S. troops stationed in their countries.

This dollar-security nexus ensured that the dollar would remain the dominant foreign reserve currency in Western Europe and Japan. It also ensured that the monarchial and authoritarian oil-producing states, which needed U.S. protection even more, would invoice their oil exports in dollars. Large-scale governmental purchases of dollar instruments among key capitalist powers and the use of dollars in oil and arm trades accounted for the vast market liquidity of the currency, motivating private enterprises and other governments to use it for their reserves and trade settlement.

This geopolitical support of dollar hegemony remained unchallenged until the end of the Cold War, in the 1990s. With the Soviet bloc as a common security threat gone, regional powers used to being held hostage by the U.S. security umbrella tried to break free of the U.S. dollar-security nexus. The rise of the euro represented an explicit attempt to create a new currency rivaling the dollar. But Europe's continuous dependence on the United States to defend its geopolitical interests, as shown by the Kosovo War in 1999, as well as the lack of centralized monetary authority and fiscal integration in the eurozone, has been undermining the ascendancy of the euro as a true alternative to the dollar.

The Chinese Foundation of U.S. Staying Power

In 2000-2008, the dollar's credibility seemed to be threatened by an unprecedented simultaneous deterioration of the dollar value and U.S. current account deficit. This simultaneous fall is largely attributable to the rise of China as a formidable low-cost exporter to the US. The rise of China's export sector was unleashed by a series of policy changes in the mid-1990s that precipitated an expanding stream of low-wage rural migrant laborers. Such export-oriented path of growth was also facilitated by China's currency peg with the United States that keeps Chinese exports competitively cheap.

While China's export expansion led to the deterioration of U.S. current account deficit, China's large trade surplus enabled China to accumulate substantial foreign-exchange reserves. It devoted most of these reserves to the purchase of U.S. Treasury bonds, turning themselves into the largest creditor to the US. Their financing of the U.S. fiscal deficit allowed the U.S. government to expand expenditures while cutting taxes. It fueled the American appetite for Chinese exports, and the resulting increase in China's trade surpluses leading to yet more purchases of U.S. Treasury bonds. These constituted two mutually reinforcing processes of increasing Chinese exports to the United States and increasing Chinese holdings of U.S. public debt, continuously deepening the market and financial dependence of China on the US. China's massive investment in low-yield U.S. Treasury bonds is tantamount to a tribute payment through which Chinese savings were transformed into Americans' consumption power. In 2008, China surpassed Japan as the biggest foreign holder of U.S. treasury bonds, and its holding continued to escalate despite the financial crisis that broke out in Wall Street in 2008.

Table 2. China's and Hong Kong's holding of US Treasury Securities before and after the crisis' outbreak (billion dollars)

	China	Hong Kong	China & HK as share of total foreign holding	China & HK as share of total outstanding	Fed holding as share of total outstanding
End of Sept 2008	618.2	65.5	24.5%	11.8%	8.3%
End of Feb 2013	1,222.9	143.2	24.1%	12.0%	15.5%

Source: US Treasury, Major Foreign Holders of U.S. Treasury Securities database

Many expect that China's hoarding of U.S. Treasury bonds made the United States increasingly vulnerable to China, which enjoys geopolitical autonomy from Washington and does not rely on U.S. military protection like earlier leading Asian purchasers of U.S. debt have. China is theoretically capable of dumping its dollar assets anytime to induce a run on the currency, financial collapse, hyper-inflation and fiscal crisis in the US. This, if it happens, would spell the final disintegration of the dollar standard.

But upon closer examination, we will see that China's purchase of U.S. Treasuries has become a compulsion generated by its export-led model of development. China's dumping of Treasuries out of its geopolitical rivalry with the United States is unthinkable. The vested interests of China that propagated export-oriented growth in the 1990s, composed of coastal provincial governments, export manufacturers and their lobbyists, plus officials from the Ministry of Commerce, were keen on perpetuating such model, preempting China's transformation to a more balanced developmental model driven by domestic consumption and depending less on the US. China's entrenched export-oriented growth makes the Chinese economy vulnerable to any major contraction of consumption demand in the United States and Europe. The large incentive of the Chinese government to employ its foreign reserves to purchase U.S. debt is not only a result of the vast liquidity and presumably stable, safe return of the U.S. Treasury bonds, but also an effort to secure the continuous increase in U.S. demand for their own exports.

China's addiction to U.S. Treasury bonds is attributable to China's trade structure too. Under China's reprocessing export model, China has become a nodal point where raw materials, machines, and components from Asia and other developing countries are put together into finished consumer goods to be exported to the United States and Europe. While China's overall trade surplus has been mounting, it has been running a rising trade deficit with the whole world if we take out the United States and Europe. This means that the growth in value of China's exports to Asia, Latin America, Africa, etc., has not caught up with the growth of China's import of manufactured components, machineries, and raw materials from them. The United States and Europe are the two sole sources of China's trade surplus. China's exports to the US, needless to say, are settled in U.S. dollars. Even China's exports to Europe are settled in U.S. dollars instead of euros. As long as China's rising trade surplus comes mostly in dollars, the Chinese central bank has few choices other than investing these dollars into the most liquid and relatively safe dollar-denominated asset, that is, U.S. Treasury bonds.

Recently, there are a lot of reports about China's activities in using its foreign exchange reserves for "buying the world" through outward foreign direct investment. Chinese companies' acquisition of Volvo Cars from Ford Motor and Chinese SOEs inroad into mining and energy sectors in other developing and developed countries from Zambia to Canada attracts a lot of media attention. But despite these high profile cases, China's outward foreign direct investment is so far of negligible aggregate size, in comparison with other major sources of FDI in the world. The Chinese official statistics show that the stock of China's non-financial outward FDI by the end of 2010 amounted to 298 billion USD (317 billion if financial investment is included). This amount is even smaller than the outward FDI from Singapore, a city-state with a much smaller economy than China. China's outward FDI looks even more insignificant if we take into consideration that 63 percent of that amount was actually FDIs that land in Hong Kong.

The stock of China's outward FDI in places other than Hong Kong is less than 118 billion USD, which is less than a tenth of Chinese holding of U.S. Treasury bonds in the amount of about 1.2 trillion at the time. After all, no other market except the U.S. debt market has liquidity deep enough to absorb China's mammoth reserves. Paul Krugman was not exaggerating when he claimed that China had been caught in a "dollar trap," in which it had few choices other than to keep purchasing U.S. Treasury bonds, helping to perpetuate the hegemonic role of the dollar.

Though China has the geopolitical autonomy that theoretically enables it to end its dependence on the dollar and even end the dollar standard, in reality, it has been helping perpetuate the standard, and hence U.S. geopolitical dominance, through its insurmountable addiction to U.S. Treasury bonds caused by its export driven growth. Compared to China's 1.2 trillion holding of U.S. Treasuries, the BRICS bank forex reserve pool of 100 billion and China's pledged contribution of 400 billion is little more than a drop in the ocean.

The Chinese government has been recently emphasizing its ambition to internationalize the RMB into a major reserve and international transaction currency as a way to maintain its export-oriented model while reducing its holding of U.S. dollars, hence curbing its addiction to U.S. public debts. But in actuality, the Chinese RMB, which is not yet a fully convertible currency, has a long way to go to become a major international currency. Its share in international currency use is minuscule, falling way behind the British pound and the yen, even the Mexican peso (see Table 1). The RMB's rise to the status of a significant international currency will require RMB's full convertibility, which in turn needs China's financial liberalization. This process will take time, even if the reluctant CCP finally agrees to take the very risky step of fully opening up its banking sector to the global economy. This step is far from an easy choice for the party-state, as such opening would be a blow to its command of the economy via its control of credits. Before such radical shift on the part of China, the talk about the death of the global dollar standard and U.S. global dominance under a China-led BRICS challenge will be far from reality.

Possible Futures

Of the two possible scenarios of the future of our world-system—a semiperiphery transformative takeover and a second-round hegemony of the United States—as inspired by Chase-Dunn's works on comparative world-systems, we see that the first possibility is not likely for the time being, provided that China, as the most powerful semiperipheral state today, is still tied by the internal contradictions of its developmental model and could not be exonerated from its supporting role behind the staying global dollar standard. It is still possible that in the longer term, China will be able to radically reformulate its model of development, rebalance its economy and fully actualize its potential power to lead other semiperipheral states to prevail and transform the system. Before it happens, China will continue to support the global dollar standard. It is unclear as to whether the

U.S. state would take advantage of the staying power of the dollar to foster the rise of new competitive sectors and formulate new solutions to the crisis of capitalism to turn itself into a second-round hegemony, as Chase-Dunn and others ponder, or it will employ the dollar's power to exacerbate its global military domination and move further to create a coercive US-centered global empire, as presaged by Arrighi. This is going to depend on how the internal contradictions and class conflicts of American capitalism will unfold.

No matter what will be the case, Chase-Dunn's program of comparative world-systems is a liberating perspective that frees us from the rigid conception about possible scenarios of the future according to classical world-system formulations. This research program will continue to stay as an indispensable analytical reference for our understanding of the present and projection of the future in the decades to come.

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Disclosure Statement

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Principles of Inter-Societal Dynamics

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Abstract

World-system dynamics are re-conceptualized as inter-societal systems with some de-emphasis on the notions of core, periphery, and semi-periphery. This tri-part division has been useful in forcing sociology to rethink macro-level sociological analysis and in establishing the importance of considering inter-societal systems as a fundamental unit of human social organization, but this Weberian-like ideal type is constraining theoretical analysis. Moreover, core, periphery, and semi-periphery are not consistently found across a broad range of inter-societal systems, beginning with those among hunting and gathering societies and moving to the current capitalist inter-societal system. Furthermore, the often-implied view that the current geo-economic global system has replaced geo-political systems is overdrawn because geo-economics and geo-politics constantly intersect and interact in all inter-societal systems. Some illustrative general models are drawn for geo-political systems, while abstract principles for geo-political and geo-economic inter-societal relations are articulated. The goal of the paper, then, is to move current world-system analysis back, in a sense, to earlier conceptualizations of geo-economics and geo-politics and empire formations that have always existed among human populations and that now drive the dynamics of the globe today. In this analysis, the seminal work of Christopher Chase-Dunn is referenced as a source of inspiration for this small, but important, shift in analysis and modes of theorizing.

Keywords: theory, geo-economics, geo-politics, warfare, empires, rise and collapse

Christopher Chase-Dunn has for the last forty-five years added significantly to theorizing about world-system dynamics (e.g., Chase-Dunn 1988, 1990a, 1990b, 1992, 1998, 2001; Chase-Dunn and Inoue 2016; Chase-Dunn and Grimes 1995; Chase-Dunn and Hall 1991, 1997, 1998; Chase-Dunn and Mann 1998; Chase-Dunn, Manning, and Hall 1998; Chase-Dunn et. al., 2000, 2009; Chase-Dunn and Lerro 2014; Chase-Dunn and Willard 1993, 1994). As a theorist, I have found much of his work important in my own theorizing about what I prefer to conceptualize as inter-societal dynamics rather than as world-system dynamics. Among his important contributions are: (a) a view of world system dynamics as unfolding in all stages of societal development, (b) an emphasis on the critical point that more is to be gained by viewing *a system of societies* as the fundamental unit rather than any of the constituent societies in this system, (c) a theory that views world-systems as [i] hierarchical formations among societies in response to a series of ecological forces revolving around [ii] technological changes, [iii] population growth, [iv] intensification of production and resource consumption, environmental degradation, [v] population pressures, [vi] emigration, [vii] circumscription, and [viii] conflict within and between societies, (d) a conception these forces in (c) as constantly iterated in cycles leading to the build up and decline hierarchical formations among societies (his "iteration model"), (e) a view that societal evolution involves upsweeps in the size and complexity of a world system, and (f) a theoretical assertion that many, thought not all, conflicts and changes in world-system hierarchy are initiated by semi-peripheral societies and, by implication, the assertion that semi-peripheral societies are one of the driving forces of major upsweeps in size and complexity of inter-societal systems.

Along with this theoretical legacy is a rich body of empirical work detailing the dynamics denoted by (a) through (f) above. The data arrayed by Chase-Dunn and collaborators to illustrate the plausibility of his theoretical arguments represent an impressive accomplishment, in their own right, in addition to their importance in testing the key ideas in his theoretical works. In my effort to theorize about many of the same process as Chase-Dunn, I have borrowed from his work, but I also approach some ideas in world-systems theorizing with a certain degree of skepticism, which I should lay out here before presenting my theoretical ideas. First, I am increasingly skeptical about the continued use of "world-system" as the label for work that I see as the study of *inter-societal dynamics*. Relations among pre-literate societies do not really constitute, literally, "a world system" but simply very small inter-societal systems. Secondly, and related to the label "world system," I am not sure that conception of the world system as consisting of a core, periphery, and semi-periphery is entirely correct. It was a very useful conception when Wallerstein (1974, 1984, 1989) first proposed it, but to continue of advocate for this tri-part distinction (Wallerstein 2004) is, I feel, not the best strategy. While core, periphery, and semi-periphery do indeed still capture some of the dynamics of the capitalist world system, the distinction now gets in the way of more general theorizing about inter-societal dynamics across the full range of inter-societal systems

today and, more significantly, in the past among pre-literate populations. Third, the implicit view of many world-system theorists that the current capitalist world-system is evolving toward a truly global society, organized by the principles of socialism, is more of an ideological hope than a likely empirical reality. It many ways, hoping for this longer-term outcome biases theorizing and leads to a great deal of selective attention to some but not all dynamics.

These points of skepticism are simply my views; and I am sure that most who conduct research and engage in theorizing within this world-system tradition would reject what are probably seen as irritating objections of an outsider. Still, I emphasize this skepticism here in order to clarify why I do not phrase my arguments in terms of a world-system vocabulary. I am not a world-system theorist but a general theorist who sees inter-societal dynamics as one generic and fundamental type of sociocultural formation in the human social universe, but hardly the only one and perhaps not even the most important one. Nonetheless, I certainly agree with Chase-Dunn's assertion that when inter-societal formations become the unit of analysis, a great deal more is explained than when focus is only on societal formations.

Conceptualizing Inter-Societal Dynamics

I always preferred Wallerstein's and others' distinction between geo-political and geo-economic empires, but disagree with the implication that the former has been largely replaced by the expanding world-capitalist system. Geopolitical systems continue to emerge and collapse, with the Soviet Union being the best example. Other geo-political formations, such as contemporary China (built from what remained of the previous dynastic collapse), are often built up again through geopolitical conflicts and then solidified as geo-economic empires, but even contemporary China could collapse again, as it has a number of times in the history of various dynasties. And in fact, one would build an argument that this will be China's fate in the long-run. Thus, both geo-political and geo-economic systems cycle to some degree: they are built up, only to stagnate, and eventually collapse and then be rebuilt through geopolitical as much as geo-economic action. Since this has cycling has occurred throughout human history, especially over the last 10,000 years, the "end of history" argument of world systems theorists that a world society is in the future are no more accurate that "end of history" arguments of twenty-to-forty years ago (e.g., Fukuyama 1992; Parsons 1964, 1966, 1971) that societies were headed toward universal political democracies. Chase-Dunn's iteration model would support this note of skepticism, as would his analysis of upsweeps, followed by declines, although Chase-Dunn nonetheless seems to hold out hope for one final upsweep to world-level socialism.

Thus, I begin my own theorizing by retaining the older conception of inter-societal relations as revolving around varying patterns of geo-politics and geo-economics as well as the view that these types of formations are built up, only to eventually disintegrate *in perhaps an endless cycle*.

And, I do not see the present set of geo-political and geo-economic systems as an end-of-history exception. It is far more likely, empirically, that the appearance of movement toward a global society are just that—a somewhat elusive appearances that will, like all of its historical predecessors, de-evolve from warfare and, in the present era, from unstable dynamics that are inherent to capitalism.

Thus, for me, theorizing on inter-societal systems should focus on those conditions that increase the scale and size of geo-political and geo-economic systems, and conversely, those conditions that cause their disintegration and de-evolution to smaller-scale sociocultural formations. The notion of iteration and upsweeps in Chase-Dunn's theorizing would suggest this same conclusion, but as noted, a more ideological agenda sneaks into his and others' theorizing with hopes that the contradictions of capitalism on a global scale will finally usher in Marx's revolution. More likely, I think, is disintegration of the existing world system to something less integrated than it is today, with very active geo-political and geo-economic dynamics ruling a conflict-ridden world. But, my assertion of this is only an extrapolation from history, and extrapolation is not the best way to develop a theory. It is a better strategy to focus, instead, on fundamental and generic dynamics driving inter-societal formations and, then, to theorize about their operation. This is the strategy that I employ here.

The Dynamics of Geo-Politics

Herbert Spencer (1874-96) was the first social theorist working self-consciously as sociologists to emphasize *inter-societal selection* as an important dynamic in the movement of sociocultural formations from simple to more complex forms. His famous phrase—"survival of the fittest"—was first uttered in 1851 in *Social Statics*, before he turned to sociology and eight years before Darwin (1859) published his famous work on natural selection. When Spencer finally did turn to sociology in the 1870s, he tended to use this phrase to describe warfare among nations. War is a competition among societies for territorial space, human labor and wealth, or any resource seen as valuable. Wars are typical won, he argued, by larger, more technologically advanced, and political organized populations over those who are smaller, less technically advanced, and less politically organized. While the loser in a war can be vanquished or extinguished, more typical is some mode of consolidation—ranging from merging of societies into various forms of coercive economic and political domination to cooptive extraction of key resources. The end result is that the consolidated society or inter-societal system is larger and more complex, and for Spencer, this meant that warfare furthered societal evolution. And, he emphasized that geopolitical formations need not be large, but they generally are larger than before war began. Indeed, he saw conflict among preliterate societies as one force driving the initial phases of societal evolution from simple to more complex forms. Long before Spencer was the work of Ibin Khaldun who explained the dynamics

of empire formation and collapse of dominant societies in the middle east as a process whereby empires are built up through conquest, reach a peak, and then decline, only to be conquered by another society that then initiates what Khaldun saw as a four-generation cycle of rise and fall. Peter Turchin's recent work begins with Khaldun's emphasis on solidarity as the key to winning wars and sustaining empires; and in a series of stunning theoretical treatises (Turchin 2003, 2013; Turchin and Nefedov 2007), Turchin has argued that warfare is both a destructive and, like Spencer, a creative force because, in the end, it increases the scale of sociality and cooperation in evolving societal formations. Like Khaldun, he sees many of the dynamics of war as cyclical, with societies on the marginal steppes outside of an existing empire often revealing more social solidarity and often new technologies of warfare (such as the Mongols' use of the horse) that enable them to conquer larger empires on downside of the "Khaldun cycle"—an argument that is similar to Chase-Dunn's assertion that new hegemons in world systems often come from the semi-periphery and through conflict or economic competition reshuffle the hierarchy of a world system (Inoue et al., 2016).

Borrowing from Goldstone (1990), Turchin and Nefedov (2009) develop Khaldun's argument that that population growth sets into motion a series of related events causing disintegration of an empire over time, but in their case, they often posit a much longer cycle of, in Chase-Dunn's (1997) words, "rise and demise." In agrarian societies, a series of related events set into motion the "demise" side of the cycle that is generally set into motion by population growth, resource scarcity, price inflation, escalated costs to the state, state borrowing, elite expansion and demands for patronage, falling real wages, rural poverty, migration of restive young-age cohorts to urban areas. All of these cascading processes work to cause a polity to fail, whether from internal revolt by commoners and/or by elites or from external conquest by another polity. Turchin extends these ideas, viewing them as a cycle that occurred in not only agrarian societies, but also in other historical epochs, thereby allowing for a more general theory of cultural evolution (Turchin 2013). His models contain many of the same forces as Chase-Dunn's, emphasizing the relationship among population growth, environmental degradation, reduced carrying capacity of the environment, and internal fiscal stress on an existing hegemon which, in turn, leads to increased inequality and reduced solidarity, thereby making an existing empire vulnerable to invasion and conquest. And while conquest has an integrative phase that builds up productivity and solidarity, this phase eventually turns into stagflation, thereby initiating the downward part of the cycle. All of this is quite reminiscent of Chase-Dunn's iteration cycle, which applies across all types of societies, not just the agrarian empires that have been Turchin's focus until his recent book on *Ultra Society* (Turchin 2013).

Modeling Empire Formation and Collapse

Like Carneiro (1967, 1970) as well as Chase-Dunn and Hall (1977), I see circumscription has often part of the dynamics of empire formation. Warfare generally begins occurs between societies that have become circumscribed in space; and if one society or several societies are conquered by another, more innovative society, the new empire can initiate an upsweep, as Chase-Dunn argued, increasing circumscription and, thereby, making warfare likely to continue in cycles like those outlined by Khaldun and Turchin, or Chase-Dunn with his emphasis on iteration. In Figure 1, I outline a model that I have used in the past (Turner 2010: 295) but modified to take account of Chase-Dunn's and Turchin's arguments. Like Spencer and Carneiro (1970, 2015), I see population growth, increasing production, increasing regulation through polity, and territorial expansion as inherently related in the social universe. Population growth generates what I have termed "Spencerian selection pressures" (Turner et. al. 2017; Turner and Abrutyn 2016) because population growth forces members of a growing population to find to means and modes for (1) increased production, (2) consolidation of the four bases of power—coercion, administration, symbols, and material incentives—into a larger, more centralized polity, and (3) development of distributive infrastructures for moving people, resources, and information about a territory and across sociocultural formations. And, with high circumscription of a population, this consolidation increasingly forms around the coercive and administrative bases of power causing mobilization of a population for conflict with neighboring populations.

Success in war comes with a larger coercive force, with more advanced military technologies, and higher levels of solidarity among members of a society and its coercive forces. With success, however, *logistical loads* on a conquering society increase with respect to controlling larger territories of defeated populations holding resentments—all of which generally increase the ratio of coercive/administrative bases of power over incentive/symbolic bases. As these loads increase over time, a hegemon becomes vulnerable from revolt from within and/or conquest from other populations, but just *how* vulnerable an empire becomes is dependent on the dynamics outlined in the model presented in Figures 1 and 2. Figure 1 outlines the complex dynamics that I see as involved in a society initially mobilizing for warfare. For many, such models appear too complex, especially those interested with explaining variance in data with a few key equations. There is nothing wrong, of course, with such efforts, but the key forces involved—say, warfare—are part of *a much larger set of interacting forces* that feed forward and reveal reverse causal effects. Thus, Figure 1 is an example of the kind of modeling that I prefer, even if it is not as parsimonious as most modelers seek to build.

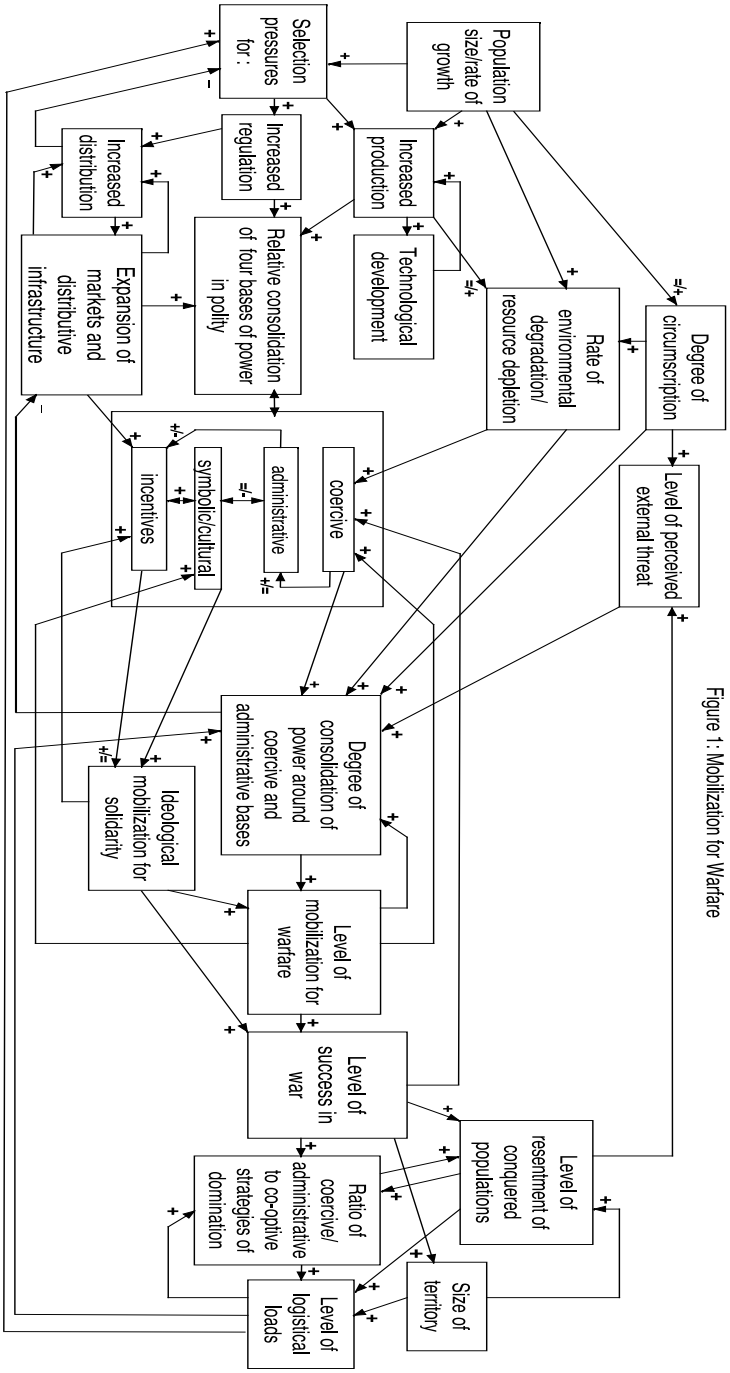

Figure 1: Mobilization for Warfare

Time flows from right-to-left, and in the model in Figure 1, with population grown and high rates of population growth initiating the processes denoted in the middle row. Population growth always generates selection pressures on individuals and corporate actors to increase the level of differentiation along three fault lines of all sociocultural formations: production, regulation, and distribution. Large populations require more capacity to produce, to distribute, and to regulate and coordinate individuals and corporate units.

Increased production comes from technological innovations as they allow more goods (and services) to be produced; increased regulation comes from the consolidation of a polity and its centralization around the four basic bases of power (Turner 1995). If production has caused environmental degradation under conditions of high circumscription, neighboring societies are often seen as a threat, and along with environmental degradation and circumscription, the consolidation of power tends to revolve around its coercive and administrative bases of power in order to address external threats, and potentially internal threats from its own population. This kind of consolidation biases decision making—as Spencer emphasized—toward mobilization for warfare; and symbolic or ideological bases of power, coupled with incentives as yet another base of power, also become biased for inducing members of a population to accept an ideology legitimating warfare that, in turn, lead to the mobilization of the population in general to support warfare and, more specifically, to increased solidarity among those who must fight the war--as Khaldun had emphasized.

Success in war is dependent on historical conditions but, in the end, a larger, better organized, more technologically advanced, and symbolically (ideologically) unified population will generally win wars. And, once a society has success in warfare, reverse causal dynamics encourage further consolidation of power around its coercive base, leading to more coercive/administrative strategies of domination over cooptation strategies employing the manipulation of material incentives for those conquered. Cooptive strategies, where institutional systems and elites are left in place but taxed in some way, are more complex and dynamic but they generally allow for longer periods of control over other populations—with the Roman Empire being a prime example. But, most hegemons in an inter-societal system rely upon the coercive/administrative bases of power and, thereby, increase logistical loads for control of a restive population; and coercion and administration are very expensive forms of domination and generally will cause fiscal crises, while generating more resentments to the extent that those conquered are heavily taxed to support their own domination by coercive forces and tight administration of an external hegemon. Also, as an empire gets larger, it encounters dramatically increased logistical loads for controlling territory, as existing distributive structures eventually prove inadequate and as the number of "boots on the ground" required to maintain regulatory control continues to increase and stretch fiscal resources of the dominant actor in an inter-societal system. Thus, as the dynamic of conquest play out, they

set into motion reverse causal effects that generally increase the reliance on coercion and tight administration (and the costs thereof, especially as resentments arise from those conquered); and coupled with increasing size of the system of domination, the logistical loads, including fiscal loads, begin to erode the coercive and ideological bases of power of the hegemon and, thereby, the commitments of its own population. The result is that the empire formed can simply collapse, or be restructured by another advancing military power.

Figure 2 selectively emphasizes some of the forces outlined in Figure 1, while adding some additional considerations about the conditions increasing the size of a geopolitical formation built around warfare. The key is mobilization of coercive power which is a function of the overall size of the population available for military activity, the technological sophistication of armaments, and the level of solidarity among a society and, especially, its coercive forces; and if all of these forces are high, then the likelihood of success in war increases. The level of distributive structures is also important, particularly modes of moving coercive forces, information, and resources about a territory. Thus, distributive infrastructures become critical in determining how large an empire can become. The capacity to move information and resources rapidly to sustain armies using advanced military technologies and revealing high solidarity can overcome some of the logistical problems of controlling territories. Further, the extensions of markets across a territory controlled by a hegemon, as well as the territories of other societies outside its direct control, is also critical in supplying coercive and administrative branches of polity. And, if a dominant society can use more co-optation relative to coercion and tight regulation, it can reduce logistical loads stemming from cultural diversity and resentments among conquered peoples.

The problem, however, is sustaining cooptation in the face of pressures generated by episodic resistance from conquered populations because such resistance inevitably causes escalated control by actors in the coercive and administrative branches of a conquering polity. The final problem facing expanding empires is that they increasingly are likely to come up against another advancing empire (Collins 1981) in a showdown war that they can lose or against societies with sufficient capacity to hold off further advancement by an empire that is logistically challenged by mounting problems of controlling large, diverse subpopulations spread across a larger expanse of territory. Once empires begin to lose battles or just stall out against resistance, they are increasingly seen as "not "winning." This perception can quickly erode a polity's legitimacy at its home base (Weber 1922; Skocpol 1979), while the conquered populations can begin to be less intimidated by a stretched out polity and, as result, engage in disruptive activities that further expose coercive and administrative weakness.

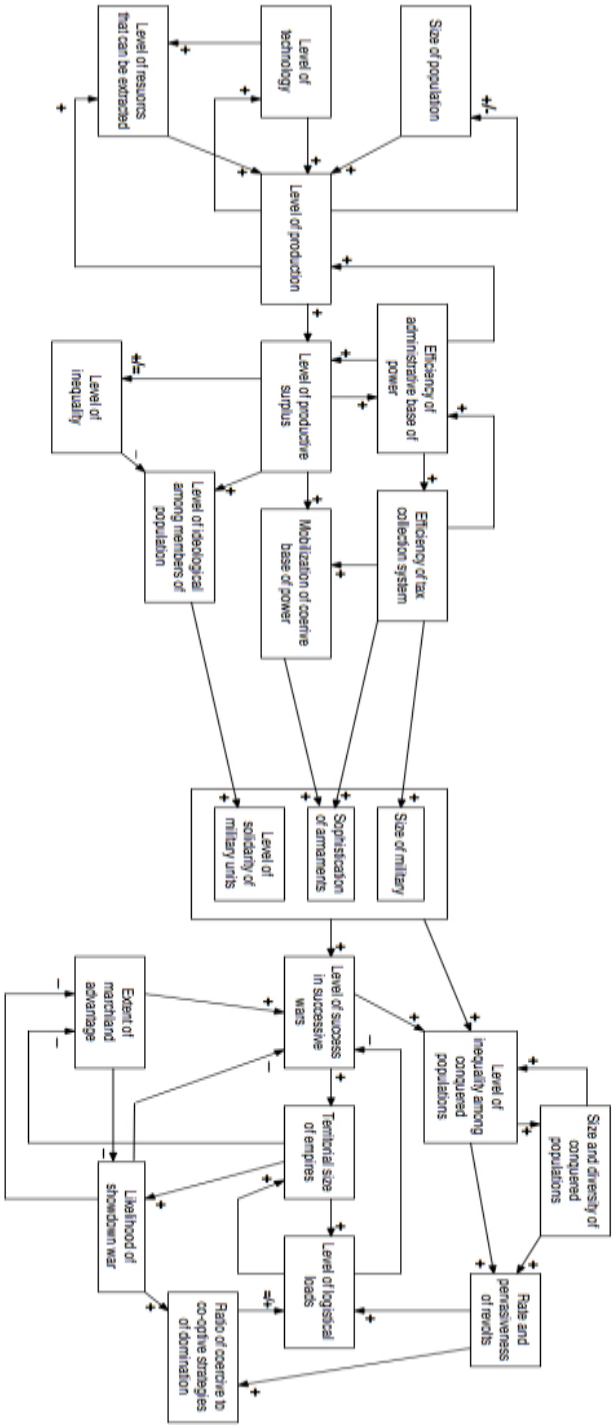

Figure 2. Conditions Affecting Size of Geo-Political Formations

The result is that an empire can begin to pull back, or simply be over-run by internal revolts or by another societies that is organized coercively and administratively for conquest.

Large empires have thus historically been difficult to hold for more than a comparatively brief period of time because of the inherent problems of controlling larger, diverse, and restive populations at many hot points across a large territory. More cooptive empires relying upon distributive and incentive systems to control large, diverse populations can last longer but they always suffer from the complexity of sustaining dominance while allowing existing institutional systems and their leaders, as well as cultural systems, to remain largely intact. Cooptation cuts down on logistical loads of the conquering society but, at the same time, makes it vulnerable to manipulation and quiet revolts that erode the power of the dominant society, unless it retains a strong coercive and administrative presence that, in turn, generally pushes for less cooptation and more coercive and centralized administrative control which, of course, dramatically increases logistical loads revolving around social control as well as fiscal problems in financing coercive and administrative control.

Principles of Geo-political Dynamics

Models like those in Figures 1 and 2 are not easily tested as a whole, but they are amenable to simulations that allow for assessment of their plausibility. Moreover, any subset of direct and reverse causal sequences in the model is testable empirically. The reason that I draw such models is because the world is complex; there are direct, indirect, and reverse causal dynamics operating even when the goal of a theory is to explain geo-political mobilization, expansion, and collapse. Often the effort to explain variance, *per se*, leads to highly parsimonious models that explain a great deal but these models often ignore the many causal forces in play, and if explaining variance is all that counts, then more complex models are unnecessary. However, if understanding of the complex interactions of the forces in play is the explanatory goal, then we are forced to produce more complex models.

One way to simplify somewhat complex models is to develop abstract propositions delineating the generic conditions under which key dynamics increase or decrease. Thus, models like those in Figures 1 and 2 can be “translated” into propositions; and in fact, new variables can be introduced in such propositions that, if desired, can be expressed as equations. In this way, a more robust way to assess variance on outcomes, such as geo-political mobilization, expansion and growth, and decline, can be explained more parsimoniously but not at the expense of ignoring key causal relations. It is still useful to develop abstract models as well in order to tease out causal connection that, inevitably get lost in equations, even the more complex equations that emerge from abstract principles to be delineated below.

Geo-political Mobilization. We can begin with how geo-political formations initially take form, as actors in a society mobilize for warfare with another society or set of societies. Thus, we can state principle 1 in the following manner.

1. The potential for geo-political mobilization by one society for territorial expansion through conflict with another or other societies is an additive function of:

A. The capacity of a society to consolidate bases of power into a polity as an autonomous institutional system, with this capacity being and multiplicative function of:
   i) the absolute size and rate of growth of its population
   ii) the level of economic surplus and wealth generated by a population
   iii) the degree of circumscription of a society by neighboring societies, coupled with the level of resource depletion and environmental degradation, as they increase the intensity of the selection pressures on political and economic actors to find new resource bases.

B. The extent to which the culture and institutional systems of neighboring societies are view by key actors in polity, economy, and religion as an external threat, with the perceived threat being an additive function of:
   i) the level of economic competition among actors in the economic domains of neighboring societies
   ii) the level of political competition and/or military mobilizations among a set of neighboring societies
   iii) the rate and intensity of past conflicts with another society or set of societies
   iv) the degree of perceived divergence in values and ideologies, particularly religious ideologies, with those of another society or set of neighboring societies

C. The level of potential internal threat perceived by actors in polity which, in turn, is a negative function of rates of mobility across social class line, while being a positive and multiplicative function of:
   i) the level of economic inequality
   ii) the degree of class formation
   iii) the extent of cultural differences among social classes
   iv) the linearity of rank orderings of classes
   v) the rigidity of barriers and boundaries to mobility across classes

D. The historical extent to which centralization of power has been around the coercive and administrative bases of power which, in turn, is a positive and multiplicative function of 1-C and 1-D above.

E. The historical propensity and capacity of the existing polity to use its symbolic (ideological) base of power to formulate legitimating ideologies for conflict by polity

which, in turn, is a positive and additive function of 1-C, 1-D, and 1-E above, while being a negative function of the extent to which polity has historically used the manipulation of incentives through markets and legitimating ideologies emphasizing autonomy of actors to pursue self interests.

Intitiation of Territorial Expansion. To some degree, mobilization for warfare biases perceptions of the range of options and alternatives that are available to actors in polity. Such biases thus increase the likelihood of decisions to initiate conflict with other societies and, thereby, to expand territory and the resources to be gained such territorial expansion.

2. The likelihood that the polity of one society will initiate conflict and attempt territorial expansion is an additive function of:

A. The conditions listed under 1-A, 1-B, 1-C, 1-D, 1-E, and 1-F.

B. Perceptions (whether accurate or not) by actors in polity that they have a productive advantage over potential adversaries for financing military operations.

C. Perceptions by actors in polity that their base of symbolic power is potentially eroding from inequalities and internal threats.

D. Perceptions that success in conflict and access to resources can restore their base of symbolic (ideological) power and, through the increased capacity for patronage to members of the home population, expand their material incentive base of power as well.

E. Perceptions by actors in polity that they possess a marchland advantage *vis-à-vis* neighboring populations.

Success in Warfare. It is, of course, one thing to perceive that success in warfare is possible, and often leaders of polity misperceive the likelihood of success and/or feel the inertial pressures of the dynamics listed in Principle 1 and, hence, feel that they have little alterative but to initiate warfare. Principles 3 delineates come of the conditions that increase the likelihood a society will be successful in war with its neighbors.

3. The likelihood that a society will be successful in conflict with other societies is an additive function of:

A. The capacity to mobilize coercive forces superior to those of adversaries which, in turn, is an additive function of:

i) the relative size of a population and its availability for recruitment

ii) the level of internal solidarity within units of the coercive base of power that, in turn, is a function of the degree of consensus over the ideologies used to mobilize the symbolic base of power across the whole population or, strategically, to important subpopulations in a society

iii) the level of military technology relative to adversaries

iv) the level of wealth to support and sustain military activities and to purchase military hardware which, in turn are a additive function of:
   a. overall size of economic production
   b. level of per-capita productivity
   c. degree of efficiency of the tax collection system
   d. level of liquid income and wealth that can be taxed

v) the level of development of infrastructures to move resources, personnel, information, and military hardware across territories

vi) the level of transportation technologies and the resulting transport units for moving personnel and armaments across territories

B. The degree to which a marchland advantage exists for initial conflicts as well as the extent to which this advantage can be sustained in conflict with successive adversaries.

Size of Geo-political Formations. Conditions allowing for success in conflict are also critical to sustaining the resulting geo-political formations. Yet, winning successive battles does not assure that an emerging hegemon can retain territories, and so, we need an additional principle of what allows a geo-political formation to become large, followed by one on the stability of geo-political formations once established. As the propositions below outline, controlling territories for longer periods of time is a difficult-to-achieve balance between (a) implentating cooptation based on material incentives and (b) using superior coercive-administrative power as a background threat, without over-using coercive-administrative power that, in turn, will shift control strategies away from cooptation and use of the material incentive base of power. For, superior coercive power almost always will, over time, erode the effectiveness of cooptive strategies and eventually increase logistical loads and costs of sustaining a large empire.

4. The overall size of a geo-political formation is an additive function of a polity's capacity to:

A. Employ cooptive strategies of control over conquered populations relative to coercive-administrative strategies of control which, in turn, is an additive function of:

i. the ability is recruit members of conquered populations into administrative structures engaged in taxation, monitoring, and policing of their own populations

ii. the willingness to tolerate and encourage a high degree of autonomy in indigenous institutional systems, particularly polity, law, economy, and religion, of conquered populations

iii. the willingness and ability to convert a geo-political formation into a geo-economic formation (see principles of geo-economics below) that allows for development of the indigenous economy, particularly its means of production and its system of market distribution

iv. the willingness to limit exploitive exchanges and economic dependency in geo-economic relations with conquered populations

B. Maintain superior coercive and administrative power over conquered populations which, in turn, is an additive function of the capacity to:

i. prevent conquered or dominant populations from copying military technologies, armaments, and organization systems organizing coercive forces

ii. deploy sufficiently large numbers of military forces across dominated territories over long periods of time

iii. construct and sustain distributive infrastructures that allow for rapid military deployment, growth of the domestic economy, and less exploitive market-based exchange relations between hegemon and conquered societies

C. Sustain resource, productive, and marchland advantages

D. Sustain legitimacy as the home base of a hegemon and, at the same time, legitimacy among conquered populations through mobilization of symbolic base of power incorporating ideological systems of indigenous populations of conquered societies

E. Avoid a showdown war with another advancing polity

F. Resist over-use and extension of control by coercive-administrative bases of power as logistical loads increase

G. Negotiate from a position of potential use of coercive power in order to reduce revolts and other points of conflict with conquered populations as the populations to be governed increase in size, diversity, and spatial dispersion

Stability of Geo-Political Formations. As the above propositions suggest, it is very difficult to sustain the balance necessary for controlling large territories over long periods of time. Cooptation and use of material incentive bases of power often become unworkable if the conquered population is restive, while coercion-administrative bases of power increase logistical loads because of (a) resentments of those governed and (b) the costs of control across large territories. For this reason, very few large empires have last for a long period of time, with the average time much far less than 100 years. Exceptions like the Roman Empire are the result of sustaining a cooptive revolving around leaving institutional systems and cultures of those conquered largely in tact (while also retaining a decisive coercive advantage over indigenous populations). In contrast, most other empires have over-used coercion and tight administration and, as a result, have not lasted for long periods of time.

Part of the reason for this tendency for employing coercive control is, of course, that the polity of empires created by violence is structurally and cultural biased toward this form of control and another part is exploitive extraction of resources from indigenous populations gives hegemons options for manipulation of incentives among members of armies and administrative staff in the

field and to key subpopulations at the home base of an empire. The result is growing resentments, increasing logistical loads; and if the empire is large and spread across large expanses of geographical space, the costs of control eventually become too much. These logistical loads and costs only escalate exponentially when conquered territories are spread across oceans, as the Spanish and English learned in the Americas and as the British Empire soon learned for an empire where "the sun never set."

5. The degree of instability of a geo-political formation and the likelihood of its collapse back to its home base is an additive function of:

A. The degree to which a dominant polity has lost its coercive, productive, resource, and marchland advantages which, in turn, is an multiplicative function of:
   i. the absolute size of the territory to be controlled
   ii. the level of costs in maintaining a coercive and administrative presence in territories
   iii. the number of hostile societies at boundaries of territories to be controlled and their relative coercive power
   iv. the level of competition and/or conflict with other dominant societies engaged in geo-economic or geo-political expansion; and the greater their proximity to territories controlled by a hegemon the greater the level of competition and conflict
B. The degree to which the distributive infrastructures prove increasingly inadequate to move necessary information, people, armaments, and resources across territories and/or the degree to which they have been breached and disrupted by hostile acts by indigenous populations.
C. The level and intensity of internal threats at a polity's home base and/or the level of threat posed by subpopulations in a hegemon's territories
D. The extent to which a polity's symbolic base of power at its home base or in its extended territories has eroded to the point of de-legitimation of polity which, in turn, is a function of losing a war, stalling in efforts to expand territories even if a war is not actually lost, losing out in geo-economic and/or geo-political competition with other hegemons (again even if not losing a war), and losing the capacity to control revolts in hot spots of conquered territories(even if these do not evolve into more widespread revolt).

The Dynamics of Geo-Economic Systems

As theorists like Frank (1969, 1978, 1979) have emphasized, inter-societal relations are often driven by the economic dependency of a society or set of societies on a more economically developed and militarily powerful society. Dependency generates exploitive patterns of trade that generate wealth for the more powerful society and do very little to develop the dependent society. These dynamics still exist, of course, in the current world system, but the spread of capitalist modes

of exchange has increased the number of free-market, or relatively free market, forms of geo-economic inter-societal systems. Below, I develop some basic principles for each type of geo-economic inter-societal system, but both types can exist within any particular world system. So, it is a matter of relative degrees of dependence or free exchanges of resources because both types frequently overlap in the empirical world. Moreover, the relative amounts of dependency or free-market systems are often tied to patterns of geo-political domination.

The Dynamics of Dependency Geo-Economic Systems

Societies that do not have well-developed and differentiated markets and meta-markets (e.g., equity, bond, money, etc.) as well as the service systems (banking, insuring, marketing, trading) goods, services, and financial instruments of their own easily become dependent upon societies that have markets, meta-markets, and NGOs such as the World Bank and International Monetary Fund. When such is the case, geo-economic and geo-political hegemons, or in world-system terms, core and semi-peripheral actors can gain some control of peripheral or dependent societies through their hold and control of the capital and technologies needed by these less developed societies. Dependency increases particularly when chartered corporate actors from other societies provide capital for infrastructural development, for financial liquidity, and market development. These external corporate actors operate to serve their own narrow interests and, thereby, bias development toward their goals and, in the process, take *de facto* control of a dependent society's economy or key sectors of the economy and often the polity as well (Frank 1969, 1978,1979).

Control generally involves cooptation and payoffs to political actors in dependent societies that, in turn, fosters a culture of corruption that further erodes the ability of a society to control its own economy. Moreover, corruption generally leads to shortages of essential goods and monetary instability, such as rapid inflation that, in turn, only increase dependency of a society on another society (for capital, technology, financial services, and foreign aid). Societies providing this "help" generally pursue self interests, and the result is highly exploitive trade relations in an inter-societal system.

The lack of entrepreneurial capacity—that is, the ability to organize resource extraction, production, distribution, and market services---assures that all economic activities will be performed poorly and will be impregnated by massive corruption. When external economic actors enter to perform these entrepreneurial functions, they do so under often unfair terms, such as zero taxation on their profits, and thus further erode a dependent society's capacity to develop indigenous sources of capital, financial services, technology, and corporate units capable of performing basic economic function of resource extraction, production, distribution, and external trade in ways that increase wealth. The result is high inequality, low real wages, constant fiscal crises, and continued corruption. And, when external corporate actors can "buy off" key political

actors, these actors will bestow more favorable terms in trade, thereby allowing "foreigners" to control much of a society's fate.

Geopolitical position can exacerbate dependency when a society lacks a strategic location that can be exchanged for economic aid, whereas with a strategic positions in either or both geo-economic and geo-political systems, hegemons are more likely to offer better terms for what they provide, if the polity of a dependent nation is not highly corrupt and, hence, sufficiently strong to bargain for more favored treatment by external actors. And, if there is intense economic and political competition among core actors in an inter-societal system, strategic position in this system can become a valuable resource for negotiations. And, while exploitive trade may not be eliminated, it can be mitigated. And, in some societies where dependency has been historically low, strategic position can often bring such societies highly favorable trade and financial assistance for economic development and upward mobility in the inter-societal system. All of these dynamics can, I think, be reduced to a relative small number of principles.

Principles of Geo-Economics Under Conditions of Dependence

6. The probability of a dependency geo-economic formation evolving, in which more powerful and economically developed societies engage in exploitive exchange will less powerful and less developed societies, is an additive function of:

A. The lack of technological development, coupled with low levels of physical and human capital formation, for extracting resources and converting resources into finished goods and commodities by the indigenous economy of a society.

B. The lack of infrastructural development for distribution of domestically produced c ommodities and services in the economy of a society.

C. The lack of development and differentiation of (1) markets for distributing goods and services and (2) meta-markets for distributing financial services, equities, capital, bonds, and other instruments of capital formation in the economy of a society.

D. The lack of bargaining power possessed by polity in a society which, in turn, is an additive function of:

i. the lack of highly valued human and physical capital resources that cannot be easily secured elsewhere in the geo-economic system

ii. the lack of a strategic position in global and regional geo-politics among societies

iii. the inability of polity in a society to mobilize all bases of power to control domestic production and to resist incursions by political and economic actors from more developed societies

iv. the lack of a sufficiently large population, labor pool, and market demand for goods produced by developed societies
v. the inability to overcome the conditions listed in 6-A, 6-B, and 6-C above

The Dynamics of Free-Market Geo-Economic Inter-societal Systems

Free-market inter-societal systems are built from trade relations among corporate actors from different types of societies, including: for-profit private corporate units, state-sponsored corporate units, and cartels of corporate units. The dynamism of inter-societal units increases when markets are, indeed, open and free and when chartered, for-profit corporate units dominate with relatively light regulation to assure that contract and laws are adhered to. This dynamism also leads to market collapses, which are inherent in capitalist production and exchange relations, *per se*, and which are dramatically increased by vertical meta-markets in which the medium of exchange in a lower-level market becomes the commodity exchanged at a higher level, more speculative meta-market, such as equity markets, money markets, futures markets, mortgage markets, derivative markets, etc. When left unregulated, meta-markets will expand (Braudel 1972, 1977, 1979; Collins 1990) and become a driving force for growth in the economies of geo-economic actors, as well as collapse in their economies.

Over time, selection pressures favor regulation of geo-economic markets through laws governing international trade, treaties among key economic actors, policies of NGO actors such as the World Bank and World Trade Organization, and consortiums and agreements among large economic actors (e.g., G7-, G8, or G-9 depending upon who is currently allowed to be a member), national regulation of dominant trading markets (e.g., London and New York Stock exchanges), Trade agreements within regions (e.g. North American Trading Agreement, European Common Market). The effectiveness of these regulatory forces varies, depending upon the current political alliances among powerful societies, geo-political strains and conflicts, and Juglar cycles within and among various societies.

The fundamental problem in geo-economic systems relying on free markets is that it is difficult to create and sustain control by international law and tribunals, enforced by fiscal punishments and, ultimately, coercive power. Societies fluctuate in how willing they are to subordinate themselves to external authorities, particularly when they are in geo-economic and geo-political conflict with the very societies making the rules and enforcing them. This fundamental problem makes, I believe, the often hypothesized movement to a one-world system very problematic. In addition to these regulatory problems of creating a viable world government, the size and diversity of a world system of 7 billion people is probably beyond the organization capacities of humans by any known set of structural and cultural tools.

Moreover, inter-societal free-market systems are often composed of societies where the respective domestic markets of each society are variously regulated or unregulated, and where the political systems vary by such critical factors as degree of democracy and level of management of production and distribution within the society. The less regulated are the markets of members in an inter-societal geo-economy, the more dynamic can these markets become but, at the same time, they also more prone to over-speculation and collapse..

The world-capitalist system that has evolved over the last 200 years, especially the last 40 years, has also depended upon the elaboration of meta-markets that are global; and in turn, these markets depend upon dramatic advances in computer and communication technologies that make trades across the globe virtually instantaneous. At the same time, these distributive infrastructures in global markets increase speculation and potential collapse of specific sets of markets and, potentially, the entire global system of markets. And, as is evident today in a number of obvious places, and as will be evident in the indefinite future of the globe, geo-political dynamics can intervene in highly destructive ways and unravel a geo-economic inter-societal system.

Free-market geo-economic inter-societal systems will evolve into economic-base empires, often supported by geo-political coercive force, when key actors within the societies of these systems can (a) produce goods and services in high demand, (b) produce and distribute these goods and services at a price and/or quality advantage over other actors in other societies, (c) subsidize this production in domestic markets, thereby giving corporate actors advantages in inter-societal markets, (d) erect trade barriers that allow domestic producers to retain their advantages in domestic markets and in balance of trade, (e) rely on inexpensive labor as a draw from capital and technological investments from other societies. Yet, in free-market geo-economic systems, such strategies are difficult to sustain in the long-term because trade barriers will often be challenged in international tribunals or countered with new import tariffs on goods produced by protectionist societies and because labor costs inevitably rise, even with societies importing labor, and create disincentives for foreign investment, which will generally seek a cheaper source of labor.

Yet, these kinds of strategies often allow semi-peripheral societies (in world-system's terminology) to grow and become more politically powerful, with the result that they can become more central players in a geo-economic system, and particularly if their accumulating wealth allows them to also become politically and militarily well-organized. The result is that geo-politics inevitably penetrates and intersections with geo-economics, often causing disruptions to geo-economic systems. The result is that free markets become more difficult to sustain, and if geo-economic systems experience inevitable contractions (inherent in capitalism), geo-political actions may begin to intersect to the degree of disrupting or causing a contraction of the geo-economic systems. Indeed, the politics of a society will, when societies experience domestic recessions, begin to have ever-greater influence on economic actors in a geo-economic inter-societal systems.

Indeed, it is quite possible that the existing geo-economic system could "crash" and cause a retreat to more a local regional systems, such as the North American Free Trade Agreement, as the larger global system enters a period of contraction and perhaps heightened military tensions among key geo-political actors.

Dependency Geo-economic Formations. Dependency and free-market formations reveal somewhat different dynamics, although the basic exchange principles are the same. A dependency system is created when one actor has valued resources that another actor cannot secure easily elsewhere, thereby giving this actor with resources a power-advantage that will be used in exploitive trade. Yet, as Richard Emerson (1962) emphasized in his power-dependence model of exchange, dependent actors will seek balancing strategies when confronted with an exploitive exchange. Such strategies can involve finding alternative sources of resources, offering resources that power-advantaged actors cannot get easily elsewhere, doing without the resources of power-advantaged actors, and other strategies to reduce dependency. Thus, an exploitive exchange relationship is inherently unstable, and even if a society cannot break dependency, the internal conflict that may emerge in a dependent society can destroy a power-advantaged society's investment. Thus, domestic politics can erode the advantage of foreign actors that have been exploiting a dependent society that, ironically, gives the dependent society yet another type of balancing strategy (revolts, riots, terrorism) to pursue.

7. The likelihood of a dependency-market empire, in which the more powerful and economically developed societies engage in exploitive and unequal exchanges of resources with less powerful and developed societies, is an additive function of:

A. The lack of technological, physical, and human capital formation in the less-developed society for extracting resources and converting them into goods and commodities.
B. The lack of infrastructural development in the less-developed society for the distribution of resources domestically and internationally.
C. The lack of development and differentiation of domestic (a) markets for distributing goods and services and (b) meta-markets for distributing financial services, equities, capital, bonds, and other instruments of capital formation in the less-developed society.
D. The lack of a developed and differentiated financial sector in the domestic economy, particularly for banks, insurance, and investments regulated by positivistic legal systems and centralized polity, in the less-developed society.
E. The lack of bargaining power possessed by the less-developed society which, in turn, is an additive function of:
   i. the inability to overcome the conditions in 7-A, 7-B, 7-C, and 7-D above

ii. the lack of a strategic position in global or regional geo-politics that can be used as bargaining ploys in negotiation of rates of exchange in the overlapping geo-economic system

iii. the inability of polity in the dependent society to mobilize all bases of power, especially the material incentive, symbolic base, and administrative bases relative to over-mobilization of the coercive base of power, to regulate production.

iv. the inability of polity of the dependent society to resist external incursions, whether coercive or economic, into domestic economic and political processes

v. the lack of a sufficiently large population base and higher-income labor pool to support internal market demand for goods and services produced and distributed domestically as well as demand for goods produced internationally

F. The persistence of a dependency geo-economic systems is a function of the inability of dependent societies to develop and employ balancing strategies with respect to:

i. Finding alternative sources of resources from more developed societies and playing these societies off against each other

ii. Mobilizing coercive power, whether by the state or revolutionary element of the population, to challenge existing domination by external economic and/or political actors.

iii. Doing without resources from external actors and developing domestic means for securing these needed resources

iv. Providing valued resources to external powers, particularly using strategic locations in a geo-political system, to negotiate for needed economic resources

v. Reducing alternative sources of resources needed by the more powerful and developed societies by forming coalitions among the potentially dependent societies

vi. Finding a means to be the mediator of exploitive relations between developed and undeveloped societies, using this middle position to develop the infrastructures and other institutional systems reducing dependence on external actors

Free-market Geo-economic Formations. Free-market geo-economic formations are rarely wholly free or equal in exchange relations. Typically, there are, in world-system terms, core nations that have advantages that they can use to create, at least for a time, economic dominance of other societies. Such “empires” tend to be short-lived because of the dynamics of capitalism whereby economic actors always seek to maximize profits, even at the expense of undermining economic hegemony of the societies where they are chartered.

8. The probability of a free-market empire forming, where economic actors in one society or transnational agencies of a this society, can intervene and, to varying degrees, control markets in another society or societies, is an additive function of:

A. The scale of global markets linking both developed and less developed societies which, in turn, is an additive function of:
   i. the level of development and prevalence of chartered corporate units in developed societies and their need for less expensive labor and material resources in other societies
   ii. the level of capital formation and reach of transnational agencies in developed societies to infuse capital, technology, and entrepreneurial models into less developed societies
   iii. the existence and power of transnational mediating agencies and tribunals to arbitrate trade disputes among developed societies and to enforce decisions
   iv. the level of development of transportation and communications technologies
   v. the level of development of transportation and communication infrastructures by economically developed societies across large portions of the globe
   vi. the development of meta-markets in developed societies for trading financial instruments across a large number of societies, both developed and undeveloped
B. The capacity of one or more societies in global markets to:
   i. produce goods and services in high demand and low supply in global markets
   ii. produce goods and services that enjoy price and quality advantages over alternative producers
   iii. procure resources necessary for production by domestic actors from dependent trading partners, or from global markets where supply exceed demand
   iv. exert disproportionate control over global meta-markets and influence over transnational agencies fostering development
   v. use superior coercive power to force favorable trading arrangements by either threats or alliance formation in a geo-political system
C. The likelihood that one or more historically less-dominant societies in a geo-economic system will become an economic power in this system is an additive function of:
   i. the capacity of the less-dominant society to protect domestic markets from imports from other global economic actors without retaliation by the polities of others societies which, in turn, is an additive function of:
      a. the bargaining capacities of polity to promise future trade concessions in opening markets in exchange for immediate access to other societies' domestic markets, with these bargaining capacities increasing with:
         1. the size of a society's population and potential for generating high levels of market demand for goods and services in the future and, hence, profits for developed societies

2. the size of the low-cost labor pool of the society as an incentive for external actors to invest technology and capital into order to enjoy the price advantage over competitors their own domestic markets and the markets of other societies in the geo-economic system

ii. the ability of the polity in a less-dominant society to protect its own natural resources for domestic production rather than export to other societies and/or to secure needed resources from other societies at low costs

iii. the degree to which a less-dominant society occupies a strategic position in the geo-political rivalries of other developed societies and, as consequence, can use this position to negotiate technological and capital investments from competing developed societies

iv. the degree to which a society occupies a strategic or central position in markets and meta-markets of the global system of markets

v. the degree to which a society has greater political and/or economic power than its immediate neighbors in the larger geo-political and geo-economic systems

9. The likelihood of breakdown and collapse of geo-economic inter-societal systems and empires is an additive function of:

A. Instability in global meta-markets or the meta-markets of a central economic hegemon(s)
B. Warfare among regional powers or global hegemons, for whatever reasons, but particularly over trade disagreements
C. Global economic recessions and economic collapse that cause polities in the global system to install trade barriers and other restrictions to protect domestic production

Conclusion

I realize that for many, these kinds of propositions are too general and cannot explain unique historical details. But, if world-systems theorizing is to be truly theoretical and explanatory, it must develop something like the principles offered in this chapter. Otherwise, explanations will be historical, tracing sequences of events in inter-societal systems over time. There is nothing wrong with such historical explanations but they are not scientific; they do not explain the general and generic dynamics of geo-economic and geo-political formations in all times and places. The generalizations that I offer assume, however, a certain level of political and market development, but they can also apply to simple horticultural and agrarian systems, and as Chase-Dunn has consistently emphasized and demonstrated, very small geo-economic and geo-political inter-societal systems can also be subject to theoretical explanation in much the same terms as large and complex systems. Thus, the generalizations enumerated above may need some reformulation to be

truly explanatory across all types of inter-societal systems that have ever existed and that are likely to exist in the future.

I am not sure that most "world-systems" research and theory should use this label anymore because what is really being address is inter-societal systems from the simplest to most complex phases of societal evolution. True, there is something like a core, periphery, and semi-periphery at many historical periods, but I am not convinced that we should continue to use this tri-part distinction because it does not hold up in all times and places. It is better to include in theories the *relative amounts* of power and/or economic development and how these generate *generic types of relations* among societies—types of relations that extend beyond those now conceptualized by the tri-part ideal type of core, periphery, and semi-periphery. Beginning with non-universal categories and assumptions that do not denote the key properties of **all** inter-societal systems leads to a shoving and stuffing of empirical reality into these categories. Even though Chase-Dunn' still employs the tri-part distinction among core, periphery, and semi-periphery, this is done, I think, to emphasize the importance effects of the semi-periphery in the dynamic of inter-societal systems, such in periodic upsweeps of inter-societal systems. But, it would be better, I think, to employ a somewhat different label, if only to escape the constraints of Wallerstein's categorization, which does not work well in pre-literate and pre-capitalist inter-societal relations. And, the iteration model does not need the Wallersteinian categories because hierarchies among societies can take many different forms; and in fact, the emphasis on inter-societal stratification by power and wealth may be better without the core-periphery distinction which, for a time, was useful in making inter-societal systems the unit of sociological analysis but, now, with the enormous advance of world-systems theorizing and research it probably less essential and necessary as a legitimating intellectual ploy. Inter-societal systems are an appropriate units of analysis for understanding virtually everything about patters of human social organization. There are fundamentally more important conceptual distinctions and theoretical models and principles built around these distinctions than the core-periphery distinction. It is time, I think, for more theoretical principle and probably better ones than I have enumerated to explain the dynamics of inter-societal systems.

About Author

Jonathan Turner is 38th University Professor of the University of California system, Research Professor at U. C. Santa Barbara, Distinguished Professor of Sociology of the Graduate Division, U. C. Riverside, and Director of The Institute for Theoretical Social Science, Santa Barbara, CA. He is primarily a general theorist, seeking to develop abstract propositions and principles as well

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Evolution and World-Systems:
Complexity, Energy, and Form[1]

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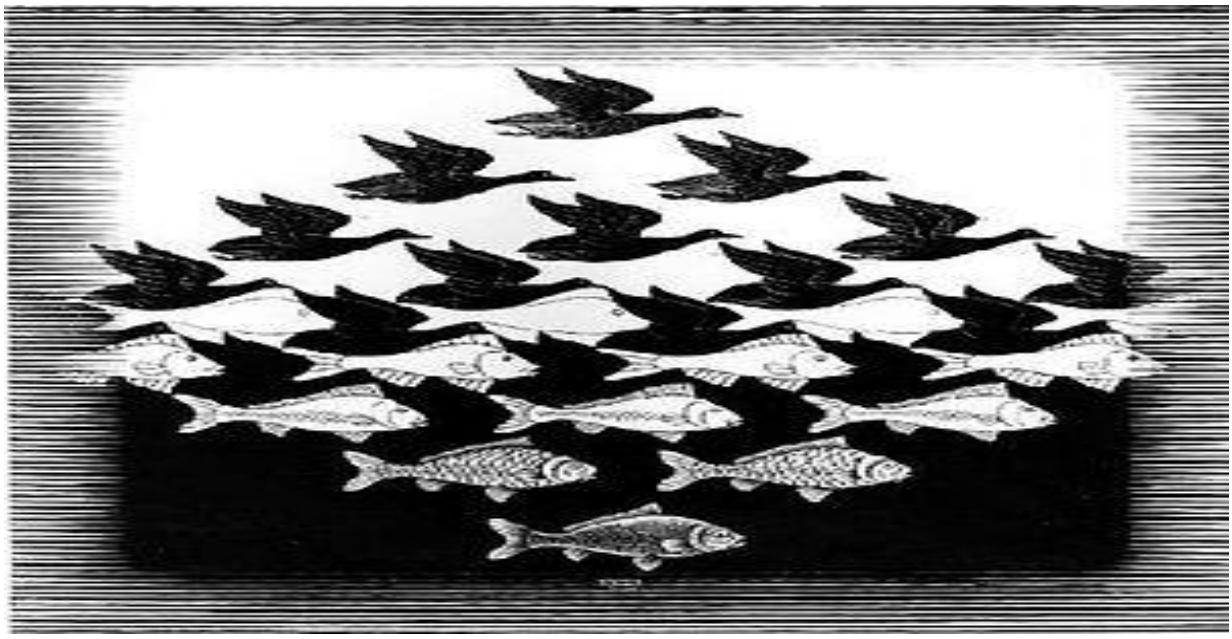
Abstract

World-Systems Theory and Complexity Theory are siblings from the same parent of Von Bertalanffy's foundational work on general systems theory. But they were ideologically separated at birth. World-Systems emerged out of dependency theory, itself a product of and reaction to neocolonialism after World War Two. Wallerstein's historical analysis of the origins of unequal exchange in the "long" 16th C., first within Europe, and then encompassing its colonies, extended dependency theory's exposure of exploitation by demonstrating the systemic consistency of geopolitical parasitism well before the modern era. Christopher Chase-Dunn has furthered that insight by using empirical research on the unequal exchange between the earliest known polities. His work has additionally shown how the methods of cross-polity parasitism have changed over time, both creating and undermining the empires of history in response to changing ecological and climatic constraints. His work also shows how systemic change often starts in the creative conditions unique to semiperipheries. The other child of general systems theory evolved in the worlds of physics and computer science, becoming known first as Chaos and later Complexity theory. It too expanded, demonstrating that positive causal feedback loops of energy and information could explain the life-processes of biology and evolutionary theory. Given their common ancestry and attention to the flows of energy and information, their re-connection was inevitable. This paper seeks to merge them. The approach will be to use complexity to explain how entropy builds structures on a physical level, then how those same dynamics created life, drove evolution, and continue to drive social complexity from our nomadic roots to our current global strife. The work of Chase-Dunn will be shown as logically consistent with complexity theory, and ideally a marriage of the traditions completed. As a former student and life-long colleague of Chase-Dunn's, the author is also paying homage while pointing a way forward.

Keywords:

[1] The author would like to acknowledge the intellectual advice and assistance of the following, in alphabetical order: Dr. Eugene Anderson; Dr. Christopher Chase-Dunn; Dr. Jeffrey Kentor, Dr. Barbara Larcom, and Dr. James Lunday.



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Complexity Theory: The Next Step Of World-Systems Theory

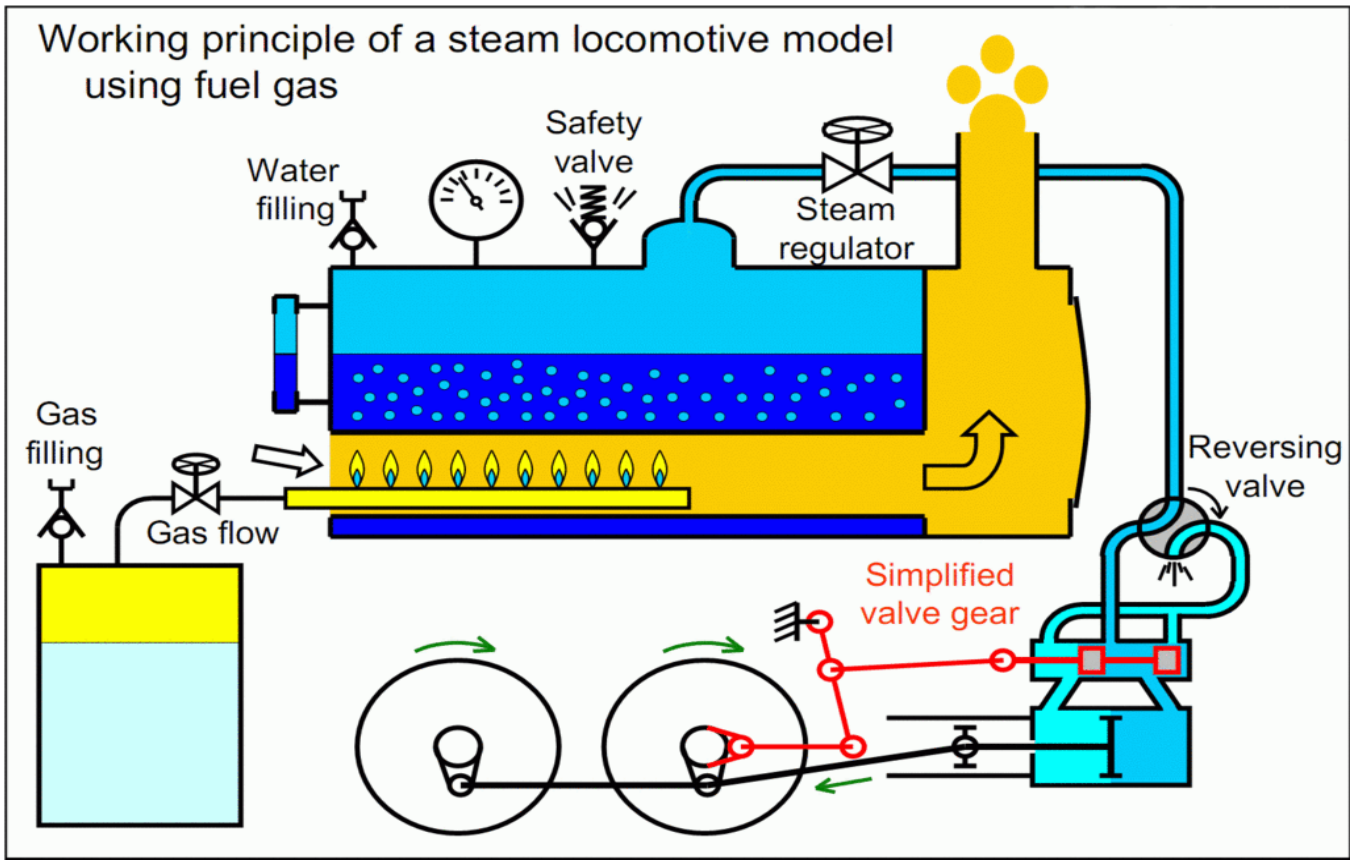
We are now several decades into another scientific revolution. Chase-Dunn's extension of Wallerstein's categories of the core, semiperiphery, and periphery into the distant past highlighted the continuity of unequal exchange since the first human settlements.[2] This theoretical expansion opened the door to connecting unequal exchange to energy flows, enabling us in turn to link history to complexity theory. This essay seeks to extend this link and explore the potential for complexity theory to further the promise of an ultimate scientific unification of the social, historical, and ecological findings of Chase-Dunn and colleagues with the simultaneous breakthroughs of complexity in physics and biology. To do so we must first explain what complexity theory is, and why the theory itself appeared. What follows will be a sketch of its history, along with selected examples chosen to illustrate its principles. We will begin with the simple example of the steam engine: how it worked, yet also how its limitations changed our understanding of physics, opened the door to thermodynamics, and exposed the path toward complexity.

[2] (Bertalanffy 1968).The entire list of sources by Wallerstein and Chase-Dunn is too lengthy to be included within this sentence, but can be found in the bibliography. Specific works will be cited within the text.

The Steam Engine: Power, Efficiency, And Thermodynamics

The schematic engine in Figure 1 strips the concept to its essentials. The steam engine was initially applied to pumping water out of English coal mines, then to powering textile looms, and only later to locomotives in the 1820s. But all used the same logic as in Figure 1, which happens to be a locomotive. A fuel source--here in the diagram natural gas, but initially wood, coal, or anything else that burned— would be placed under a horizontal hermetically sealed cylinder (the boiler) filled partially with water. When the water boiled into a gaseous form as steam, the steam would quickly fill the area within the boiler above the water, displacing and pushing the original air out via the safety valve pictured above the boiler in the diagram. Once the steam pressure had reached a critical value sufficient to overcome the inertial mass of the entire machine (indicated by the pressure gauge atop the boiler), the "steam regulator" valve would be opened. Super-heated and extremely energetic steam would race through the pipes to fill up the piston mechanism (lower right).

Figure 1. Schematic View of a Steam Engine



Source: Image courtesy of Amos Wolfe 8/18/2010, License Creative Commons, http://creativecommons.org/licenses/by-sa/3.0/

The result was the transfer of the steam to the piston chamber, which could only release that enormous pressure-power by pushing the piston to the left (in the illustration). That piston-push transferred the steam pressure energy to the steel rods bolted to the rims of the wheels. The movement of the wheels released the hot steam inside the piston into the air while restoring the piston to its original position, enabling the next cycle. Sufficient energy from fire (***FORCE***) was generated, converted, and channeled into overcoming ***(MASS)*** to result in movement ***(ACCELERATION)*** hence overpowering ***(INERTIA)***. The entire apparatus was a practical application of Newton's law **F=MA**, and another triumph of physics (Atkins 1994; Summers 1971).

Once a steam engine had been purchased at great expense, it needed constant maintenance by skilled mechanics, another cost. Further, it needed a steady supply of fuel, preferably coal, because coal packed the greatest amount of combustible energy into the smallest volume of any fuel then known. In the early 19th Century coal was mined in crude tunnels vulnerable to flooding and collapse, at great cost in labor and lives. It was expensive, so every effort to minimize its use was deployed by successive improvements in the design of the steam engine to increase its energy efficiency and minimize its fuel consumption. As with all learning curves, initial design changes yielded a rapid increase in efficiency, beyond which further changes seemed to approach a ceiling that could not be broken. Exploration of this stubborn barrier would reveal an entirely new realm of physics called **Thermodynamics**, in turn opening the door to complexity theory. Starting with the study of gasses and later fluids, thermodynamics explained why **all** energy transfers in form (like those from the flame in the steam engine to the boiling water, or from the steam in the boiler to the piston, and ultimately the wheels) **must** cost energy at every step of conversion. This recognition of the necessity of energy loss was the core gift of thermodynamics, and its crown jewel. It is generalized as the second law of thermodynamics[3], the law of ***ENTROPY***—the requirement that all sources of energy must ultimately lose that energy to their environment, in the process creating an equality between any energy source and that environment (Atkins 1994). Phrased another way, ***all differences in the distribution of energy in space must disappear over time, such that all areas achieve energy equality, or thermal equilibrium*.** To understand this on a practical level, let us return to the steam engine and more closely examine its parts, starting with the flame.

[3] The first law of thermodynamics is that energy cannot be created or destroyed. Hence the energy supplied by the "big bang" has remained constant ever since (Atkins 1994).

Figure 2. The Candle Flame Is A Common Dissipative Structure

Source: https://duckduckgo.com/?q=free+use+download+candle+flame+pictures&t=ffsb&ia=images&iax=1

Careful examination of the flame in Figure 2 reveals some of the key insights of complexity theory drawn from studying everyday gases. First, the *shape of the flame* is the same as all candles everywhere in space and time. That constant shape is determined by the rate at which the surface area can shed the heat inside the volume of the flame. The shape of a flame will always approximate a "teardrop" because that is the most **efficient** way that the heat within the core can achieve thermal equality with its environment, obeying the law of entropy. Yet the entropic process of shedding its excess energy compels the flame to conform to a predictable **shape**, or ***STRUCTURE***. The flame illustrates a fundamental principle of complexity: in the process of "seeking" thermodynamic (energy) equilibrium with its environment and thereby conforming to the law of ***ENTROPY,*** the flow of energy can ***SELF-ORGANIZE matter into entirely new structures.*** Hence there is no contradiction between the law of entropy and the creation of new structures. Because they emerge as efficient methods of ***DISSIPATING*** spots of high energy into their environment, complexity theorists call the emergent structures ***DISSIPATIVE STRUCTURES*** (Grimes 2012, Lehn 2002, Nicolis 1989, Prigogene 1996, Prigogene, Ilya; Isabelle Stengers 1984)**.**

Another aspect of the flame's service to entropy lies in its colors. The photograph in figure 2 captures many of them, but not all. Once the wick is ignited, the energy creates a flame as it raises the temperature of the wick high enough to begin combining it with oxygen, high enough also to

melt the "wax" below the wick into a liquid, which is in turn drawn via osmosis up the wick to meet the flame, replacing the fuel of the wick with the gas boiling off of the wax. It is the oxidation of both wick and gas that releases its chemical energy as light. The energy is high enough at that meeting at the bottom that the light it releases is ultraviolet, beyond human perception. So to the human eye it looks clear. But hidden from our eyes, the high-energy ultra-violet photons of light emitted at the base of the flame are themselves boiling the wax liquid, generating yet more super-heated gas. It is a positive feed-back loop of energy: a mutually causal cycle of (gas +UV photons)➔(liquid wax) ➔(more gas)➔(UV photons). Usually run-away energy feed-backs like this lead to explosions, unless there is a complementary negative feed-back releasing the energy. Here there **is** a negative feed-back—**the flame itself**, which is the escaping hot gas made visible as it shoots upward and cools, dissipating the energy as it rises. The next step down in energy release is the deep blue captured in the image, sequentially shifting through the color spectrum as one's eyes move toward the top of the flame, fading off into deep orange and infrared (uncaptured in this image) as each molecule in the gas passing through the flame releases photons of declining energy, ultimately perceptible only as residual smoke that has ceased glowing at all in the realm of human perception. These colors within the flame are as predictable as its shape, another aspect of the structure imposed by the dissipation of entropy.

What is actually happening inside a flame reveals three observations of complexity theory that apply to every system studied:

(1) The Law of Entropy requires that pockets of space with more energy than their surroundings will release that energy until the entire environment has the same energy and has thereby achieved thermodynamic equilibrium.

(2) The material medium through which the energy passes will self-organize into a structure that is shaped to maximize the speed of achieving equilibrium, a dissipative structure persisting until general energy equilibrium is achieved.

(3) The structure's energy circulates in a balance of positive and negative causal feed-back loops. If either loop is disrupted, the structure will collapse (Holland 2014, Mitchell 2009, Lineweaver, Charles H.; Paul Davies, Michael Ruse 2013).

Throughout the examples below we will encounter these rules frequently, and build upon them additional rules which, taken as a whole, will provide us with some of the tools to understand their application to human socio-cultural evolution.

But let us first return to the steam engine to watch how these rules apply to it in ways unknown to its first designers. Recall that the flames beneath the boiler in figure 1 are the source of the energy for the entire engine. That flame energy is a gas glowing in a dissipative structure as it emits photons while shedding energy. The gas flow does not stop at the boiler, but shoots beyond,

up, and out through the chimney in front. So we have already lost energy twice—in photons that never strike the boiler at all but leak out the sides, and again when the flames quickly caress the boiler while speeding to the chimney. Hence the water inside the boiler does not—indeed it cannot—receive all of the energy in the fuel. Assuming we are initially working with a cold engine, the water in the boiler starts at the same temperature as the steel and air around it—thermodynamic equilibrium (Atkins 1994).

Before the fuel beneath the boiler is ignited, the equilibrium of the water inside with the surrounding steel and air has some qualities important to complexity theorists. The water itself is of course made of H_2O molecules in fluid form, which means that the molecules share some bonds (swapping electrons) but are much freer to move around than they would be as solid ice. All are able to bounce around and off of each other, reflecting the energy of the overall temperature of the environment. If one could imagine the water *as if one were a water molecule inside the cold boiler*, everywhere you "looked" you would see the same view: other water molecules bouncing about randomly. The view would be the same in the front section of the boiler as in the back, bottom, top, or sides. All views would appear **identical**, meaning that all locations would be **symmetrical**. All would be a fog of ***SYMMETRY***. In this sense **space itself** would be symmetrical, so the very concept would lack meaning. Further, as long as the energy (temperature) remains the same, so are the views of the same fog over time. **Hence time also is symmetrical, lacking meaning** (Nicolis 1989). This quality of space-time symmetry, sameness, and homogeneity is true of all circumstances lacking energy differences (such as the vacuum of inter-stellar space).

However, once the fuel beneath the boiler is ignited, ***the symmetry of the water is broken because shapes emerge within it***. As the water at the bottom eventually warms, the warmer molecules bounce more vigorously and take up more space. That also means that the molecular density of that warmer water decreases, allowing the denser and heavier cooler water above to fall into the empty space created by the warmer area below, displacing the warmer water and compelling it to rise. As the warmer water rises, it dissipates its energy to the cooler water surrounding its path to the surface, where it releases its remaining energy into the air. Sluggish at first, the constant injection of the energy from the fire below gradually accelerates the circular flow of cooler water to the bottom and warmer to the top. Once the average temperature within the boiler has breached a ***critical threshold***, the water "boils." The effects throughout the water are immediate and dramatic: vertical columns from the bottom to the surface spread to immediately consume the entire chamber, snapping into adjacent spaces. Along one side of every column the water races to the surface, ejecting water molecules in gaseous form to release energy, while the opposite side of every column is violently sucking (cooler) water back to the bottom. This instant reorganization of matter is a ***PHASE-CHANGE*** (Atkins 1994, Nicolis 1989). The former symmetry of the water is broken by the appearance of the columns, collectively self-organized into

tightly packed dissipative structures shaped to maximize the efficient dispersion of the concentrated fire-energy into the environment, in the service of entropy. As with the flame, these structures contain causal feed-backs, circulating columns of water from hot to cold. Finally, as with the flame, the new structures shatter the symmetry of space and time. Our hypothetical observant water molecule can now determine its location (whether it is in an up or down flow in, say, the third column from the back, fifth row), as well as time (by traveling horizontally at the same speed across columns while marking the time between traversing the equally spaced column locations) (Nicolis 1989).

Close examination of the flame and the water in the boiler not only ratifies the first three rules of complexity listed above but now allows us to add another. ***The spontaneous appearance of self-organized dissipative structures marks a "phase-change" within the affected matter*** (Nicolis 1989). In the case of the flame, its ignition imparts enough energy to a stable solid (wick and wax) to break its molecular bonds and combine them with oxygen, yielding enough energy to force them into a phase-change (liquid ➔ gas). In the case of the boiling water, the tightly packed adjacent columns of vertically circulating water also reflect the transition of the phase-change from fluid to gas. In each case the spontaneous appearance of a dissipative structure marks a phase transition. Below, we will see this pattern repeated within natural processes and even echoed in human social forms.

To complete our improved understanding of the steam engine in the light of complexity, let us follow the energy of the steam in the boiler to the wheels. The pipes from the boiler provide an escape for the super-heated steam. Along the way, the now-hot boiler is also freely radiating its heat to the air around it, as are the pipes leading to the piston chamber, and even that chamber itself (with more energy loss). Even so, enough hot steam enters the piston chamber to force the piston to move, in the process converting the gaseous energy of the steam into mechanical movement of solid metal, ultimately moving the wheels. Solid metal does not change shape with energy (unless it melts); instead it can move in space with time. As it does so, the bolted connections between the piston and wheels lose yet more energy in friction, as do the wheels grinding against the rails (Atkins 1994).

In summary, it is now clear that every change from one form of energy into another necessitates an energy loss, and no engine re-design could eliminate that loss.[4] The failure to do so during the 19th C.—the failure to break the ceiling of energy efficiency—ultimately gave birth to the field of thermodynamics and its second law, the law of entropy. Ironically, a close examination of the steam engine—the iconic materialization and triumph of Newtonian

[4] The peak efficiency of modern steam engines used today for electric power generation is about 40% (Summers 1971). That is the energy captured from the initial fuel. The remaining 60% is lost to the environment.

mechanics—yields the very flaws of energy leakage generating the discovery of thermodynamics, entropy, dissipative structures, the self-organization of nature, and even life itself (Brooks & Wiley 1988; Kauffman 1993; Kauffman 2013).

Emergence And Self-Organization

The full implications of the law of entropy did not receive much attention until the 1970's and 1980's and the study of chaos (Gleick 1987, Waldrop 1992). The most profound insight from the renewed pursuit of entropy was that it was not just a ***law of decay***, but also a law of ***creation and emergence.*** The realization that entropy required that the energy loss through matter must reorganize that matter into new shapes, creating new structures along the way, introduced a revolutionary new view of nature (Atkins 1994; Bertalanffy 1968; Ford 1989; Gleick 1987; Holland 1995; Mitchell 2009; Waldrop 1992). The mechanisms creating gaseous flames and structures within boiling water were just the beginning. Once they were also coupled with phase changes in matter, other examples of self-organization were found in nature. One simple example is the role of entropy in creating a tornado.

Tornados

Storms are disruptions of a stable atmospheric environment at rough energy equality, like all other dissipative structures. Unlike steam engines, they are spontaneously produced by entirely natural forces, yet they also replicate many of the same mechanisms of entropic dissipative structures first noticed in the steam engine. To understand weather, a good place to begin is the moon, which illustrates solar absorption and release in its simplest form, without the complications of an atmosphere. The moon's surface is exposed directly to the sun, whose radiation quickly raises its naked surface to 117^0 Celsius. When that baking surface rotates into lunar night, the heat is quickly released into the absolute zero of deep space as infrared photons, plunging the night surface back again toward equilibrium with the surrounding vacuum. However, the earth has an atmosphere dragging behind its surface, absorbing (while protecting the surface from) the high-energy solar photons in daylight, and retaining the blanket of the daylight heat during the night, even as its surface and atmosphere also emit infrared energy out into space and back down to the surface. Complicating matters are the vast oceans, themselves retarding solar absorption and night-time release.[5] In addition, the annual wobble of the earth around its axis produces dramatic temperature oscillations with the shifting seasons (Burroughs 1992, Graedel, T. E.; Paul J. Crutzen 1993). As we saw with the steam engine, energy differences below a critical threshold do not change the local environment in an obvious way—warmer areas convey their energy into cooler areas quietly

[5] To simplify this story, many important causal influences must be minimized, skimmed, or ignored altogether, such as Hadley Cells, ocean currents, and the influence of mountains and vegetation (Graedel, T. E.; Paul J. Crutzen 1993).

and effectively. Yet we also saw that when the energy **difference** achieves a critical level, a ***PHASE-CHANGE*** in matter occurs: solids become liquids, liquids gases, or even the reverse (e.g.—a gas becoming liquid as rain; or a gas becoming a liquid and then a solid as hail).[6]

Every ordinary spot on Earth experiences breezes, cloudy days, and rain. These events represent the quiet efficiency of the equilibration of minor temperature differences. A violent storm can only occur under the rare conditions of large energy differences--differences between closely adjacent areas exceeding the ***critical threshold value of a phase-change***, the value required to create a dissipative structure.

Across the seasons the equator always receives the most solar energy. The warm ocean evaporates, and the hot humid air rises. But it does not leak out into deep space. That path is retarded by gravity: 90% of the mass of earth's atmosphere lies within the first mile above the surface. A portion of the tropical air will follow the tropospheric ceiling toward the nearest pole. When it moves far enough away from its tropical birth it will encounter colder air, compelling it to release its heat via rain. This is a routine dynamic that happens all year. But when the closest pole is approaching winter, the encounter can expose energy differences approaching the critical threshold, creating the violent dissipative structures we call tornados. It is this clash that makes us correctly associate violent weather with seasons (Robinson 1993).

Temperature is molecular motion within any material medium, regardless of its phase (solid, liquid, gas). The shift from one phase to another is just an outward sign of the reorganization of the bonds between molecules and their speed. As in the case above of the steam engine boiler, cooler forms of water have less energetic molecules that are more densely packed and heavier per volume. The hotter a phase, the more vigorously the molecules collide and create more space between them, making hotter media more loosely packed and lighter. Yet, paradoxically, in hotter and less dense atmosphere *more water molecules can be suspended and retained per volume than in cooler and denser air*. A good metaphor reconciling this paradox is to imagine the hotter air molecules as enthusiastic volleyball players, where the volleyball is the H_20 molecule, and the energetic players the high temperature atmosphere. The rarity of the molecular distribution of the hot air molecules is compensated for by their speedy juggling of the water. This contrasts with the denser cooler air, whose atmospheric molecules are sedated and unresponsive, constantly dropping the ball and allowing it to bounce straight down as rain or dew, allowing the water to clump into clouds blocking the sun.

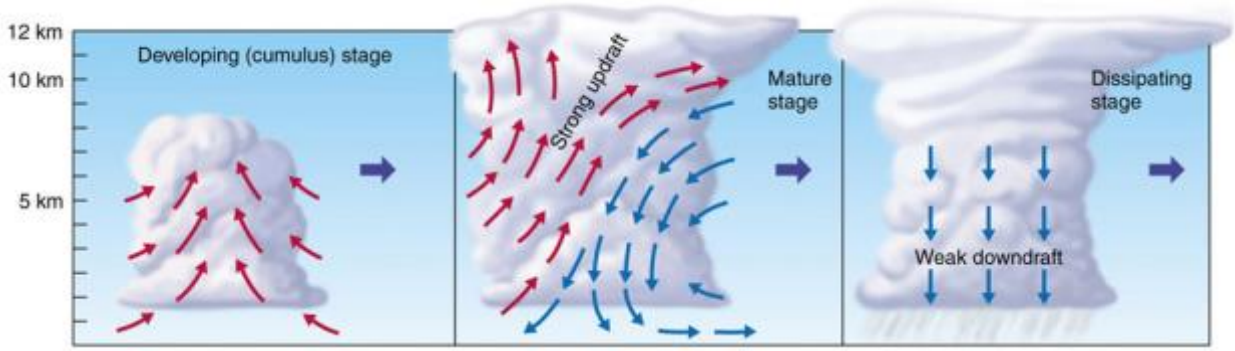
Such is how an ordinary rain-storm develops. Even during seasonal clashes when the energy differences are at their highest, the encounters between cold/dry and hot/humid air masses only

[6] Unnoticed by us in daily life, such phase transitions are always happening around us, but at rates so slow we ignore them: ice evaporates into water vapor, dead wood oxidizes without flame, etc. It is the speed of these phase transitions that creates the dissipative structures addressed here.

rarely produce tornados. Why they are rare remains unclear, but complexity theory suggests a direction to look: As with the steam boiler, there probably are conditions within the atmosphere that create some kind of boundary**,** enclosing, channeling, and ***forcing*** the violent thermal clash creating these dramatic dissipative structures. One such boundary is between the troposphere and the stratosphere, with gravity along with widely separated molecules constraining the height that clouds can typically go. But this ceiling can be broken with enough energy. Clouds bearing tornados have been observed as high as 50,000 feet, deep into the stratosphere (Robinson 1993). There may also be other similar ground forces at work pushing divergent air masses to clash. For example, the mountains in the west of the United States channel cold air south during the fall into the warmth of the Mississppi valley and tropical Caribbean basin, while the reverse movement of humid air flows north in the spring (Robinson 1993). Whatever the exact circumstances, it would be consistent with the observation from complexity theory that ***dissipative structures emerge under compulsory bounded and channeled constraints***; and that ***the complexity of the resultant structure(s) reflects the volume of the energy*** being forced to clash. What remains unknown is *not why tornados appear*, ***but rather why they are so rare***.

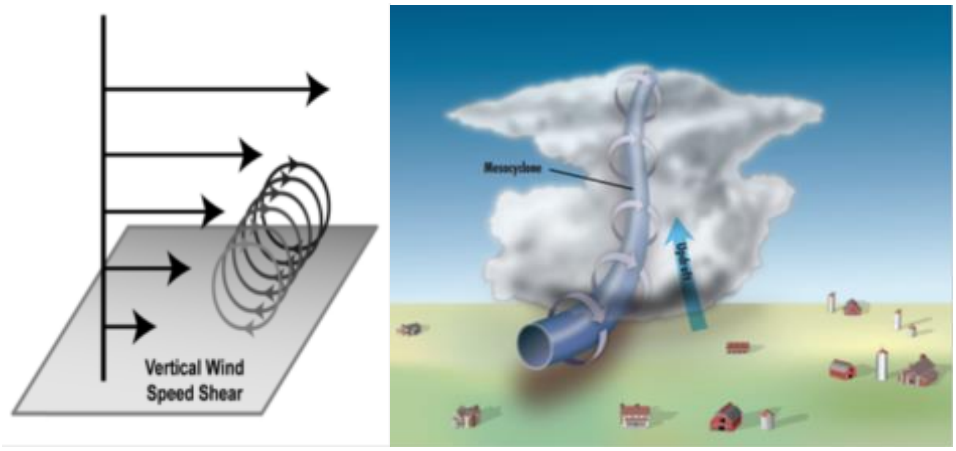
Figures 3, 4, and 5 below illustrate the special conditions producing a tornado. The three schematic images in Figure 3 (below) start on the left with the upward hot air flow typical of all thunderstorms, producing visible water vapor in the form of a cumulus cloud as it cools. The middle image illustrates how sufficiently hot air can punch up to 35-50,000 feet, forcing the cloud to flatten at the top, producing an "anvil" shape. Not shown here is that at such heights the cloud often changes color from dark blue to greenish yellow, because the water droplets at the top level have frozen into hail (phase-change), refracting the sunlight at the top downward through the cloud. What **is** shown in the second image is the beginning of a thermal circulation (*the same as in a boiler*) caused by the displacement of the cold air at the top by the hot air from the bottom, sucking cold air from high altitudes back toward the warm ground, where a portion is ***pulled back up with the hot air*** even as another portion spills across the surface as high-speed cold winds. If the energy clash is sub-critical, the outcome is a thunderstorm as in the third image on the right. If, however, the energy *breaches the critical value**, the cold downdraft in the middle image curls back up to create a self-amplifying cylinder***, as illustrated by the forces of wind shear in creating supercell mesocyclones in Figures 4 & 5. Also see photos in Figures 6 &7 below.

Figure 3. Three Stages Of Thunderstorm Development



Source: Image courtesy NOAA http://www.photolib.noaa.gov/

Figures 4 & 5. Wind Shear Creates Spinning Cylinder And Mesocyclone



Source: Image courtesy NOAA http://www.photolib.noaa.gov/

The enormous speed of the dissipated energy in a tornado tends to make their life-span short (3-10 minutes). Multiple "**daughter**" tornados are created when the **central storm has too much energy to shed efficiently with just one vortex**. These demonstrate how enough energy compels the creation of ***additional forms of increasing complexity***. The ability to spontaneously add new shapes is one reason dissipative structures are inherently unpredictable (Prigogene 1996). This ability is like speciation, or the division of labor within societies.

Figure 6. Tornado

Source: Image courtesy NOAA http://www.photolib.noaa.gov/

Figure 7. "Daughter" Tornadoes

Source: Image courtesy NOAA http://www.photolib.noaa.gov/)

To create and sustain complex structures far-from-equilibrium, external power is most effective when it is augmented by *amplifying causal feed-back loops recycling that power* ***within*** the new structure, like the circulating cells within a boiler or tornado. **These loops capture and prolong the influence of the external energy, retarding its release and enabling the construction of new structures**. Further, the causal loops not only help construct the structure, but are sustained by it. Once a complex structure emerges, it becomes an active agent in its own recreation (as in a mesocyclone, or the UV-wax-gas-UV cycle at the base of a candle). A central

contribution of complexity theory is that every component of a complex structure plays a role in its own reproduction: there are no **"epi"-phenomena**. Once created, every new form shapes the future of the entire structure. ***The integrated whole is more than the sum of its parts,*** *and collectively recreates the simpler elements from which it emerged* (Holland 2014).

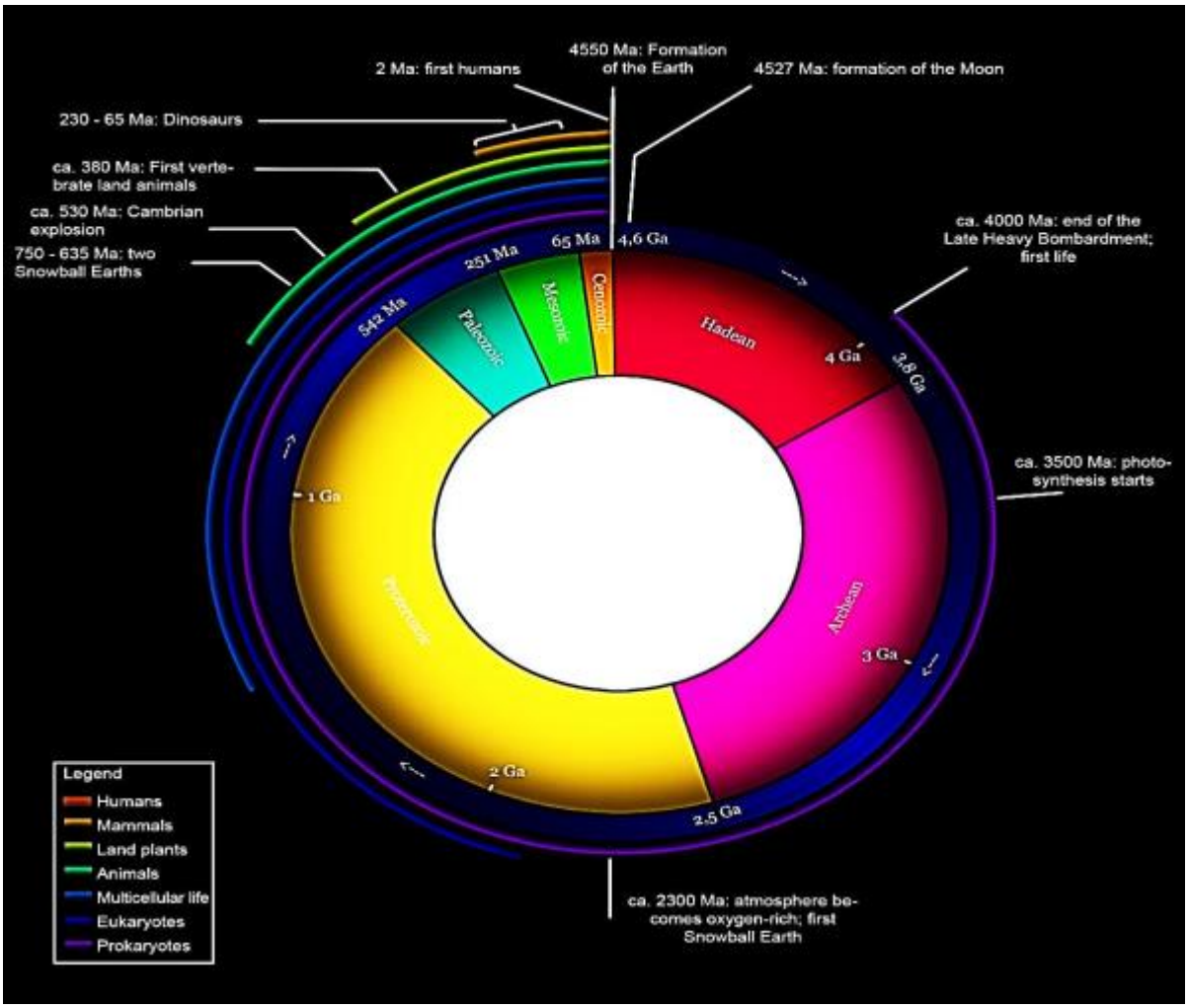
When any structure is compelled to develop new forms (like the "daughter" tornados in Figure 7 above) to dispel more energy, complexity theorists call this jump a ***BIFURCATION***. The result is unpredictable in advance. Since the precise qualities of the new forms created by bifurcations are shaped by their environment at a particular instant, they each reflect their own unique history (Holland 2014, Nicolis 1989, Prigogene 1996).

Life as a Dissipative Structure: The View from Complexity

The ability of dissipative structures to create unpredictable new shapes through bifurcation also extends to the speciation of life and to development of increasingly complex societal forms. The entire history of life itself is historically conditional, making it impossible to predict in advance. A corollary is that while extraterrestrial life may be abundant, its particular expression on earth is probably unique.

The circular visualization of the sequence and timing of different life-forms appearing on earth illustrated in Figure 8 serves as a map of evolution. It is a clock-face representing life forms since the initial formation of our planet up to the present (from 4.6 billion YA [here Bya is noted using the British notation Giga year or GA] to the present). The colored sections radiating out from the white circle at the center indicate major geological epochs and eras, while the in-most blue line enclosing the entire circle marks specific dates. Starting at 4 GA, asteroid bombardments drop off, allowing the first life to develop, indicated by the violet line just outside the blue circle. The side comments around that circle point to the emergence of the first photosynthetic life appearing around 3.5 GA. The color-coded legend on the lower left inside Fig. 8 indicates that these earliest life forms were Prokaryotes, cells lacking nuclei enclosing DNA. Just before the 2 GA mark during the yellow Proterozoic era, a blue line appears marking the evolutionary jump to

Figure 8. Schematic view of the evolution of life on Earth.



Source: Courtesy woudloper, 9/07 https://commons.wikimedia.org/wiki/File:Geologic_clock.jpg

Eukaryotes, cells with sealed nuclei containing DNA—the same cell design that built all later life forms and continues to do so today. Thereafter, an accelerating feed-back builds upon prior forms to sequentially create multicellular life, plants, animals, mammals, and humans: each represented by an additional band of a new color of shorter length. Clearly the emergence of new life forms is accelerating, as is complexity itself.

When new structures emerge from, yet augment, prior structures, they create more total complexity and internal hierarchy. When they do so at an accelerating rate it is a type of cumulative positive feedback called a "deviance amplification." Here the "deviation" is away from thermal equilibrium, the building of structures whose complexity requires the capture and retention of ever-greater energy, creating yet newer structures even farther away from equilibrium (as with the

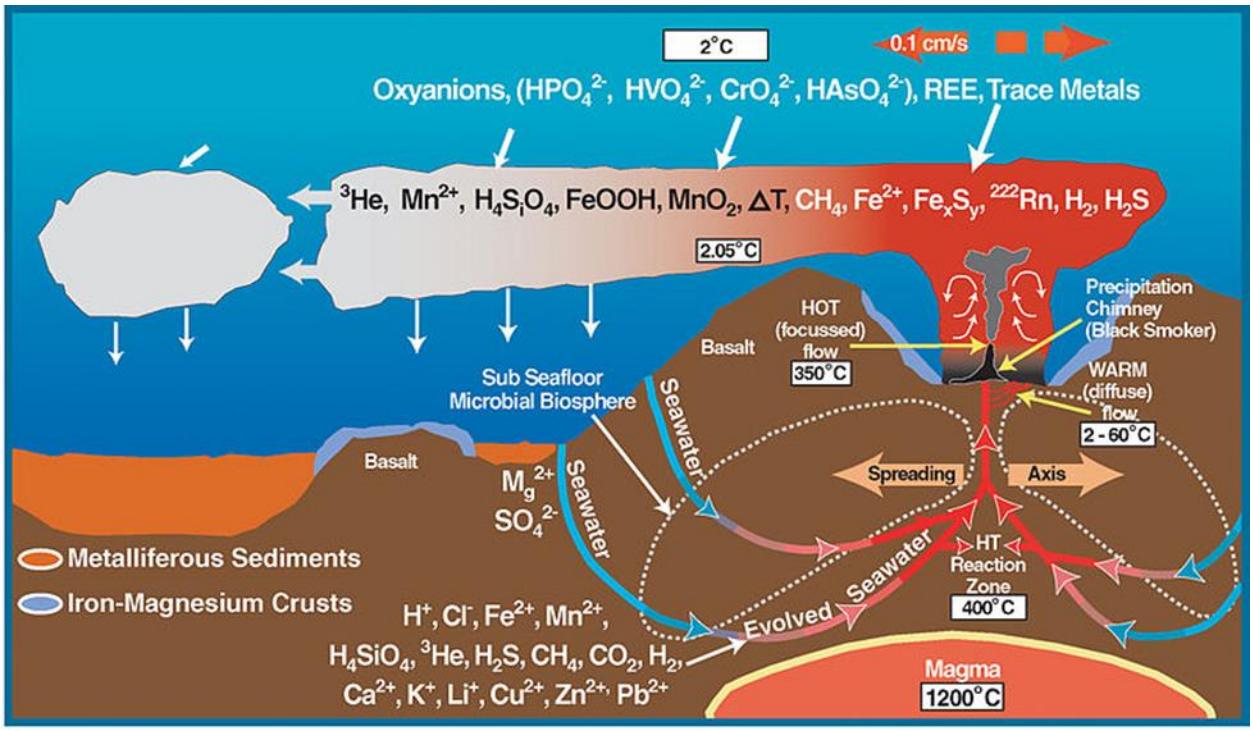
"daughter" tornados). The "amplification" refers to the self-reinforcement of the processes creating that "deviance."

The emergence of life happened at the tiny scale of molecules, but the causal feedbacks of deviance amplification are independent of scale. The chemistry of the process of self-reinforcement still relies on cycles of circular causation, where the initial materials are ultimately reproduced. Typically, this cycle is accelerated by one or more chemicals produced during the process that increase the probability that the appropriate molecules in the causal chain will link more quickly than by chance alone. These guiding molecules are called "***catalysts***." Their presence within the cycle accelerates it, giving it the label of "***auto-catalytic***," or self-accelerating. **Figure 8** illustrates this process over the long term: once life began, its development of complexity was both cumulative and accelerating, hence ***autocatalytic***. This is precisely the process that complexity theory addresses, and is uniquely equipped to explain (Schwartz 2010, Virgo, Nathaniel; Takashi Ikegami, Simon McGregor 2016).

As with tornados, the building blocks of what might have become living structures on earth likely started as efficient ways of dissipating the intense heat from the young planet's interior to the cooler initial seas and via them to the surrounding vacuum of space. Since the energy difference between the magma just beneath the surface and the vacuum just beyond the atmosphere was so very great, the physical and chemical structures that first emerged to equalize that difference could have quickly became highly complex (See Figure 9 below) (Marshall 2016).

Figure 9 illustrates the chemistry and energy flows of a deep sea vent. Vents like this power continental drift, as the magma in the core pushes up through cracks in the mantle and crust. Maps of the seafloor show these "spreading centers" as lines like zippers running through the center of all of the oceans. Even after the 4.6 billion years since earth's creation, the bulk of the interior is still magma. The solid ground beneath our feet is a crust a few miles deep at most, compared to the nearly 8,000 miles of the planetary diameter. The mantle beneath the crust itself is a semi-liquid, gradually melting with increasing depth into the pure fluid of the molten core inside, allowing the crust (powered by these spreading centers between crustal plates) to slide across the slippery mantle. Like boiling water in extremely slow motion, this inexorable pressure pushing up through the mantle breaks through the surface crust, prying tectonic plates apart, allowing the vents to out-gas. These spreading centers are compensated by complementary continental collisions where one plate rides atop another, forcing the bottom plate to curve inward and melt back into the mantle (Robinson 1993).

Figure 9. The Dissipative Structure Of A Sea Vent On The Ocean Floor



Source: Back smoker (deep sea vent) http://oceanexplorer.noaa.gov/explorations/02fire/background/hirez/chemistry-hires.jpg Template:PD-USGov-Interior-NOAA)

The chemistry surrounding these deep sea vents is clearly complicated. When combined with the large energy differences between the magma and the sea, it is obvious that this is a complex dissipative structure. The energy of the magma serves as a catalyst accelerating the circulation of the water and with it the flow of molecules, themselves forced to interact in unlikely ways by the high pressure, heat, and the tight quarters of the rocks. This natural complexity is an attractive candidate for the emergence of life (L. E. Orgel 1995, L. Orgel 2004). It already has several requirements: an external power source, natural boundaries confining the reactions, and a circular flow.

Today deep sea vents are indeed surrounded by life forms using a chemical metabolism rather different from our own, using some of the same chemicals illustrated. These creatures use sulfur to assist in storing energy, and appear as tubes several meters high. They also have DNA and can reproduce. Comparison of their DNA with that of all other life forms has identified enough genetic overlap to suggest that we share a common ancestor. This ancestor has been called LUCA, an acronym for "Last Universal Common Ancestor" (Boussau, Bastien; Samuel Blanquart, Anamaria

Necsulea, Nicolas Latillot, Manolo Gouy 2008). The precise sequence of events leading to its emergence remains contentious, but research during recent years has itself been accelerating toward a convergence (Marshall 2016, L. E. Orgel 1995, L. Orgel 2004, Smith, John Maynard; Eors Szathmary 1995). Among the breakthroughs have been how naturally abundant amino acids could have combined to create many forms of RNA, including a subset that could indirectly self-replicate, govern metabolic cycles, and eventuate as DNA; how cell boundaries could have developed out of naturally occurring lipids, liberating cells from the need for rock boundaries; and how metabolic cycles themselves could have developed around external energy sources as diverse as meteor impacts, volcanism, sea vents, or sunlight (Marshall 2016). Once begun, by any or only some of these means, the key capacity was self-replication, which has also been solved.[7] With replication, selection becomes possible, enabling adaptation and with it evolution. Even RNA alone can carry an instruction set remaining dormant and isolated (L. Orgel 2004), yet harness a range of metabolic cycles, as in a modern virus.[8]

The map of the evolution of life in Figure 8 teaches us that the first life began no later than one billion years after earth's formation (or 4Bya). One half of that time later (3.5Bya) anaerobic cyanobacteria had already started pumping oxygen into the atmosphere while dwelling near the ocean surface. Immediately that implies two critical developments: first, that photosynthesis had developed, converting solar energy into a chemical that can be used as a storage battery; and second, that **some kind of boundary enclosing the cellular life-form existed** to protect it from dangerous radiation.[9] Cells using solar energy needed boundaries to contain their metabolism,

[7] Spherical cells can be stretched by natural forces into cylindrical strings with the molecules of metabolism and the DNA to govern them spread equally along the string, so if the spaghetti-like string is severed, its components can continue to function. For reproduction to become routine, the external forces creating elongation must have become internalized, perhaps by the initial cells absorbing too much energy to remain internally organized, requiring a sub-division to avoid bursting the cell walls (Marshall 2016).

[8] All of these attributes are found in viruses today. A virus is just an RNA instruction set coated with proteins. Absent a host, it can retain its structure indefinitely. When it is within a suitable host, its protein jacket can fool a target cell into gaining entry, upon which it quickly inserts itself into the host's DNA, altering the cell instructions to convert its energy into generating more viruses until the host cell explodes, dispersing daughter viruses like dandelion seeds. Hence the virus can assume control over the functions of metabolization and replication of alien life without needing to carry those functions with it. It is a brilliant parasite, and a plausible model for the first life forms. The simultaneous development of anaerobic Cyanobacteria c. 3.5 Bya supports the segregation of RNA instruction sets from specific metabolic paths.

[9] We must also think about what was happening to the sun itself during this time. The current view is that our star formed around 5 Bya, not long before the inner planets. Its capacity to fuse hydrogen into helium within its core would have only just begun, manifested externally first by an increasing output of relatively low-energy infrared photons as viewed from afar. The fusion reaction $\mathbf{H_1 \rightarrow He_2}$ is negatively dampened by its expansion against the intense gravitational pressure of the interior, and by the energy released to the surrounding vacuum of external deep space. Initially the external radiation was low. Interior expansion pushed against gravity, slowing fusion. As the rate of fusion dropped, gravity pulled matter inwards again, re- igniting fusion. Hence the young sun would have oscillated in diameter until fusion had reached equilibrium with gravity, and the surface temperature would have risen to radiate fast enough to balance the fusion inside. This time lag between interior fusion and external radiation allows for an

protecting its chemistry from diffusion into the surrounding water; and also to control the wavelengths of sunlight allowed in. By 2.3 Bya, photosynthetic life had proliferated enough to have altered the earth's atmosphere by the addition of massive amounts of oxygen (the waste from photosynthesis). By then the sun's radiation would have maximized, reflecting the generalized spread of the fusion of hydrogen throughout the star. Correspondingly, the surviving cell walls of existing life forms must have both toughened and become more selective about which wavelengths to allow inside.

The common core unifying the most generically adaptable portions of RNA became the central operating system of DNA. Conversely, DNA seems to have eventually absorbed and combined the most specialized aspects of RNA that could be "switched on" when useful. Hence DNA became a metaphorical Swiss army knife able to deploy job-specific RNA. The appearance of cells containing a protective boundary around DNA (Eukaryotes) dates to around 2.3 Bya, long after the first life 4 Bya. It was an evolutionary leap enabling cells to expand their habitats and energy sources across all of the oceans.

Living Complexity:
Boundaries, Channeled Information Flows, And Hierarchies

The leap to Eukaryotes containing DNA protected by a separately enclosed membrane in the cell was also an expansion of complexity, the internal division of labor[10], information processing, and hierarchy. The key lies in the sophistication of how information is handled. On a physical level recall that we are dealing with molecules and chemistry, units so small that even the largest proteins containing many tens of atoms remain governed by the micro-scale forces of electromagnetism. At these scales, the three-dimensional shapes of molecules are controlled by the shape of their fuzzy electron clouds and the weak nuclear forces binding atomic nuclei. Likewise, the boundaries of the exterior cell walls, as well as the internal boundaries surrounding the cell nucleus and mitochondria, are themselves chambers built of interwoven molecules. These interior chambers within the cell protect the specialized "labor" within them from external interruption, maximizing productivity. Yet if they were completely sealed they would be useless, exhausting their energy supply and unable to "export" their molecular product(s)—their function. The solution is for the cell itself and the chambers within it to have boundaries that are permeable

early period of a "dim" sun, during which the bulk of the earth's temperature would have been governed by the heat from internal compression combined with the radioactive decay of heavy elements contributing to the earth's formation such as uranium & its isotopes, plutonium, etc. (each having been produced by earlier stellar explosions) (Longair 1989).

[10] All functional specializations are "divisions of labor". It could be argued that every atom involved in metabolization has its own specific task, hence any interaction between even two atoms is a primitive division of function.

to some molecules but impermeable to others—***semi-permeable*** (Holland 2014). The key is molecular shape and charge. Like a lock and key, if the molecule satisfies certain criteria, the boundary will be ***transparent***; if not, **opaque**. [11]

Semi-permeable boundaries selectively allow or exclude molecules. This enables them to act in an "on/off" fashion: if (molecular shape fits), then (allow entry). After a molecule is allowed entry, it does not just sit there. Like a guest allowed into a horticultural village, the inhabitants (here molecules) interact with it. In a village, the human inhabitants talk to the guest, determine its intentions, and then guide it to the appropriate authority. Inside a cell, the functional equivalent of the human interaction with the guest in the village is the molecular shape. If the molecule conforms to one of a particular range of shapes, it will eventually bump into and bind with another molecule, forming a new combined shape capable of interaction with yet another molecule (which might break the combination into entirely new parts), leading to a long series of molecular interactions. The net result is that the new molecule or its by-products get "delivered" to the appropriate cellular "authority" (perhaps as molecular food energy to the mitochondria, or information stimulating switches in the activation of DNA). Hence every molecule allowed entry into the cell comes with a specific "address" guiding it to a particular location, just as in the village where the guest was admitted because of the acceptable tattoos or identifying "tags," And just as inside computers whose binary strings "tag" and address machine code. The cell, village, and computer all use analogous processes to accept/reject outside input in a Boolean if/then sequence. Complexity theorists perceive these as separate examples of the same underlying ***information processing***, different ways of gaining new inputs from and about the local environment and responding to them. Note also that in the case of the cell, the molecule gaining entry may be food, so that for cells our distinction between energy and information disappears. The same distinction dissolves in computers, where the channeling of the power supply governs the running programs. However, among humans the members of the village do not typically eat their guests.

Hierarchy is another feature intrinsic to complex systems (Holland 2014, Ghysen 2003, Holland 1995). To understand this, we must clarify the meaning of the word. Human power hierarchies are populated by individuals with their own wants and needs, so we are accustomed to confusing power with both ego and greed. But for complexity theorists hierarchy is divorced from ego. Cells have hierarchies, but molecules lack ego. Here hierarchy is meant simply as differences in the power to affect the system. For the delivery system inside a cell, a good metaphor is a

[11] In this "lock and key" metaphor, current viruses have a "master key" allowing entry into multiple "locks" common across multiple cell types. Yet the fact that no virus can infect (enter) all cells across all species of organisms reveals the counter-evolution of defensive cell walls. Another evolutionary change since the earliest RNA is that today's viruses are exclusively parasites invading pre-existing complete cells, whereas the notion of an "RNA world" relies upon the capacity of the earliest RNA to construct entire cells "from scratch."

railroad network. When rails diverge, a switch determines which path is taken. The switch is a point of disproportionate power compared to any other section of rail. The switch position directs the train to the pre-programmed location, just as molecules do within a cell. So the molecules with "switch" functions have disproportionate power, and the most powerful switches lie within the nucleus of the DNA. As with life itself, hierarchy is an emergent quality common to ***all*** *complex structures*.

Hierarchy, a segregated division of functions, and the capacity to channel information appear to be unique to life, although their precursors can be found in other far-from-equilibrium dissipative structures. Stars derive their energy from fusion, which is like a metabolism. But stars lack anything like a "switching" function for channeling either matter or energy, and ***it is that very capacity to direct "information" in a Boolean "if/then" way that seems to be unique to life. The emergence of that capacity within living cells along with the ability to "store"/preserve that information as RNA or DNA is the essential divide of complexity between living and non-living.*** The development of all dissipative structures can go through bifurcations that give each one a specific history, making their futures impossible to predict precisely. ***But only life can record and replicate that history. It does so every time it reproduces.***[12]

Evolution and the Acceleration of Complexity: The Cambrian Explosion

The circular presentation of Figure 8 shows the compound acceleration in complexity. Like compound interest, ***compound acceleration of self-organization produces exponential growth***. This quality is unique to life, because life can chemically store and draw upon both energy and information as needed.[13] During a 50 million year-long period, from 550 Mya to 500Mya, life diversified and built shells and teeth that were preserved in the fossil record for the first time. This recent and rapid acceleration in the diversity and complexity of the forms life is called the "**Cambrian explosion"** (Cowen 1995). Its appearance in the fossil record can best be explained by the ability of life to use RNA➔DNA to store and build on its own past construction, enabling it to use existing energy and to channel that energy within its walls and between life forms. Its timing and appearance remain mysterious (Jermilin, Lars S.; leon Poladian, Michael A. Charleston

[12] Note that the development of a human embryo is governed by a sequence of DNA switches that collectively "recapitulate" the developmental forms of life across evolutionary time. Not only is life conservative, but the fact that embryos briefly develop and then eliminate gills and tails, for example, shows that the capacity to reproduce ancient forms has not been lost, merely switched on and quickly off during the launch sequence. The evolutionary information is retained in the DNA, and its recapitulation during the construction of an embryo implies that the genetic sequence built over evolutionary time must be followed in programmatic step-wise precision to construct the final life form. No steps can be by-passed (Ghysen 2003, Smith, John Maynard; Eors Szathmary 1995).

[13] Contrast that capacity with a storm. The continuity of storm forms is merely a passive reaction to the same forces encountering the same barriers as the last time, just like waves crashing onto a beach. No information is either stored within or used by such structures. Once the storm energy is exhausted, there is nothing left to build upon.

2005), but complexity theory suggests that we look for solutions in changes in the construction of and interactions between organisms—the balance of positive and negative causal feed-back loops—as they developed new structures. Further, we must include how their environment changed in response to the emergence of neighboring life.

The First 3.5 Billion Years of Life: The Peaceable Kingdom Before the Cambrian

Initial life started around 4 Bya, followed by Cyanobacteria and similar Prokaryotes governed by RNA around 3.5 Bya, then Eukaryotes with DNA protected by a segregated chamber around 2.3 Bya. The "Cambrian explosion" did not even start until at most 600 million years ago. That leaves over 3 billion years of simple pre-Cambrian life forms. Compared to developments since, it was a stable period, verging on stagnation. But behind that quiescence, a set of processes was at work that would eventually converge into the explosion of the Cambrian.[14] Three processes led to that convergence: *Reproduction, Oxygenation, And Respiration.*

One of the processes quietly working during those first 3 billion years was the ***reproduction of life***, and its growth in abundance (see note 7 above). The advent of reproduction, combined with the capacity of single-celled life (or even just RNA) to go dormant when energy was withdrawn, allowed for the ocean currents and storms to spread the seeds of life on a global scale. This was one of the quiet changes happening during the long 3.5 billion years before the Cambrian explosion, and an essential precursor. The capacity of life to reproduce near energy sources and go dormant when deprived of them translated into a gradual population increase. During the quiet 3.5 billion years between 4 and .5 Bya, life could have colonized every favorable location throughout all of the seas on the planet.

One fossilized remnant of the proliferation of life is a stromolite (Cowen 1995), now thought to be the fossilized remains of massive colonies of cyanobacteria, densely packed cells clustered around favorable energy sources, collectively building "apartment towers" containing innumerable inhabitants. Stromolites are those towers in fossilized rock form, dating back nearly 3 Bya, and found wherever the rocks are old enough.

Cyanobacteria are photosynthetic, and use chemicals for their cycle of energy storage like their cousins on the sea floor. But modern plants use photosynthesis in an entirely different way to

[14] The ratio produced by dividing the .5 billion years of rapid evolution by the preceding 3 billion years of apparent stability is 5/30 or 1/6 or (roughly) 15%. This ratio can be compared to the length of human settlements as a ratio of the time anatomically modern humans have existed. Human settlements proliferated between 6➔10 Kya, whereas "modern" humans may have existed as early as 200 Kya. 8/200=1/25=4%. I suspect that the speed of human social complexity compared to the more prolonged burst of complexity across all of life reflects the efficiency of cultural knowledge via language, vs. adaptation via genetic change.

create carbohydrates as an energy battery. The chemistry of that cycle consumes carbon dioxide to create carbohydrates (a form of sugar) and releases oxygen as a waste product.[15] When the sun sets, modern plants consume that sugar by reversing photosynthesis--using oxygen to break the chemical bonds--in the process releasing carbon dioxide and water as waste, allowing the plants to take the released energy to power the building of new structures such as roots and leaves. This night phase is called respiration, and its chemistry is the same generating power for animal life. But entropy requires that the ***amount of solar energy needed to construct the carbohydrate battery is greater than the energy it can release***. Hence the CO_2 used in building a carbohydrate is greater than the CO_2 released during respiration, and the O_2 released in building a carbohydrate is likewise greater than that consumed in respiration. The net result of photosynthesis + respiration in a plant is the creation of more O_2 than CO_2.

It is a complementary cycle where the waste from each phase becomes the fuel for the next, although its energy efficiency is retarded by entropy. This two-cycle metabolic engine is relatively modern, emerging long after the photosynthetic cyanobacteria built stromolites. Cyanobacteria produced oxygen, but lacked the capacity to respire. Oxygen was a poison to them. Instead, they used other chemical paths to access their stored energy. The result was a gradual build-up of atmospheric oxygen on a planet that originally had none. Oxygen is a dangerous atom—promiscuously reactive and highly volatile. The colonies of cyanobacteria that left behind stromolites were prodigious producers of oxygen. For a long time this toxic waste would not have been a local threat, because the tides would have absorbed the oxygen and swept it away, eventually releasing it to the atmosphere. In either sea or air, most of the free oxygen would have quickly reacted with and been locked up into ferrous rocks, leading some to speculate that for a time the rivers would have turned blood-red with iron oxides (Cowen 1995). But eventually these reactive sinks would have become exhausted, allowing free oxygen to enter the atmosphere unimpeded, with nothing left to bond with. Since oxygen is clear to infrared photons, its increasing abundance in the atmosphere would have accelerated global cooling. The oxygen content of our atmosphere today is 20%, all of which was created by photosynthesis**.**

At the local scale of stromolite colonies of cyanobacteria, the oxygen saturation of the sea and air began to become a problem (ultimately forcing them to retreat into anaerobic areas). A new life form emerged: novel cells capable of using the concentrated oxygen surrounding and within the colonies of cyanobacteria to develop respiration (Cowen 1995). This was perhaps the ancestor

[15] The basic chemical equation of photosynthesis is: $CO_2 + H_2O$ + hi-energy photons → $[CH_2O] + O_2$, or, more precisely: $6CO_2 + 6H_20$ + hi-energy photons → $6H_{12}O_6 + 6O_2$ [In words, Carbon Dioxide + water + light energy → Carbohydrate and Oxygen]. When the sugar battery is used during respiration, the equation is run backwards: Carbohydrate + Oxygen → low-energy photons + water and Carbon Dioxide. Note the energy difference between the photons absorbed during photosynthesis compared to those released during respiration, another appearance of entropy (Cowen 1995).

or cousin of mitochondria (Niedzwiedzka, Katarzyna Zaremba; et. al. 2017). It harnessed the volatility of oxygen in its own novel metabolism. Starting initially as a parasite confined to the tight quarters between stromolite cells, it too linked with RNA to find new niches eventually, some of which would unfold as symbionts with the first proto-modern plants (creating carbohydrates, unlike cyanobacteria) to enable those plants not only to photosynthesize carbohydrates but to respire as well.[16]

So we have now seen the processes that would eventually converge to create the Cambrian "explosion." The first was the invention of reproduction. That invention preserved accumulated information as RNA/DNA, while eventually populating all favorable underwater environments with life. Second, the gradual accumulation of oxygen protected the earth's surface from UV light,[17] after it had saturated the oceans. Finally, the emergence of respiration, allowing life to harness the volatile energy of oxygen, and ultimately to leave the seas altogether.

The Cambrian Explosion:
The Accelating Flow of Energy Between Organisms

The cumulative result of these innovations by life, along with their environmental effects of oxygen saturation prompting yet more innovations, is a ***classic positive feed-back loop***. Without compensatory negative loops, run-away feed-backs culminate in exponential outputs and violent collapse. For life, the negative loop lay in materials. The molecules required by photosynthetic life floating in the oceans were limited. Today the oceans appear blue in part because they are largely sterile. Except for oxygen, the molecules necessary for life are larger and heavier than water, and thus drift to the bottom. Yet photosynthesis requires a solar intensity only available near the surface. Modern algae can only live where the two intersect: where ocean currents collide with continents creating a turbulence that draws bottom sediments up to the surface (Colinvaux 1978). The obvious corollary is that the abundance of photosynthetic life has always been constrained by the number of locations near continents where the right molecules were exposed to the right energies. Indeed fossilized stromolites are only found in ancient rocks that were once on the coasts of ancient seas. The limit on the number of locations where the necessary materials were connected

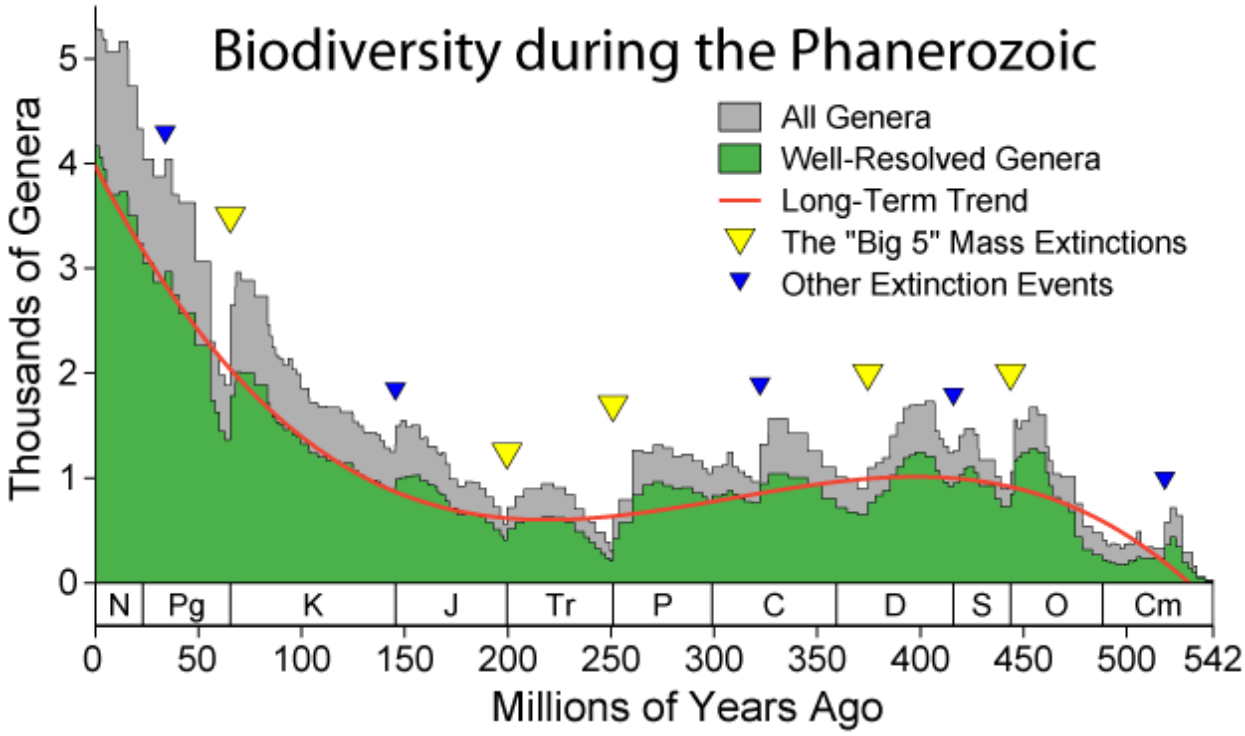
[16] Photosynthesis can power many different chemical cycles. Cyanobacteria and algae are both photosynthetic, but use quite separate chemical paths. Algae and modern plants can tolerate and even respire using oxygen, whereas it is a toxin for cyanobacteria that can only thrive in its absence, in refuges within mud or eutrified ponds and lakes.

[17] The high energies of UV light can break atomic bonds. That is why humans get burned by it, yet can also harness it to create vitamin D. In the atmosphere, when a UV photon strikes O_2, it splits it into two separate O_1 atoms, which often re-combine into O_3—ozone. Ozone itself is unstable (and toxic to humans), quickly returning to the more stable O_2 form in the reaction $O_3 + O_3$ ---> 3 (O_2) atoms. Yet the ozone layer in the upper atmosphere is recreated by solar UV fast enough that the layer has remained roughly constant until recent times (Graedel, T. E.; Paul J. Crutzen 1993).

with the required energies was a selection pressure, favoring life forms that could either survive prolonged dormancy separated from "food" (matter or energy); or forms that could push competitors aside to acquire favorable locations. Doubtless both strategies were deployed. The aggression of the latter forms would have favored predation (Bonner 1988).

Likewise, the "prey" were equally pressured to generate new defenses quickly. The arms race was frenetic (albeit in slow motion), generating creatively bizarre extensions of animal forms never observed before or since. It was an "all-out war" of Hobbesian proportions involving all life. Within a relatively short 50 million years (550-500 Mya), the mutually accelerating clash between a growing population of rapidly changing life forms with a finite chemical food supply created a new ecosystem of organisms. It was a ***bifurcation*** that dramatically and quickly reorganized the internal design of most organisms and the relations between them. Once again, the ***phase-change*** of boiling water comes to mind: after some billions of years of imperceptibly increasing population of life, a critical threshold (the limited chemical food supply) was finally breached, and a phase-change occurred (Kauffman 1993).

Figure 10. Global Biomass Since The Cambrian



Source: https://commons.wikimedia.org/wiki/File:Phanerozoic_Biodiversity.png

The **Phanerozoic Eon** in **FIGURE** 10 includes all of the Eras and Periods beginning with the Cambrian. From right to left, the periods abbreviated in letters are: **Cm=Cambrian, O=Ordovician, S=Silurian, D=Devonian, C=Carboniferous[18], P=Permian, Tr=Triassic, J=Jurassic, K= Cretaceous, and Tertiary (Pg=Paleogene + N=Neogene).** Fossils from the Silurian period suggest temporary land use for eggs; the Devonian suggests arthropods, animals, and some plants; the Carboniferous, full plant adaptation to land along with the emergence of fully adapted tetrapods. Note that with the exception of the end of the Permian (in which up to 90% of all life died),[19] the great extinctions only retarded—**but did not stop**--the *exponential growth of life*. From this we can infer that even then the core information of DNA was sufficiently retained to allow for a rapid rebound and renewal of self-organization (Hallam, A.; P.B. Wignall 1997, Sepkoski 1986, Raup 1991).

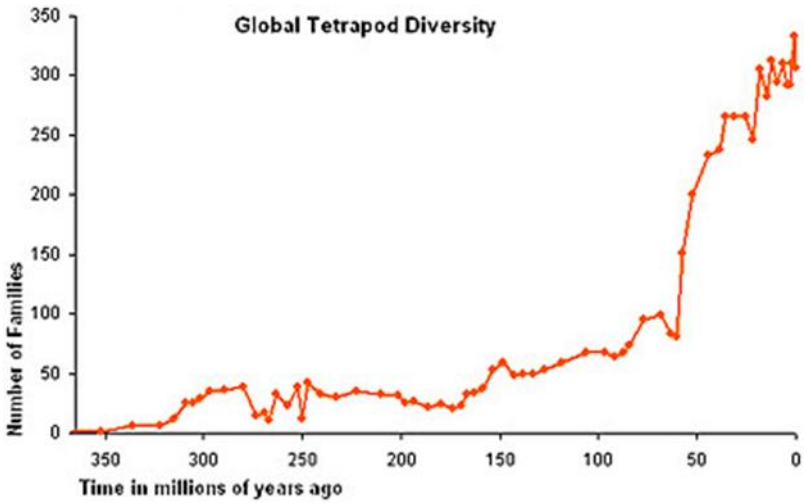
Within the surviving life forms, many became actively mobile, interactive, and interdependent--requiring a coordinated internal high-energy multi-cellularity. Every multi-celled organism was pushed by selection to develop an exponentially increasing number of sub-sections containing many specialized divisions of molecular labor—the precursors to modern organs. External protective shells appeared, along with the first true neurons. ***It was an explosion of internal regulatory hierarchy, as well as an explosion in organismic size and diversity***. The growth in size conferred advantages to the predator, but also to the prey. One common method of escape from predation used by the prey was "***pioneering***" into entirely new and unfamiliar areas (including size). During the periods immediately following the Cambrian, some of these newly complex life forms would make it just a few feet out of the water to bury their eggs safe from predators (Bonner 1988, Cowen 1995). Pioneering onto land to escape predation could not have been possible without the prior innovation of entirely new multi-cellular life forms using the oxygen needed for the respiration of carbohydrates. The evolution of respiration itself required a saturation of the oceans with oxygen, a saturation created by the perpetual production of cyanobacteria during the billions of years before. It was respiration that fueled the growth of fish and their capacity to build internal organs, skeletons, and the brains to coordinate them. It was respiration that also built the battle-ready external armor surrounding the arthropod ancestors to the lobster, spider, and crab. It was respiration that powered the creation of the bulk of skeletons and shells forming all of the fossils ever discovered: all because the evolutionary burst of new

[18] The Carboniferous period derives its name from the abundance of fossil fuels deposited then—the oil and coal powering modern machinery. From the volume of these un-decomposed deposits we can infer that the biodiversity of decomposers on or underground lagged behind the diversity of plant life above ground.

[19] Estimates of percent of species extinguished during "mass" extinctions cannot be definitive, because they rely on assumptions about the abundance of species lacking fossils. But based on fossil evidence, the end-Permian extinction seems to have been unique in devastation, with typical estimates of 90% or more. Even the most conservative estimate of 50% still places it as the worst ever experienced (Hallam, A.; P.B. Wignall 1997).

creatures involved in Cambrian combat had previously acquired the capacity to harness the power of oxygen and carbohydrate metabolic respiration. Respiration powered the arms race between predator and prey.

Figure 11. Global Tetrapod Diversity



Source: Courtesy http://fishfeet2007.blogspot.com/2007_05_01_archive.html

Despite extinctions, the division of labor within and between life forms continued throughout the Phanerozoic Eon (the time from the Cambrian to the present). The Cambrian explosion has never stopped. The Pre-Cambrian "Ancestral Chordate" was a worm using neurons to sequentially squeeze muscles along its digestive tract to burrow through the mud (Ghysen 2003). By the beginning of the Cambrian, some of its descendants had acquired protective vertebrae surrounding the neuronal trunk line. The existence of neurons already implies a coordinated multicellular and specialized division of labor within the organism. Also, all of the major generic divisions among the animals with spinal columns (except for the birds) preceded the massive Permian extinction 245 Mya.[20] The profusion of life after the Permian extinction was due to the resumption of mutual competition continuing the (interrupted) series of bifurcations both internally and externally:

[20] Mass extinctions eliminate the largest and most complex life forms, both because of their reliance on a larger food web necessary for such life, and because their gestation times are longer (Neutel, A; Heesterbeek, J. A. P. and de Ruiter, P. C. 2002, Simberloff 1994). The cessation of chordate differentiation with the Permian extinction (except for the birds) may reflect that. The chordates that survived were probably small, yet still preserved the DNA instructions for protected neurons, enabling the renewed growth of competitive complexity. Also, it should be noted that the devastation of every extinction is at best an educated guess, so the most reliable comparisons must remain relative for now.

internally as a division of labor among cells becoming organs governed by neurons and ganglia of increasing sophistication, and externally as ecosystems of specialized organisms using some combination of photosynthesis, predation, parasitism, or mutualism.

Pioneering: The Growth in the Size of Organisms

n any physical conflict between organisms, size matters.[21] That is why carnivorous predators seek out smaller prey, unless they hunt in groups. Over time, this selection pressure generates larger prey, in turn generating larger carnivores. The entire cycle of selection favoring larger size is one example of pioneering over time, another way that competition literally breeds complexity (Bonner 1988). Even though basic body designs and the DNA regulating them only change incrementally with growth in size,[22] every increase requires complementary changes in anatomy and physiology. So a gradual doubling or even tripling of size implies an exponential growth of the number of cells and the complexity of coordinating them (Bonner 1988). Yet the fossil record during the age of the dinosaurs demonstrates that process continuing across the entire Mesozoic Era (sequentially embracing the periods of the Jurassic, Triassic, and Cretaceous). The result was the emergence of the largest land animals ever recorded.

Entropy and the Limits to Size

The largest animal ever known to have existed continues today: the great blue whale. Its enormous bulk is possible because it is supported by water. Were it on land, it would immediately collapse. Hence for a land animal lacking external watery support, its own mass would crush it if it were large enough.

The other limit to the size of any organism is far more subtle, but equally decisive. It lies in the *availability of energy and the* ***law of entropy***. Recall that entropy caps the amount of input energy that can be used, and that the most efficient modern steam engines use only 40% of their fuel doing their work. The rest is lost as heat (Summers 1971). The same caps apply to life forms. The maximum measured efficiency in a young corn plant is 8% of the sunlight received, and across its life-span is a paltry 5% (Colinvaux 1978). So 95% of the sunlight received by corn is not or cannot be used. Plant efficiencies doubtless vary, but it is safe to assume that with abundant sunlight even low efficiencies have sufficed to allow plants to colonize most land areas since the Carboniferous period. Instead, the constraint on plant growth has been the abundance of materials,

[21] For the moment I am ignoring microbial infections.

[22] See, for example, the dramatic growth sequence of Theropod and Tyrannosaurid fossil sizes using identical skeletal designs from the Triassic through the Cretaceous, as illustrated in Bonner (1988, p.29, Fig. 6).

particularly rainfall and CO_2, each of which has been gradually dropping since at least the Mesozoic, a point to which we will return shortly.

Plants are the gate-keepers of life, the doorway governing the size and diversity of all organisms feeding on them. Their unique ability to acquire all of their energy from sunlight makes them act as a valve regulating all of those downstream. Yet entropy adds its own toll to that downstream flow, like leaks in an irrigation canal. Plant-eaters are more energy-efficient than plants, but not much. They average 10-15% efficiency, losing 85-90% of the energy in the plants that they eat (Brooks and Wiley 1988, Carbone C 2002, Marquet 2002). Hence, a 70-ton Sauropod would have potentially required **700 tons** of plant matter to build itself. This plant volume would not be a daily requirement, of course, but the cumulative sum needed for its growth to full maturity. Thereafter its daily intake—like our own—would only be that necessary for organ maintenance, injury repair, or energy storage. *Logic requires that the entire biomass of herbivores could not be much greater than 10-15% of plant biomass for very long*. If we extend the same logic to carnivores, the same rigorous limits apply. They too seem to be around 10-15% efficient today, and were presumably during the Mesozoic also. So even the fearsome T-Rex, like all big fierce animals, would have been rare: thin on the ground. Once again, the collective weight of all carnivores could not have long survived above 15% of the herbivores, themselves constrained to 15% of plant biomass. Despite such inefficiencies, existing metabolic cycles have still adequately powered the increasing complexity of life, and natural selection may yet compel further improvements to the efficiency of those cycles. But entropy imposes an ultimate ceiling on their efficiency. It is a ceiling as rigorous as gravity and, like gravity, blocks the pioneering pathway of size for both predator and prey (Raffaelli 2002).

Finally, the construction of bone uses carbon, derived from carbon dioxide. Bone proliferated in the seas during the Cambrian, and it has since accumulated in vast deposits of calcium carbonate on the sea floor. An example can be found in the “white” cliffs of Dover, which were once an ancient seabed. Even on land, bone is not a food source. The result has been a gradual drop in atmospheric CO_2, bringing with it global cooling and drying (Graedel, T. E.; Paul J. Crutzen 1993). Hence vegetation (requiring both CO_2 and H_2O for photosynthesis) has contracted in abundance, requiring parallel contractions in the sizes of herbivores and carnivores. So, even if the asteroid ending the Cretaceous had never struck, the dinosaurs of the Mesozoic would have still held pride of place as the largest land organisms that ever existed. Their hypothetical descendants would have been compelled to shrink to the sizes of the plants and animals typical today.

Pioneering: Biodiversity, Chemical Defense, and the Roots of Human Language

Beyond pioneering in increased size, another way of escaping predation was also available: a colonization of new ways of getting energy via highly specialized behaviors, dwellings, and metabolisms. Plants also tried pioneering using size; ***but their primary pioneering lay in environmental specialization, symbiosis, and chemicals***. Plants could not instantly move sideways in space, but they could do so over time via their spores and, later, seeds. By adapting to higher, colder, and drier areas, they could escape insect and animal predators requiring the lower, hotter, and more humid areas. In a co-evolutionary parallel, their predators themselves would have followed, thereby limiting their own capacity to live in the lowlands. The net result of this cat-and-mouse game eventuated in increasing specialization, symbiosis, and even mutualism among subsections of life. Plants today are sometimes pollinized by specialized insects, so that the shape of a plant's flower has evolved to allow only some co-evolved insects to access the nectar, creating a symbiotic relation of mutual co-dependence (Holland 2013). Another example is that some insects are only able to live on the specialized sap of a particular tree, so that if the tree is attacked the resident insects will defend it. It was the coevolution of symbiotic and mutualistic relations like these that served as one mechanism producing new ecological niches, and with them the profusion of biodiversity, despite falling levels of carbon dioxide, rain, and temperature across the entire Phanerozoic Eon. As with the initial Cambrian "explosion," ***the accelerating cycle of the diversity of life has been autocatalytic***, *one giant positive feed-back loop generating an expanding number of niche-specialized sub-loops like eddies in a stream, all governed by the negative limits of available energy, materials, gravity, and entropy*.

Information Flow Among Organisms

A by-product of the increased diversity of energy flow was a growth in the flow of chemical information. One source was from plants: the development of molecules toxic to animals is a common plant defense against predation. Modern examples include plants with poisonous fruit, bark, leaves, or thorns. These compounds are not by-products of core metabolism, but instead require specialized production. Beyond self-defense, chemicals also serve as information signals between plants. Recent research has demonstrated that if a forest of many plant species is attacked by a fungal or insect parasite or predator, the affected plants will produce chemicals alerting all of the other flora inhabitants across considerable distances. The method is via root systems connected by underground fungi collectively comprising a complex communications network similar in both structure and function to a neural net—an underground "brain," as it were. The recipient plants respond by diverting their energy toward the production of appropriate chemical defenses.

Adjacent plants also lend and borrow carbon as needed via that system (Gorzelak, Monika A.; Amanda K. Asay, Brian J. Pickles, Suzanne W. Simard 2015, Rees, Mark; Rick Condit, Mick Crawley, Steve Pacala, Dave Tilman 2007, Song, Yuan Yuan; Suzanne W. Simard, Allan Carrol, William W. Mahn, Ren Sen Zeng 2015, Vivaldo Gianna; Elisa Masi, Camilla Pandolfi, Stefano Mancuso, Guido Cadarelli 2016).

Ant colonies have taken the chemical-neural net of plant communication to a higher level. They are entirely organized by the exchange of pheromones between individuals. Like forests, ants can communicate threats, marshalling entire divisions of specialized soldiers to pour out for defense. Sections of ant nurseries have embryos guided in their development, via titrated chemical inducements from supervising adults, to mature into specialized shapes pre-destined for their roles, anticipating Huxley's *Brave New World* by at least 80 million years (Moreau, Corries S.; Charles D. Bell, Roger Vila, Bruce Archibald, Naomi E. Pierce 2006). Taken as a whole, ant colonies replicate entire animals, complete with specialized organs, governed by a distributed neural net in which all individuals participate. Every individual acts like both a cell and a neuron at the same time. Bees have extended the ant model of coordinated chemistry by the addition of movement: the "dance" of a forager inside the hive. Hence, the volume of information exchanged among bees is greater than that among ants, and both are a great leap beyond the sophistication of plants.[23]

Visual signals among bees and animal groups augment chemical signals, but do not replace them. An additional layer is sound. Birds in the corvid family (ravens, crows, blackbirds) have been shown to recognize individual humans, and crows seem to have a call vocabulary of 70 distinct sounds communicating specific information. Among other birds, the songbird males "sing" in the spring to claim specific territories to warn off competing males, guaranteeing enough geographic dispersion to allow their future young to survive, much like the howling of male wolves. Molecules, movement, and sound comprise a suite of media used in sophisticated combinations by all chordate life forms with brains living in groups. Taken together, they are a powerful "alphabet" with an infinite set of possible arrangements, enabling a wide range of information potential (Holland 2013). Human language is unique only in its complexity. These core components emerged during the Mesozoic era (Bonner 1980).

Non-Genetic Energy and Information Flow Across Generations: The Origins of Culture

The land colonized by the first plants was warm and moist. Both the warmth and the moisture were products of high levels of greenhouse gases, particularly CO_2 and methane. In this soppy world, plants could successfully reproduce like their fungal cousins (and sometime symbionts) using

[23] Leaf-cutter ants also use movement to alert their colonies.

spores. Around 220 million years ago, close to the end of the Triassic period, spores were gradually replaced by seeds as the atmosphere cooled and dried. The hard shells of seeds enclosed a starter pack of water, some food, and DNA—like a packed lunch with instructions. Later innovations were seeds adapted to survive digestion by herbivores, spreading their dispersion. But it was with animals that the young stayed near to and dependent upon their parents for food and protection. This seems to have started with dinosaurs. Certainly we see it today in most animals. The dependence of the young on their parents is a far more complex method of transferring energy from parents to offspring than is true for the seed of a plant. That energy transfer is also accompanied by a transfer of information—instruction by the parent about appropriately adaptive behaviors. The intergenerational transmission of information after hatching or birth is in addition to genetic transmission, and its volume rises with brain intelligence. ***It is the origin of culture***, according to Bonner (1980). His point was that the growth of brains gradually favored behavioral instruction over genetic, because it could respond to survival challenges in "real time."

Humans mastered linguistic non-genetic transmission in another ***exponential inflection point***[24] some unknown time ago (Anderson 2016, Corbalis 1999, Fisher, Simon E,; Matt Ridley 2013). But like all of the prior inflections of increasing complexity – the origins of life, life's ability to reproduce, and life's diversity during the Cambrian – human language itself was a ***phase-change*** rooted in ancient trends breaching a critical value; trends quietly gathering momentum from the accumulating media of chemical, vision, and sound communication across life forms starting in the Permian period. External chemicals, movement, and sound collectively co-evolved into a communications network spanning and informing large areas of ecosystems populated by a myriad of specialized species: portions of these elements became potentially interpretable to every life form within that ecosystem. We have already confirmed this to be true across different plant species within a forest. It is also true of chemical and visual communication between plants and insect pollinators. Likewise, mosquitos distinguish among humans for selective attack; mammalian carnivores smell chemicals indicating fear, and mammals share many sexual pheromones in common. These observations exemplify the existence of signals, but are at best only the component alphabet of a potential language (Holland 2013).

The hominid➔human use of language was a profound breakthrough far beyond anything before. It drew from media first developed in the Mesozoic, but did so in a revolutionary new combination, enabling an explosive volume of information to be delivered in an extremely compact and efficient way. Given our disproportionate intellect, it included how to interpret a high proportion of the signals from the rest of the ecosystem.

[24] Exponential curves (such as compound interest) start out rising slowly, then bend like an elbow sharply upward. The location of this bend is called an "inflection point."

Human Language and Social Compexity

Human language eased group living. Presumably it started slowly and grew exponentially from selection pressures (Anderson 2016). Among some large mammals, sexual relations are of the "harem" form, in which a dominant male has exclusive sexual access to several females (e.g., rhinos, lions, walruses, and gorillas).[25] One indicator of this strategy is a significant size difference between the sexes, preserved in their fossil remains. Among the fossils assigned to the hominid line(s), the few found within the millions of years between 4+ and 1 or less show a clear drop in sexual dimorphism, a trend toward an equality of size (Gibbons 2002). This trend might have accompanied a growth in the sophistication of a proto-language, for two complementary reasons: (a) females could negotiate sexual access ("no means no"); and (b) male competition for access to females could itself have shifted from violence to verbal negotiation. Both would have enhanced group survival. Language would have reduced competition among all and enhanced reciprocity. In turn, this would have boosted group survival chances, favoring groups with greater language skills via lower infant mortality and higher rates of food acquisition. Parallel with the drop in dimorphism was a growth in brain size faster than body weight (Merkel-Bobrov, Nitzan; Sandra L. Gilbert, Patrick D. Evans, Eric J. Vallender, Jeffrey R. Anderson, Richard R. Hudson, Sarah A. Tishkoff, Bruce T. Lahn 2005).

The proliferation of hominids over the past one million years contrasts with the fates of the other great apes, all but three of which are now either extinct or soon will be.[26] Gorillas, orangutans, and chimpanzees[27] continue only because of tenuous human sufferance. The sheer weight of gorillas compels them to live on the ground, leaving them vulnerable to ground-based carnivores like humans, cats, baboons, and the large snakes that also prey on monkeys. This weight/prey problem might have been another selection pressure that operated on hominids, favoring group cooperation and a potential acceleration of language.[28] All we know for certain is that during the past 4 Million years some hominids survived during a period that others died out (Gibbons 2002, White, Tim D.; Berhane Asfaw, Yonas Beyene, Yohannes Haile-Selassie, C. Owen Lovejoy, Gen Suwa, Giday WoldeGabriel 2009).[29]

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[25] Elephants use a different strategy, in which the females and young males live in herds supervised by a senior matriarch, while the adult males are banished after maturity. Among Orcas, adult males are allowed to stay in the pod, but they remain subordinate to the matriarchs.

[26] See Chase-Dunn and Lerro, 2014, Chapter 3.

[27] Chimps and bonobos are close cousins, although the substitution of the male aggression typical of the former by the sexual promiscuity of the latter is fascinating. Yet both remain human prey and are headed for extinction.

[28] On the other hand, Colinvaux (1978) reports that large mammalian predators do not control the number of their prey, because they select the easiest catch, typically the infirm or young, the former of whom are already unlikely to reproduce and hence are ecologically "dead" anyway.

[29] The Neanderthals also died out during this period.

Size Limits on Hominid Bands and Kinship

Energy flows limit the number of organisms that occupy any niche. Herbivores are typically 10-15% efficient in energy use; carnivores also. Further, let us consider that the long-term growth in biodiversity in a world of gradually declining CO_2 can only be explained by a compensatory growth in niche specialization. Logic dictates that the more specialized the niche, the less energy available to it and the fewer the number of individual organisms able to populate it. Yet there is also a minimum size: too few organisms and they risk extinction. One of the paths to extinction is inadequate numbers of viable young, and one entrance to that path is inadequate genetic variation. So the size of surviving hominid bands must have negotiated between these limits. Too few individuals risk inadequate genetic variation and/or inadequate mutual defense and aid when attacked, while too many risk starvation. A thought experiment may give us a general range for possible band sizes.

Let us hypothetically assume one hominid with a strictly vegetarian diet needing only 2 Kilocalories/day, located in an area receiving the average solar energy for a square meter of earth of 1,161 K calories/hr. Calculating a 5% efficiency of solar energy use by the local plant life, 5% of 1,161 = 58.05 K calories of generated plant mass/meter^2/hr. The maximum day-length is 12 hours at the equator, so 58.05 * 12 = 696 Kcals/meter^2/day. Hence, our hypothetical equatorial hominid would be required to consume roughly 3 meters^2 of all of the plant matter therein per day to survive. Like other herbivores, however, it could use at best only 15% of the energy contained in the plants: 0.15 X 696= 19 usable Kcals/meter^2/day –increasing the necessary land area per hominid ten-fold, to 30 meter^2/day. But this 1:30 ratio assumes 12 hours of sunlight, and it ignores the more realistic constraints of the human inability to digest cellulose, the need to avoid plants with toxins, and the need to vary diet. Even in an ideal environment, the number of band members would be limited by how fast they could move.[30] These simple calculations suggest a geographic range of roughly 1km/day/individual to survive (if the meters required were all in one line one meter wide). This range, combined with the probable rate of movement on foot, limits the number of individuals per band to 10~40+, continuously on the move (less than 30 members risks extinction). Over the course of a year, the search for accessible plant food alone would have necessitated travelling several hundred kilometers. A maximally efficient spiral search pattern could have enclosed those kilometers into a much smaller area; but even then, the territory required would have been large enough to have made hominid bands rare, thin on the ground.[31]

[30] Another example of the same point is provided by locusts. Their vast numbers require even vaster energy from huge areas of crops, which they can only acquire by flying at great speed.

[31] This crude average ignores the uneven distribution of edible plants, clumps of abundance segregated by areas of scarcity.

Among our nomadic ancient ancestors, band survival depended upon equality and reciprocity. Food was shared among all, just as times without food were endured by all. The band was not "like" family, it *was* family. All were genetically related, unless encounters with another band enabled sexual exchange (negotiated or coerced) (Millassoux 1975). Even then, the nearest band might have been composed of cousins only recently compelled to separate. The cultural expectation of reciprocity among kin would have persisted well into the Neolithic era and its settlements.

Territorial competition motivated migration, sometimes beyond Africa. The alternative was warfare, dangerous and painful (emotionally and physically) (Curry 2016). Evidence of early migration dates back 2Mya. In European Georgia, the skull of a forty-year-old toothless man was unearthed and dated to 2Mya. The tooth sockets had healed before death, implying social support and social bonds. Homo Erectus emerged 1Mya and left remains at an outpost in southern England dated to 700Kya, along with the horses they'd eaten. But these migrations were limited to certain "launch windows" by the "Sahara Pump"—climatic phases in which the area now occupied by the Sahara desert was well-watered and verdant. During the Pleistocene era (a time enclosing the "Paleolithic"), cycles of glaciation dating back to 700Kya were punctuated by warmer inter-glacial intervals; these cycles governed the ability to cross the Sahara, limiting migrations out of Africa. This explains why the ancestors of Neanderthals left Africa perhaps several 100Kya, whereas our nearest relatives could not leave until perhaps 60Kya. However, once they did so, they survived migrations that spread quickly: Australia and Eurasia by 55Kya, and the Americas by at least 13Kya, more likely 20Kya. The expert sailors of Polynesia had settled Hawaii by 1500 CE.

Over a few tens of thousands of years, humans had successfully occupied every continent. Like the planetary diffusion of the first life forms, new environments required new adaptations. However, unlike the first life, the most important adaptations were not genetic[32] but cultural, social learning communicated by language. Further, cultural knowledge was treasured for its survival value. It was passed down intact through generations using methods protecting its accuracy and continuity. Elders of nomadic bands were relied upon for their knowledge and experience. Cumulative group knowledge was passed along via histories memorized by the young before marriage, supervised by those elders.[33] Among the traditions retained from the nomadic life (even

[32] Of course, there were genetic changes also—lactose tolerance, skin color balancing UV protection with vitamin D generation, and perhaps others—but these had no clear consequence on the creation of social bonds or complexity.

[33] Michel-Dolmatoff reports that hunters in the Amazonian jungle living as recently as the 1960s were not encouraged to bear children until they had successfully demonstrated their knowledge of tribal history and cosmology to the satisfaction of the shaman. We find these passage rites of puberty faintly echoed in every major religion today (Cambell 1988, Reichel-Dolmatoff 1971). Portions of the initial books of the Bible (Leviticus) shared by all of the Abrahamic faiths were clearly memorized, given the repetitive frequency of the phrasing, using the same "book-marking" function as the repeating chorus in songs.

up to and beyond settlement) was shamanism, a vocation assigned to or chosen by a particularly gifted child. Shamanism required years of specialized training, because it combined the skills of an herbal doctor (requiring extensive plant knowledge), an historian, a teacher, a psychologist, a mystic seer, and a medium to the ancestors (Plotkin 1993). Such a person would have commanded respect, so his/her blessings would have been politically valuable.

Within Africa, human geographic diffusion and climate change over time had compelled us to shift niches/food sources. Starting with a diet perhaps like that of chimpanzees – plant roots, fruit, insects, and the occasional monkey – humans might have encountered some environments which had dried out to become grasslands; and/or some groups may have migrated into drier areas that were already savannah. Either scenario would encourage a dietary shift to meat and a lifestyle shift to hunting. In South Africa, human remains dating to 70 Kya have been found with rock beads whose color required exposure to sustained high temperatures (Chase-Dunn, Christopher; Thomas Hall 1997). So fire was in use, and meat could have been cooked. This is an example of ***a niche-shift (bifurcation) that was cultural***, something unique to humans. Further, the development of hunting did not stop the continued development of gathering elsewhere. The two niches were not exclusive. Nor did either **require** (either biologically or energetically) any major change in the division of labor by gender or age, although all hunting groups observed to date assign hunting to males. Energetically, in both hunting and gathering societies, the aged, the very young, and pregnant/nursing women would have been the least productive; but all could have participated in each activity. Division of labor aside, in hunting the prey would be wounded and tracked, then periodically re-wounded until it bled out. Once dead, all could have participated in the rendering and assisted in the transport of the body parts. As our ancestors learned how to hunt, so their prey learned how to avoid them; this is why large animals today still survive in Africa. But by the time humans started populating Eurasia and the Americas, they had developed spear-throwers able to deliver a payload of razor-sharp rock at high speed over a considerable distance (Nielsen, Rasmus; et. al. 2017, Alroy 2001). Simultaneously, the global climate was shifting as the last ice age ended, raising the question of what combination of climate and human invasion destroyed the Megafauna. Whatever the causal sequence, large animals quickly went extinct in the Americas and Australia around the same time as the arrival of humans, bringing in turn extinctions of the carnivores that had preyed on them. In Eurasia, the last wooly mammoths, shrunken by island dwarfism, died out in the Aleutians around 5Kya.

Circumscription, Division of Labor, and Hierarchy: The Human "Cambrian Explosion"

To "circumscribe" something is to draw a boundary around it, to enclose it, and restrict it. As with the Cambrian before, the growth and spread of human life began to collide with the boundaries of its food sources. The last glaciation ended around 11Kya. By then humans had spread around the globe. Their migrations had brought them into previously unfamiliar environments, forcing them to adapt to new niches, to "speciate"/bifurcate culturally, a uniquely human trait. Just as in the Cambrian era, a growing population density was constrained, not just by a limited food supply, but by one now actually shrinking. But that shrinkage was uneven and slow. The "megafauna" (mammoths, mastodons, rhinoceros, giraffes) required large grazing areas to survive, areas with suitable plants that in turn prospered in geographic shifts with the seasons, latitudes, and altitudes. The last glaciation did not end abruptly, so climate shifts were as patchy then as is warming today. Plants would themselves have relocated in latitude or altitude, compelling all herbivores to follow. Further, successful plant movement depends on their pollinators, methods of seed dispersal, and the seeds landing in the right soils exposed to the right amounts of sunlight. Necessarily these linked contingencies must have often failed, reducing the total herbivore food supply even as they forced new patterns of migration upon them, yet another survival challenge. Changing megafauna migration routes also challenged their predators. Following the scent and scat of the herbivores, human and animal carnivores could no longer rely on ancient routines (large cats) or received wisdom (humans). In this competition among carnivores, the big cats had to lose. Yet the inevitable human victory was Pyrrhic, because the humans were already competing among themselves as their numbers grew. Once again, conflicts among competing bands of hunters would have increased. However, the extensive peopling of the planet precluded migration to resolve conflicts. A new solution emerged: trade between bands. Instead of all hunting bands pursuing all game everywhere they went, they worked out a territorial division of labor where trade in meat and goods allowed survival during the periods that the herds were absent. The most important unintended consequence was the ability to settle in one location, in effect substituting trade for migration. The megafauna still went extinct, but humans had begun the process of settlement, a first step toward cities (Chase-Dunn, Christopher; Hiroko Inoue, Teresa Neal and Evan Heimlich 2015).

Hunters also "down-shifted" to smaller game with shorter breeding times (e.g., rabbits). Some eventually became herders or, as in North America, set fires to clear forests for grass land to feed the deer they would hunt later ("fire-stick farming") (Mann 2006). Meanwhile, those humans who'd remained reliant on gathering were themselves compelled to shift gradually to horticultural gardening, also using their own variation of "fire-stick farming" (see below).

Under the stress of foreclosure in ancient hunting life-styles and rapid fluctuations in climate, many humans found themselves responding in the same way as our simpler ancestors during the Cambrian. Within a few thousand years after the last glaciation, settlements had become common where the food supply allowed. Those settlements that would incubate the first true cities and surrounding polities had also emerged, typically along rivers with fish running through lands that could be cultivated, and began to develop social hierarchies. This Neolithic wave of settlements seems to have eventually become global, beginning first in Eurasia some 4,000 years after the last glaciation, and then in the Americas after an additional 4,000 (Mann 2006). The content of the social changes among humans was strikingly similar to the genetic changes of the Cambrian: the ***emergence of conflict, hierarchy***, ***reorganization of energy flow*** from the weak to the strong, an ***increasingly complex division of labor***, ***and social regulations*** designed to coordinate labor and keep the flow of energy reliable. The Cambrian explosion was recapitulated by reorganizing the relations among human beings using language, but the qualities that emerged were the same: a specialized division of labor controlled by a hierarchy of authority coordinating the creation and distribution of food (Chase-Dunn, Christopher; and Bruce Lerro 2014, 75-148).

The most famous settlements creating the pristine[34] (or first) states were generally located between 20^0 and 40^0 north of the equator. Mesopotamia, illustrated in Figure 12, was closer to 40^0. This was no accident. The climate within that latitudinal band 10Kya was cool enough to have winters allowing some deciduous hardwoods to grow, dropping leaves during the cool months. Winter leaf decomposition was retarded by microbes, themselves either greatly slowed or forced into hibernation. These are the conditions producing the fastest growth of the most fertile topsoil able to feed wheat, maize, and rice for generations (Colinvaux 1978, P. Grimes 1999). It was these soils produced by temperate climates that made the eventual intensity of agriculture possible in the downstream alluvial river deltas, generating the food required for high populations and pristine states.

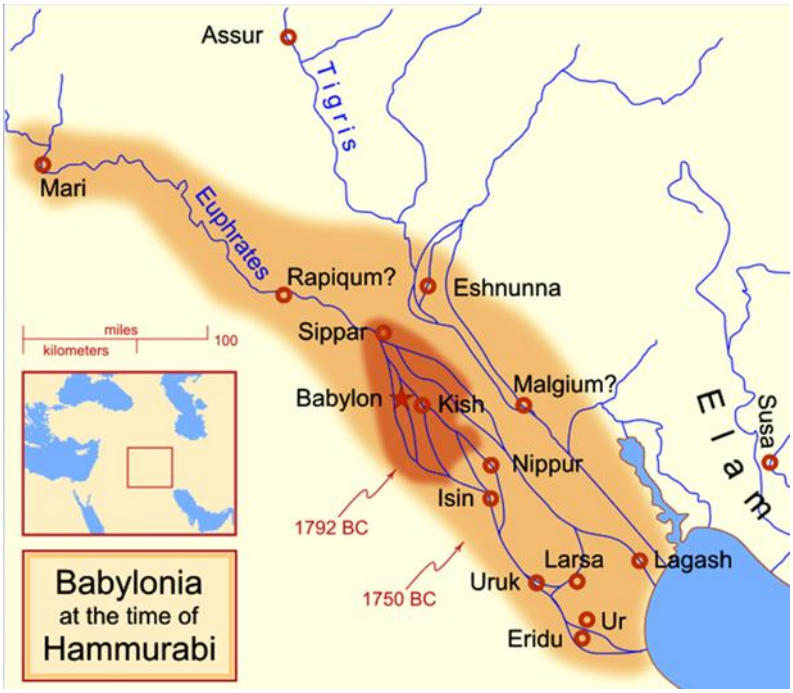
This can be contrasted with the soils nearer the equator beneath tropical rainforests. There, the intense solar energy supports the greatest biodiversity (Jablonski, David; Kaustuv Ray, James W. Valentine 2006), including abundant species of animal, insect, and microbial herbivores and decomposers, collectively preventing dead plant matter from storing nutrients in the soil. Absent winters, dead leaves drop evenly over time and are immediately eaten. In addition, frequent heavy rains quickly wash lose topsoil into the nearest river. Hence tropical soils cannot support the agricultural re-use available in the north (Colinvaux 1978). Instead, tropical farmers must re-fertilize their intended cropland by burning sections of forest.[35] After a few seasons the burned

[34] "Pristine" states were the ***first*** states, not the "cleanest."

[35] Another form of "fire-stick" farming, more typically called swidden, and/or "slash and burn."

and fertilized land is exhausted, compelling the process to be repeated in another section. Even if the pattern of sequential burning is optimally organized in a circle around the central village, such that the original area is renewed, the net energy available to the human villagers is less than that available to the agricultural occupants of the temperate zones. The tropics limit human population density, capping social complexity at the level of chiefdoms emerging from an alliance of villages. Without enough surplus food to support a standing army, even a simple kingdom would be impossible. The exceptions of the Khmer and Mayan kingdoms were possible because of massive river basins depositing upstream nutrients (P. Grimes 1999). Equally rigorous energy limits capped the polar hunters. In the Americas, the Eurasian experience was recapitulated, but retarded by 4K years by a lower population density which took longer to reach crisis levels.

Figure 12. The River Cities Enclosed By Hammurabi Over The 42 Years Between 1792 And 1750 Bce



Source: https://en.wikipedia.org/wiki/File:Hammurabi%27s_Babylonia_1.svg (Mapmaster)

Conflict, Food, and Armies

Settlements require a stable food supply. Early horticultural techniques in the temperate zones replicated the tools used in the tropics, such as digging sticks like spears applied to the soils, tools

that were eventually improved to function like the modern hoe. Simultaneously, the former hunters in all areas would have been compelled eventually to become herders (Chase-Dunn, Christopher; and Bruce Lerro 2014, 75-104). Some of them also used horticulture to feed their animals, but not all, and not at once. Others still remained nomadic, travelling with their animals. Inevitably these nomadic pastoralists would have encountered the cultivated crops of horticulturalists, doubtless to the great delight of their animals. The ensuing human conflict would have favored the herders (because they retained the tools and cultural knowledge of hunting), leading to burned villages, kidnapped women, and many dead. Enough such conflicts created the walled villages typical of ancient chiefdoms, whose remains are scattered across the globe.

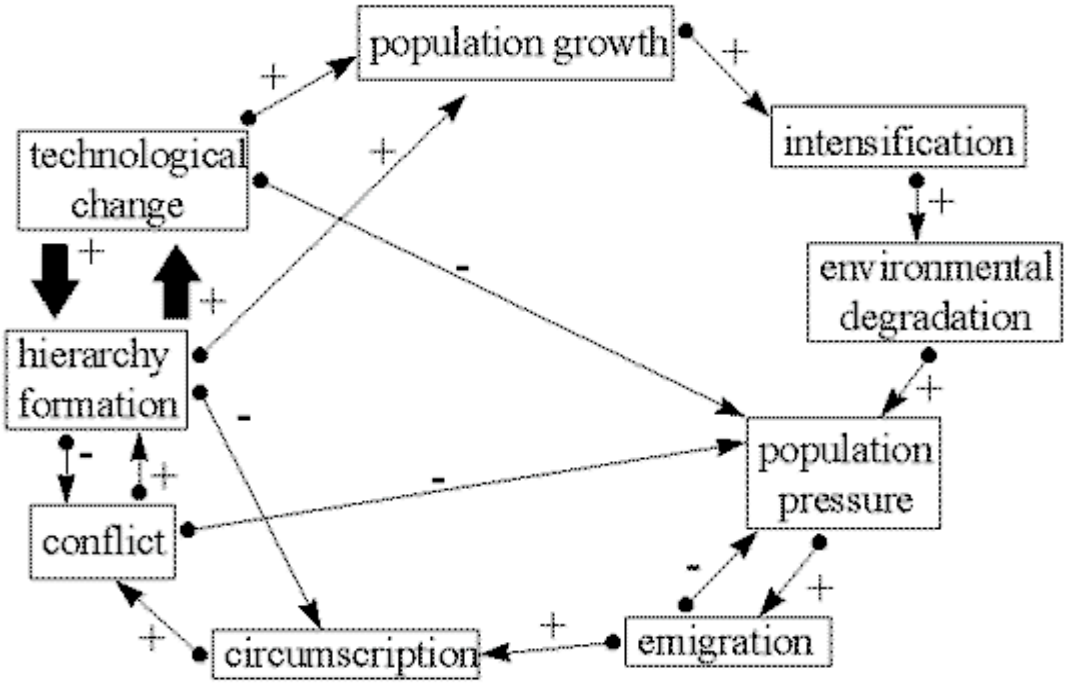
In the tropics, food supply limits population and the capacity for standing armies, so these niche-clashes would have likely ended by negotiation instead of victory. But in the temperate zones soil fertility eventually enabled the villagers to collectively support armed young men for defense, turning the tables and keeping the pastoralists at bay. The long-term result over thousands of years was a retreat of pastoralists into mere nuisances living in the mountains, peoples who would sometimes trade with or raid the settlements, but were otherwise consigned to semiperipheries, such as the Elamites living in the mountains in the map in figure 12. The semiperiphery continued to produce charismatic leaders who would sometimes be able to use their lineage connections to assemble large armies on horseback to conquer enormous areas in a blitzkrieg fashion such as the Mongols.[36] However, these amazing achievements did not stop the steady progression of agricultural production. Conquest and wars checked the proliferation of production and settlement, but with far less impact than any one of the extinctions during the Phanerozoic. As with the Phanerozoic, checks and set-backs were simply brief interruptions to an inexorable process powered, like the Cambrian, by the autocatalytic cycle described below.

The map in Figure 12 is a snapshot of this process, a snapshot taken late in the game (1.7 K BCE) over 2,000 years after the creation of the first settlements archeology has found 3.7 K BCE (see figure 14 below). The reason for its inclusion here is geographic. The rivers are always shifting their course, but the map shows the abundance of water and the fertile alluvial soil. It also shows some of the important early cities relying on those soils. Over time the city locations tended to move upstream as the best land was settled earliest. The occupants of "Elam" (lower right) were semiperipheral warriors, alternately trading with and raiding the inhabitants below. But the driving force of settlements in the Mesolithic and urban growth in the Neolithic was mutual competition

[36] Chase-Dunn's team have discovered that at least 50% of imperial geographic expansion during recorded history originated with organized semiperipheral armies, whose conquests were only put to an end with the invention of guns (Chase-Dunn, Christopher; Hiroko Inoue, Alexis Alvarez, Rebecca Alvarez, E. N. Anderson and Teresa Neal 2015, McNeil 2011).

between cities over land and trade routes. A model describing this process appeared in (Carneiro 1970), and a version by Chase-Dunn and Hall in 1996 is in figure 13 (The figure is also labeled 2 in the paper from which it is drawn.)[37]

Figure 13. The Iteration Model

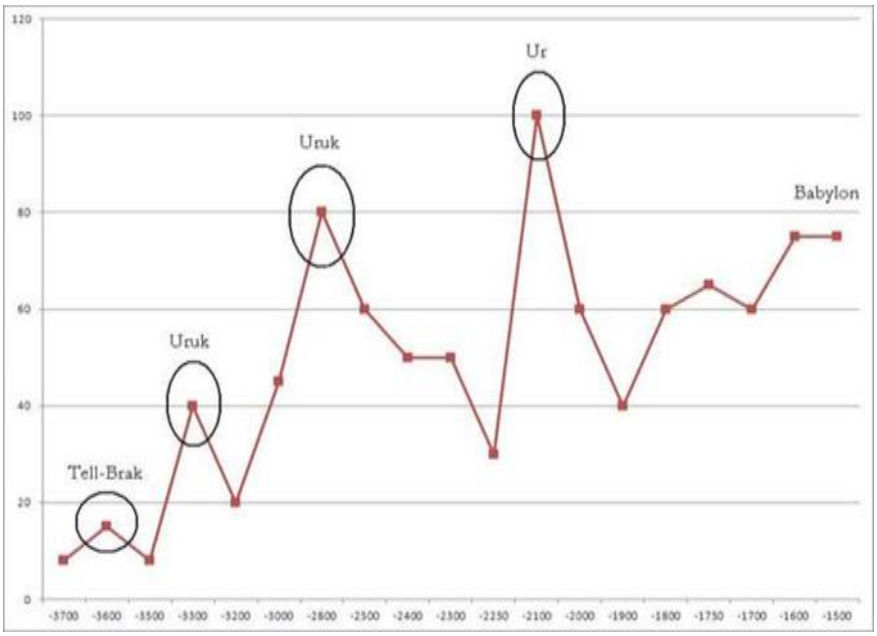


The "Iteration Model" in Figure 13 is ***essentially identical to the causal dynamics of the Cambrian: an autocatalytic cycle of self-amplification.*** It also resembles the cyclical causality of the origin of life (Virgo, Nathaniel; Takashi Ikegami, Simon McGregor 2016)**.** Starting from the top and moving clockwise through the model, we see that population growth intensifies the search for food, creating more population density, encouraging some to break out on their own while compelling others to become more tightly organized. Conflicts erupt between groups with greater frequency, promoting both social hierarchy and internal rebellions against it. Hierarchy and technology are mutually reinforcing, enabling further population growth. These processes replicate the Cambrian with one crucial difference: During the Cambrian, these changes were retarded because they happened within organisms via **genetic change**. Among humans **culture** compressed the process from millions of years to thousands.

[37] Environmental degradation is another important input to the cycle (Chase-Dunn, Christopher; Thomas Hall 2006).

Another parallel between the Cambrian and Neolithic periods was a growth in speciation (Cambrian); analogous to the growth of the division of labor within cities (Neolithic). The exponential growth of both are "outputs" generated by positive feed-back loops. In Figure 14 below, Chase-Dunn and colleagues have plotted the urban populations of the cities found near the mouth of the Tigris and Euphrates rivers mapped in Figure 12. It is a jagged line, a fractal echo of the growth of biomass during the Phanerozoic between extinctions.

Figure 14. Urban Population (In Thousands) Of The Earliest Cities Found Nearest The Mouths Of The Tigris And Euphrates, 3700 Bce –1500 Bce (Chase-Dunn Et. Al; 2014, Fig 2).



In Figure 15 below, the geographic size (in square mega meters) of the empires of the "Central Civilization" (basically the Mesopotamian, Egyptian, and Persian areas (Chase-Dunn 2015, Chase-Dunn, Christopher; Peter Grimes 1995)) is plotted, along with those of "East Asia" (China and surroundings). Hence there are two superimposed lines, one for each area. Imagine adding the two together into one combined line. Recall also that these lines omit the contemporary American states of the Yucatan, Central Mexico, and the Andes (collectively spanning 500 BCE to 1500 CE).[38] The cumulative result of including all known areas of conquest is another fractal echo of

[38] During its peak c. 14-1500 CE, the Incan empire alone is estimated to have approximated that of Rome (Mann 2006). If included here, that additional area would have extended the time and added height to the outlier dominated by the Khanate in figure 15, while its Yucatan predecessors would have smoothed the sharp variations found in the graph between 200 and 1200 CE. If these American data had been included, the result would have been a smoother upward line until 1500 CE. But the plummet after 1500 would have remained, perhaps reflecting the plague in Europe and smallpox in the Americas, each perhaps worsened by the "Little Ice Age."

the Phanerozoic. All of these graphs are the life-outputs of the same self-amplifying causal loops of matter and energy identified by complexity theorists. The commonality of these loops reflects their common source in autocatalytic deviance amplification.

The Division of Labor and Hierachy Within Core Areas:
The Ideology of Social Control and Centralization of Resources

Within the fertile core areas of Mesopotamia protected by armies, walls, and mutual defense treaties, the populations could continue to fish, farm, and cooperate with settled (hence "domesticated") herders to produce food with a varied diet. The land productivity continued to rise with irrigation, extending the nutritious water ever further from the river courses, augmented by the use of animals to pull ploughs or power irrigation. Abundant food fed not only armies when needed, but also craftsmen and women creating pots, clothing, and jewelry. Food created the capacity for a division of specialized labor, but this did not require a power hierarchy. At the daily village level of barter, trade, and neighborly negotiation, political power would only be invoked to resolve disputes. Otherwise the exchange of goods could have been among equals (Kohl, Philip L,; Rita P. Wright 1977).[39]

The informal culture governing these exchanges did not arise out of a vacuum. Instead it retained the shadowy echoes of kinship reciprocity handed down from the enormous history of small-band living.

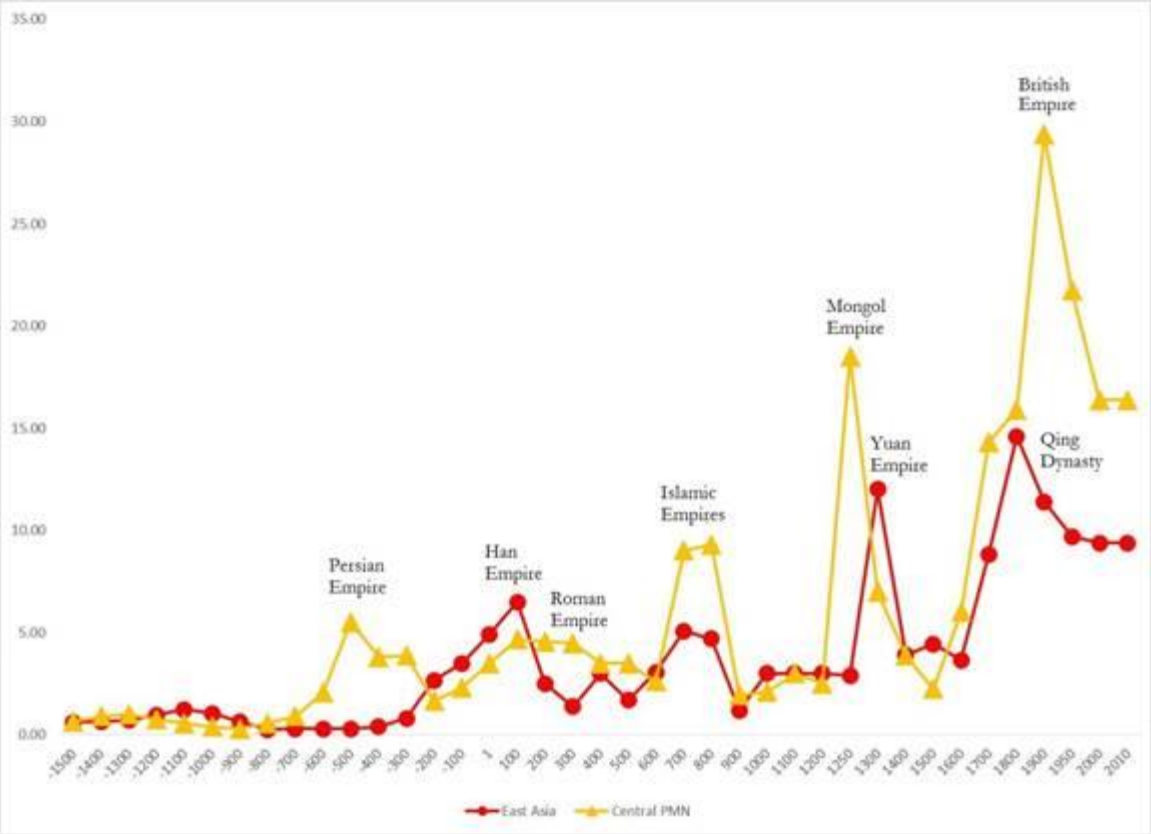
Reciprocal kinship ties would have provided a comfortable touch-stone legitimating all more distant ties.[40] So within settlements, kinship ties would have remained a foundational link, a unit allowing peaceful relations among adjacent villages. Disputes would have been resolved by respected elders.

An elder leading one village could have been acquainted with all, allowing individual "lobbying" by inhabitants, perpetuating at least the illusion of popular democracy and the morality of reciprocity. But a paramount chief responsible for a cluster of villages containing over 1,000 people—let alone 10,000--could not possibly have known them all, requiring the emergence of an ideology of legitimacy transcending personality and instead inhering in the office derived from religion.

[39] The caste hierarchy of India originated in the division of labor imposed on family trees. My point here is that divisions of labor do not *require* social hierarchies to function.

[40] Indeed it continues today as ritualized tributary gift exchange during holidays. This pattern is global, indicating its continued utility as a bonding ritual.

Figure 15. Eurasian Area Under State Control For 3.5 K Period 1.5k Bce—2.0k Ce (Figure 2 In Chase-Dunn Et. Al. 2015).



The Tributary System in the Pristine Cores: A Dissipative Structure

Weber's classic description of the transition from "charismatic" to "traditional" authority applies well to the gradual shift of authority which accompanied the increased complexity of human settlements from the Mesolithic to the Neolithic. Authority shifted from personal ties within one village to an individual or group of priests presiding over a population of multiple thousands. Another corollary development was the transformation of the reciprocal sharing of food and other necessities typical of bands and small villages into "gifts" expected by the gods (the "state") as ritualized expressions of gratitude. The frequency of these gifts, and their material forms as food or labor, became the acts of "tribute" giving the system its name.

The effect of these changes was to pass energy up and out of the villages via the village headman to the authorities in the ceremonial center, liberating them from direct labor. Yet once again, entropy via this parasitism necessarily contracted the amount of energy available across

every transfer along each step to the top.[41] ***In this regard, society itself is a dissipative structure, like an ecosystem, with energy flowing from the plants to the farmers, thence via social layers to the most powerful.*** Even subtracting the necessary energy losses of entropy, the accumulation of a food surplus in the center allowed redistribution to craftsmen and warriors—or even back to the villages themselves during bad years. This system has had many variations, leading to scholarly debate over whether the flow of energy (via food or labor) was state administered, and/or bartered, and/or regulated by markets (Chase-Dunn et.al.; 2015; Smith 2004). I agree with Chase-Dunn that it was a combination that varied over scale and time. As today, kinship ties dominated at the "household" level. The parasitic flow of energy from mother to child during nursing is primordial and continues today, as do the social expectations of males to assist. But 6Kya, the definition of "household" was quite different, including perhaps an entire village, or at least dozens of individuals. Child-rearing was truly a social project, as were social instruction and sharing food. Reciprocity among kin continued as always at the village level, and most of the village were, in fact, kin (Zagarell 1986). The bulk transfer of energy as firewood, food, and labor to the centers of regional administration was likely perceived much like a "tithe" in churches today – an act of self-sacrifice to the gods, who were theological symbols of the common good. The accumulated energy from food, fuel, and labor indirectly (via the ruler) fed the families with specialized skills living in urban centers, families who in turn were creating items for village distribution. The energy created by the farmers and delivered to the manufacturing centers returned to their village origins as useful household goods, minus production and administration "costs" (military and priesthood).

The trade in bulk goods required for survival imposed practical limits on the geographic size of the exchange, forming a geographically close-knit economy (Chase-Dunn et. al.; 2015). Urban craftsmen also produced jewelry and other culturally valued scarce items for the king, enabling him to send some of them as goodwill gifts to neighboring kingdoms. These "prestige goods" were a form of diplomacy, covering a much larger area of political-military alliances. Recently, obsidian arrowheads from southern Mexico were unearthed in the Cahokia mounds near modern St. Louis, and copper from mines near Lake Superior was found in ancient pre-Columbian settlements surrounding the Chesapeake Bay (Mann 2006, Chase-Dunn, Christopher; and Bruce Lerro 2014, 111). Hence Chase-Dunn proposes an early model for the first multi-state "systems" with three concentric circles (Chase-Dunn, Christopher; and Bruce Lerro 2014, 20-21). The inmost circle is the area within the range of bulk goods transport of daily requirements; the second is the realm of overlapping power with adjacent states where shifting alliances and warfare occurred; while the largest circle overlaps with other "world-systems" centers connected by the exchange of

[41] Therefore, the social distribution of power and wealth is always pyramidal. Political stability is presumably related to the ratio between pyramid height and the area of its base.

diplomatic prestige goods. The realm of diplomacy and geopolitics enclosed the known "world-system" of that region into one "Political-Military-Network."

So the pristine states emerging in the most favorable areas during the Neolithic were built in cultural layers forming a dissipative structure. The first layer was village-level kinship obligations; the second, religiously mandated tribute supporting urban centers; and the third, the exchange of prestige goods for cross-polity diplomacy. So we have now come full circle, following the iteration model in Figure 27 above, as illustrated by Sumer. The very success of kinship reciprocity which enabled peaceful relations and tied many villages together unintentionally allowed (1) the emergence of a paramount chief➔chiefdom➔kingdom; (2) indirectly, the sweeping up of shamans into official priests employed by the state; and (3) a tribute requirement compelling farmers to support craft workers. The ultimate result was the creation of a powerful (social) dissipative structure with enough energy to spawn a division of labor like daughter tornados. It was a new form—a new complex structure—of self-organization emerging from the same dynamics that had produced life itself.

The self-amplification of the causal feed-back of the Cambrian has never stopped, despite mass extinctions. It continues to generate new life forms finding new niches. The same is true of its human form as exemplified in the "iteration model." It continues to produce new social formations today, generating the current global economy and the potential emergence of a global state (Chase-Dunn, Christopher and Hiroko Inoue 2012, Chase-Dunn, Christopher; and Kirk Lawrence 2011a, Chase-dunn, Christoper; and Kirk Lawrence 2011b).

Population pressure among the pristine states of Mesopotamia, Egypt, China, and India (Chase-Dunn, Christopher; Peter Grimes 1995)—collectively the first core areas of multi-state "world"-systems—found their leaders tempted or compelled to expand their areas. At the very least, expansion could increase the agricultural land they could draw from. Their well-fed armies could conquer ever-more distant areas. When successful, the newly conquered peoples had their own histories, ethnicities, and deities; making their enslavement more palatable. Slavery was endemic to conquest and an additional reward of new energy to the structure, allowing slave labor to be used for the construction of monuments like the pyramids of Egypt or, more practically, for mining and farming.[42] The code of Hammurabi has long sections addressing the treatment of slaves and the punishment for mistreatment, and these sections clearly imply that slaves were quasi-commodities subject to both sale and inheritance. The capacity for manumission and for

[42] The peoples that could be enslaved were governed by a theology used to discriminate between "us" and "them," a theology that evolved in response to the increasing frequency of contacts with the "other" peoples enslaved and the realization of their common humanity. That recognition of common humanity broadened the theological concept of "us" and contracted the category of the "other," ultimately increasing the areas off-limits to slavery ("No Slaving Zones") and increasing the raids on the shrinking areas where slavery was permitted, such as the savage chiefdoms of northern Europe, the Balkans, and horticultural Africa, as brilliantly documented by (Fynn-Paul 2009).

anyone to be enslaved created the first true multi-ethnic empires: states large enough to encompass peoples of many ethnicities/cultures, indirectly promoting equal inclusiveness for religions (Fynn-Paul 2009).

Nearer the centers were the peoples of the semiperiphery. These were tribes living outside of core state control but aware of their existence. Their interactions would have perhaps begun as conflicts like those described above between pastoralists and horticulturalists. But over several millennia, conflicts would have fallen in frequency as the victories of the settled armies became increasingly assured. Their environment in the hills and mountains supported herding, but lacked the fertility necessary for agriculture, making their lands less attractive to core conquest. But those same rough conditions also made their lives dependent on a keen awareness of their environment, along with a skill with weapons that could be deployed in an instant. Their contacts with the initial cores were mutually useful trade (and occasional raids), exposing them to the latest technologies, beliefs, and prestige goods. The combination of their precarious lives with core technologies formed a perfect cauldron of creative innovation, enabling them to apply core technologies in unintended "off-brand" ways. One by-product was the development of novel weapons and military tactics. Chase-Dunn's team has discovered that about 50% of imperial expansion originated from the ***semiperiphery*** (Inoue, Hiroko; Alexis Álvarez, E.N. Anderson, Kirk Lawrence, Teresa Neal, Dmytro Khutkyy, Sandor Nagy, Walter DeWinter and Christopher Chase-Dunn 2016). While these geographical expansions were impressive in speed and size, they merely accelerated the land area under state control.[43]

The Semiperiphery and Capitalism

Another important contribution from the semiperiphery was its creation of city-states governed by capitalists. Capitalism itself emerged within the tributary mode, but was always carefully controlled lest it provided a source of revenue and power separated from state control. Initially, the prestige goods of diplomacy and symbolic communication could be acquired by semiperipheral nomadic peoples via negotiation with the core and then passed along as attractive small objects. Their proud recipients could display them as symbols of rank to their brethren, increasing their geographic demand.[44] News of this demand would trickle back to the producers and motivate more production. Complexity theorists have called this positive loop a "bucket brigade" and have

[43] It was this dance between intimidation and popular support that compelled the evolution of the state from a fearsome parasite to its modern form as the provider of last resort, a power with a "monopoly on the use of ***legitimate*** violence." The slogan of the United States Postal Service originated in the Persian Empire.

[44] This is how copper from Lake Superior found its way to the Chesapeake, and obsidian to the Mississippi.

observed it in life at all levels from the cell up (Holland 2014). As long as every member of the "brigade" is rewarded with more energy along the path, the path will expand in width and length and the original producers will differentiate and multiply.[45] The traders became the long-haul truckers of the ancient world. They were tolerated as transient migrants across the territories of the tributary states they traversed, both because their goods were useful and also because they themselves paid "tribute" for the crossing. It was in this fashion that the camel caravans of the Sahara emerged, as well as the "Silk Road." (Abu-Lughad 1989).

Trade itself gave birth to merchant capitalism, sometimes even production capitalism as well, especially along the relatively safe (from robbers) seafaring routes—another form of niche "pioneering." Chase-Dunn (2015) argues that merchant capitalists with full state power may have first emerged in the city of Dilmun (in modern-day Bahrain) during the Assyrian empire, and has sporadically re-emerged ever since, within politically independent island or port niches outside of tributary state control.[46]

The eventual displacement of the tributary mode by capitalism has not changed the fact that ***social structures at all scales are dissipative***; but it has completely re-arranged the social organization of energy flow creating that dissipative structure, and that on a global level that has come to envelope us all. Trade started with prestige goods and, with seafaring, shifted to bulk goods. As it did so, the goods traded went from luxuries to necessities. Even the Phoenicians were loading tin ore from Cornwall in today's England to be off-loaded in Egypt. Tin was then a strategic raw material for bronze weapons. When the Western Roman Empire collapsed, the population dropped, reflecting the necessity of trade for survival. By no later than 1700 CE, the entire planet was involved in mutual trade, and the depression of the 1930s was itself both marked and caused by a collapse in international trade. Trade has become the means of energy distribution on a planetary scale, a true circulation system.

Conclusion

Chase-Dunn's work took the concepts of core, semiperiphery, and periphery from Wallerstein's explanation of the early European inter-state system of capitalist imperialism. He then carried these concepts back in time to help us understand the emergence of the first urban centers. Complexity theory allows us to extend that backward push to the origins of life itself and even before, by

[45] One non-social example is the growth of neuronal pathways in the brain as it learns: neurons receive blood as needed, and more firing means more blood, while those not firing at all die. So the logic expanding neuronal pathways re-appears in the reinforcement of trade routes

[46] Phoenicians 3-2.5 Kya (Chase-Dunn, Christopher, E.N. Anderson, Hiroko Inoue, and Alexis Alvarez 2015), Venetians and Genoese c. 1400 CE.

identifying the common dynamics unifying all dissipative structures and demonstrating that social organization is merely another form of complexity bound by the same rules. Complex structures cannot be precisely predicted because their forms are so sensitive to their shifting environments and histories. But all generate additional structures creating greater complexity when supplied with more energy, and all simplify when energy is withdrawn. Complexity theory alerts us to the fact that social reorganization is a form of phase-change, and phase-changes (like boiling water) require ever-increasing energy inputs to breach their critical levels. Hence Chase-Dunn's vision of a global state is unlikely (Chase-Dunn, Christopher; and Kirk Lawrence 2011a, Chase-dunn, Christoper; and Kirk Lawrence 2011b), because more energy is either lethal (fossil fuels, nuclear fission) or inadequate (solar). Humans have shifted energy sources with increasing frequency with population, enabling an intricate global division of labor and competing centers of accumulation, each protected by an energy-expensive military shell. Current global violence indicates that humanity is facing another bifurcation, while complexity theory allows us to see the continuity between past bifurcations since the emergence of life itself and the current one generating the 6th mass extinction. All share in common an imbalance between self-amplifying cycles of exponential deviance versus compensatory mechanisms of dissipative energy release. Even without global warming, entropy alone mandates that increasing energy inputs must create increasingly hot outputs. As with all life before us, our social complexity is capped by the fundamental laws of physics. This adds urgency to the need to integrate the sciences, and mine the promise of the principles of complexity. Our future as a species may depend on it.

About Author

Dr. Peter Grimes specializes in the Earth as a total system. As an undergraduate at the University of Michigan, he studied ecology and political economy. His M.A. at Michigan State University was on the political economy of global population growth. His second M.A. and PhD at Johns Hopkins (under the direction of Dr. Chris Chase-Dunn) were on the role of economic cycles in the shifts of global hegemony. During that period he was also co-PI on an NSF grant to study global warming. His recent work has been to merge the historical and physical sciences using the tools of complexity theory.

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Social Science and World Revolutions

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At the 2014 annual meeting of the American Sociological Association (ASA) I received a Distinguished Career Award from the Political Economy of World-Systems (PEWS) section of the ASA. At the 2015 ASA meeting a session was organized by Jeffrey Kentor in which several colleagues presented comments on aspects of my academic work. Several of those presentations were subsequently turned into documents and are included in this special section of the *Journal of World-Systems Research*. I have been asked to comment upon them and I will also take this opportunity to present a brief overview of my scholarly life since graduation from high school.

The authors of the comments are all colleagues that study topics related to my work and whom I have known for many years. They are Jennifer Bair and Marion Werner, Albert Bergesen, Peter

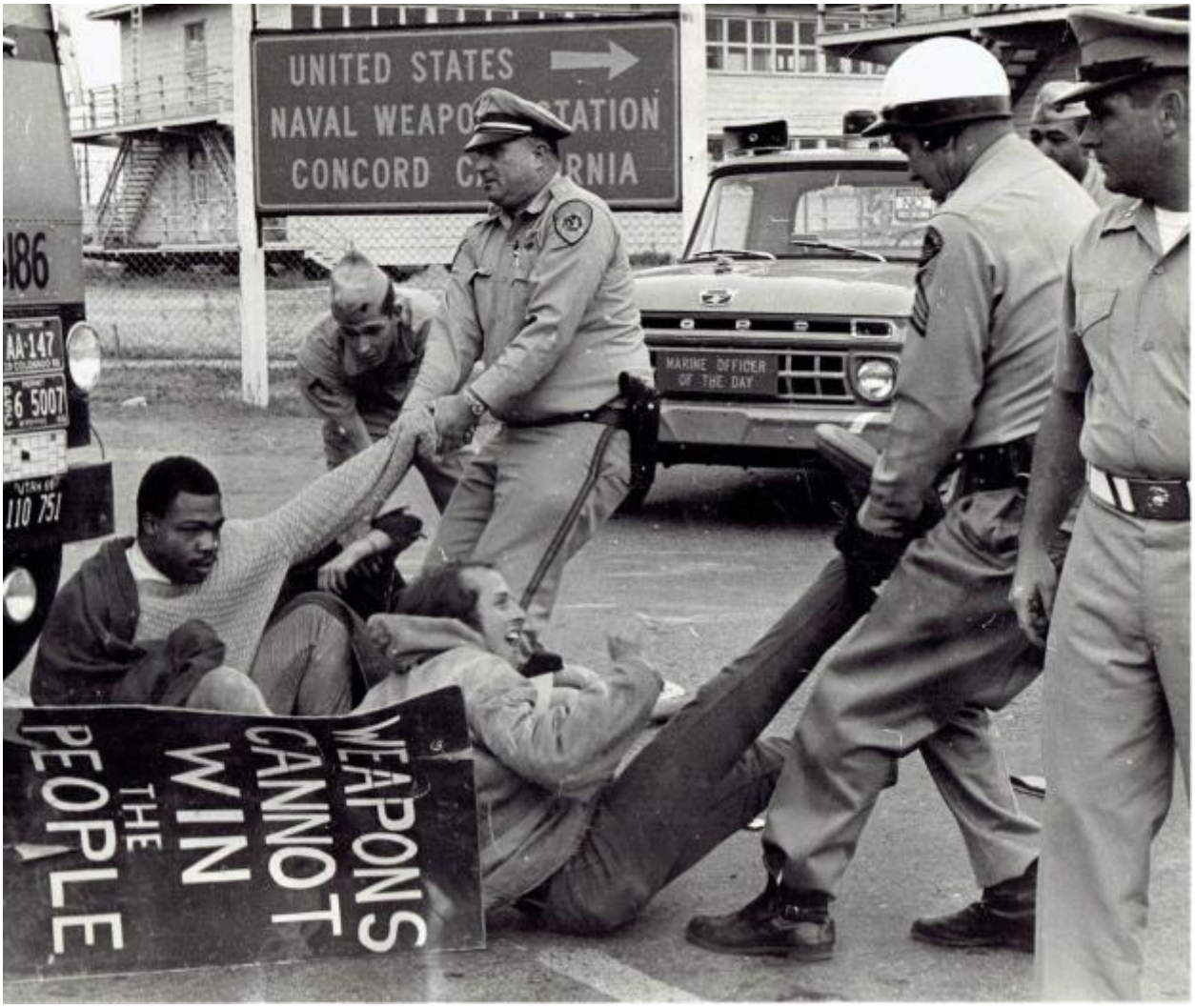
Grimes, Ho-Fung Hung, Andrew Jorgenson, Jeffrey Kentor, John Meyer, Valentine Moghadam, Michael Timberlake and Jonathan Turner.

I have been very fortunate to have lived most of my life during the second half of the 20th century and the first decades of the 21st century, which has been a period of relative peace and security in the world, and to have been a middle-class white citizen of the United States. My life in the academy has also been fortunate. After high school, I majored in journalism at Shasta College in Redding, California and then transferred to the University of California at Berkeley in 1964 where I majored in Psychology. At Berkeley I took Collective Behavior from Herbert Blumer and a Social Psychology course from Edward E. Sampson, and I participated in the Free Speech Movement in 1964. In 1966 I applied to the sociology graduate program at Stanford and was accepted. These were the years of what I came later to understand to have been the World Revolution of 1968. I was an activist in the anti-war movement and was arrested at the Concord Naval Weapons Station in Port Chicago, California for stopping napalm trucks (see Figure 1).

In 1969 I dropped out of the graduate program at Stanford and took a job teaching sociology at Cañada College in Redwood City, California where I burned my draft card in a pumpkin with several of my students. I was not rehired when my contract expired and so I drove my Volkswagen bus to Panama because Che Guevara had said "two, three, many Vietnams." I organized an anti-war demonstration on the Canal Zone and fell afoul of the authorities. I was in way over my head and was lucky to survive the return trip to California. The California Department of Education tried to revoke my community college teaching credential on grounds of moral turpitude, citing my arrest at Port Chicago as evidence. My claim to having a good moral character was entirely based on the fact that I had stopped napalm trucks at Port Chicago. The hearing officer restored my credential.

After returning from Panama I was living in San Francisco and driving a truck for the Salvation Army. Stanford Professor John Meyer somehow got my phone number and he called to encourage me to return to the Stanford graduate program, which I did. I joined a cross-national comparative research project on the expansion of education and economic development in all the countries of the world led by Meyer and Mike Hannan (Meyer and Hannan 1979). My dissertation used this cross-national research design to examine the effects of dependence on foreign investment on national economic growth and inequality. It was inspired by Al Szymanski's Columbia University dissertation research on the same topic.

Figure 1. Stopping Napalm Trucks at the Concord Naval Weapons Station. 1967[1]



I found that countries that had greater dependence on foreign investment (which later became known as "capital penetration") grew more slowly and had more income inequality than countries with less dependence on foreign investment (Chase-Dunn 1975). I was very fortunate to have John Meyer as my main mentor, and I also am greatly indebted to Morris Zelditch, Bernard Cohen and Joseph Berger who taught me the fundamentals of the comparative method and theory construction which every social scientist should know.[2] I also formed a lifelong friendship with Al Bergesen, also a graduate student in sociology at Stanford. And I met Immanuel Wallerstein during his stay at the Center for Advanced Studies in Palo Alto. And I became life-long friends with Wally

[1] The marines had to drag us on to the base in order to arrest us. See the painted line I am sitting on.

[2] Rather than taking sides in the contest between social activists and social scientists I choose to be both, though they are very different activities. I agree with Michael Burowoy's conceptualization of social science as a big tent that contains both public and professional arenas that should respect one another. See "Global Public Social Science"

Goldfrank, a world-system sociologist who invited me to teach a course at the University of California-Santa Cruz in the early 1970s.

In 1975 I moved to Baltimore, Maryland to take a job at Johns Hopkins University. At first I was half time in Sociology and half time at the Center for Metropolitan Research, where a colleague, Roger Stough, introduced me to urban geography. I worked with Ricky Rubinson in Sociology, a fellow graduate of Stanford, to develop a structural version of world-systems analysis that combined our Stanford training in theory and quantitative methods with the ideas coming from the progenitors of world-systems analysis—Immanuel Wallerstein, Samir Amin, Andre Gunder Frank and Giovanni Arrighi.

I also became friends with Marxist Geographer David Harvey and joined his "Reading Capital" seminar. The *American Sociological Review* published an article in which I summarized the findings of my dissertation and I began a long and fruitful collaboration with Volker Bornschier of the University of Zurich. Our book *Transnational Corporations and Underdevelopment*, was published in 1985. In 1975 Volker and I attended a conference at the Rockefeller Bellagio Center on Lake Como in Italy at the invitation of Neil Smelser (seated in the center in Figure 2) and Harry Makler (seated at the far left). The meeting was organized by the Research Committee on Economy and Society (RC02) of the International Sociological Association. Brazilian Sociologist (and later President of Brazil) Fernando Henrique Cardoso (seated next to Smelser in Figure 2) was in attendance, as was Alberto Martinelli (later to be president of the International Sociological Association). Alberto is seated to the left of Barbara Stallings. Arnaud Sales is seated at the far right, and I am next to him (eyes closed). Volker is standing second from the far right.

In 1979 I received a research grant from the National Science Foundation (NSF) to study the growth of cities in all the countries of the world over the past 200 years in order to examine the development of urban primacy in national city systems. In the later 1970s I also began to regularly attend the conferences of the International Studies Association and the read the works of international relations scholars and to formulate my version of the world-systems perspective in interaction with them (e.g. Chase-Dunn 1981). The work of George Modelski and William R. Thompson was especially important despite our very different sets of intellectual ancestors (Chase-Dunn and Inoue, Forthcoming).

Figure 2. Bellagio RC02 Conference, 1975

In 1985 I finished writing *Global Formation* and in 1989 it was published by Basil Blackwell. It presented a structural and semi-formalized version of the world-system perspective.[3] In Chapter 10 there is a section (p. 214) in which I assert that the search for distinct boundaries between the core and the semiperiphery and the semiperiphery and the periphery is a pointless exercise because the core/periphery hierarchy is really a set of continuous distributions of different kinds of economic and military power. The categorical terms are heuristic ways of pointing to the top, the middle and the bottom of a set of continuous distributions. Despite that extensive literature, beginning with Arrighi and Drangel (1986) that searches for, and often finds, gaps between the "zones" there is no theoretical explanation of what would produce these gaps. The fact that there has been some upward and downward mobility means that regions occasionally will have passed through the gaps. I stick with my contention that the global stratification system is a set of continuous hierarchical dimensions.

While writing *Global Formation* I became interested in the possibility of comparing the modern whole world-system with earlier smaller systems—cross-world-system studies. And the first version of what later became formulated as the semiperipheral development hypothesis occurred to me (Chase-Dunn 1990; see also Chase-Dunn and Hall 1997: Chapter 5).

[3] A second edition was published in 1998 by Rowman and Littlefield.

In 1994 Salvatore Babones, Susan Manning, Tom Brown and I founded the *Journal of World-Systems Research*,[4] an open-access electronic journal that eventually became the official journal of the Political Economy of World-Systems (PEWS) section of the American Sociological Association. It was in this period that Tom Hall and I turned toward the comparison of the modern system with earlier regional world-systems. Our book, *Rise and Demise* was published in 1997. It retooled the concepts that had been developed to comprehend the modern system for the larger job of comparing world-systems[5] and we developed a general iteration model[6] to explain the spirals of size and complexity that have occurred in world-systems since the Stone Age. In 1991 I got another NSF grant to study small world-systems and in 1998 *The Wintu and Their Neighbors: A Very Small World-System in Northern California* (with Kelly Mann) was published by the University of Arizona Press. We used ethnographic and archaeological evidence to examine the nature of a small system in which the interacting polities were all village-living hunter-gatherers. My collaboration with Terry Boswell led to the publication of our *Spiral of Capitalism and Socialism* in 2000 (Lynne Rienner) in which we added a series of "World Revolutions" [7] to our model of the evolution [8] of the modern world-system. Yukio Kawano, Ben Brewer and I did research on waves of trade globalization, which was published in the *American Sociological Review* in 2000.[9] I was also fortunate that Stephen Bunker came to my Department at Johns Hopkins. He and Alejandro Portes and Maria Patricia Fernandez-Kelly were great colleagues during those years. Beverly Silver and Giovanni Arrighi came later from Binghamton and the Hopkins Sociology Department became an important node in the scattered world of world-systems research.

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[4] See "The Rise of JWSR" http://irows.ucr.edu/papers/irows119/irows119.htm

[5] World-systems are defined as being composed of those human settlements and polities within a region that are importantly interacting with one another (Chase-Dunn and Hall 1997).

[6] The first version of our iteration model is explained in Chapter 6 of Rise and Demise. An improved version was presented in C. Chase-Dunn et al (2007).

[7] World revolutions are clusters of social movements and rebellions that break out in different regions of the system during the same time periods. These clusters are designated by symbolic years in which dramatic collective actions occurred that characterize the nature of each cluster: 1789, 1848, 1917, 1954, 1968, 1989 and the current world revolution, which we designate as 20xx because we are not yet sure of its symbolic year. 1917 obviously refers to the October Revolution in Russia, but it also includes the Chinese Nationalist and Mexican revolutions.

[8] In using the term 'evolution,' we mean long-term patterned change in social structures, especially the development of complex divisions of labor and hierarchy. We do not mean biological evolution, which is a very different topic, and neither do we mean "progress." Whether or not simplicity, complexity, equality or hierarchy are good or bad are value questions that are not necessary to the scientific prehension of social change (Sanderson 1990).

[9] An appendix with the data used in this article is at http://www.irows.ucr.edu/cd/appendices/asr00/asr00app.htm

In 2000 I moved to the University of California-Riverside (UCR) to found the Institute for Research on World-Systems (IROWS).[10] Andrew Jorgenson and I worked together with other graduate and undergraduate students at UCR to produce more studies of the trajectory of investment globalization and the rise and fall of the Dutch, British and U.S. hegemonies. In 2005 Peter Turchin and I got a National Science Foundation grant to study global state formation. Beginning soon after I arrived in Riverside, the Settlements and Polities (SetPol) Research Working Group has been quantitatively studying the growth of cities and empires since the Bronze Age.[11] Alexis Alvarez, Hiroko Inoue, emeritus Anthropology Professor E. N. (Gene) Anderson and many graduate and undergraduate students at UCR have collaborated on a series of papers produced by this project. Empirically focusing on the population sizes of the largest cities and the territorial sizes of the largest polities in political/military networks and world regions has allowed us to identify those upsweep events in which the scale of socio-economic and political complexity increased greatly (Inoue *et al* 2012; Inoue *et al* 2015. We have also been able to ascertain that over half of the urban and polity size upsweeps can be attributed to the actions of non-core (semiperiphery and peripheral) marcher states (Inoue *et al* 2016), a finding that confirms the necessity of using the world-system as a unit of analysis for explaining sociocultural evolution.[12]

UCR Professor Ellen Reese and I worked with a large group of graduate and undergraduate students on the Transnational Social Movements Research Working Group. We mounted four surveys of attendees at meetings of the World Social Forum in Porto Alegre, Brazil (see Figure 3) and in Nairobi, Kenya, and also at meetings of the U.S. Social Forum in Atlanta and Detroit (Smith and Karides *et al* 2014). Our surveys discovered a rather stable network of overlapping social movements that constitute the structure of the global justice movement (Chase-Dunn and Kaneshiro 2008).

[10] See also irows.ucr.edu/workpaptoc.htm

[11] We adopt settlements and polities as important units of analysis for the quantitative study of world-systems evolution. We use the term "polity" to generally denote a spatially-bounded realm of autonomous authority such as a band, tribe, chiefdom, state or empire (see also Cioffi-Revilla 2001). The term "settlement" includes camps, hamlets, villages, towns and cities. Settlements are spatially bounded for comparative purposes as **the contiguous built-up area**. Our theoretical framework is presented in Chase-Dunn, Inoue, Wilkinson and Anderson (2017). The project web site is at http://irows.ucr.edu/research/citemp/citemp.html. IROWS collaborates with SESHAT: The Global History Data Bank.

[12] A lecture I gave on the evolution of global governance and networks of transnational social movements at the Orfalea Center, University of California-Santa Barbara on, March 6, 2009 is at https://www.youtube.com/watch?v=FxNgOkU6NzY&feature=related

While still in Baltimore I began working on a textbook for an undergraduate sociology course on Social Change.[13] This book, co-authored with Bruce Lerro, finally appeared in 2014. It was originally published by Paradigm Publishers but is now held by Routledge.[14]

Figure 3. UCR Sociology Graduate Students Erika Gutierrez, Linda Kim and Christine Petit at the World Social Forum in Porto Alegre, Brazil 2005

While still in Baltimore I began working on a textbook for an undergraduate sociology course on Social Change.[15] This book, co-authored with Bruce Lerro, finally appeared in 2014. It was originally published by Paradigm Publishers but is now held by Routledge.[16] The SetPol project is now working on an improved version of the iteration model of world-systems evolution first

[13] I wrote the first version of the preface on Wreck Island in 1997, see www.irows.ucr.edu/cd/stories/boat/wreckisland.htm

[14] Social Change: globalization from the Stone Age to the Present. A useful appendix is at http://www.irows.ucr.edu/cd/appendices/socchange/socchangeapp.htm

[15] I wrote the first version of the preface on Wreck Island in 1997, see www.irows.ucr.edu/cd/stories/boat/wreckisland.htm

[16] Social Change: globalization from the Stone Age to the Present. A useful appendix is at http://www.irows.ucr.edu/cd/appendices/socchange/socchangeapp.htm

presented in Chapter 6 in *Rise and Demise*. We have made great efforts to spatially bound whole world-systems.[17] The results of the SetPol project will be published in a forthcoming monograph.

Commodity Chains and System-Wide Class Relations

Jennifer Bair and Marion Werner's essay (this section) on new geographies of uneven development notes some of the issues on which my theoretical stance differs from other world-system scholars and addresses several issues that have become important since the publication of my *Global Formation* in 1989. They also read a 1988 essay of mine that cites Trotsky's ideas of uneven and combined development in connection with the importance of semiperipheral societies for the evolution of world-systems.[18] Bair [19]and Werner note that my version of class analysis allows for a continuum from protected to coerced labor with an important sector of protected labor in the core. The theorists of a global stage of capitalism, starting with Ross and Trachte (1990), have argued that globalization was causing the peripheralization of the core as the neoliberal project attacked the welfare state and labor unions and much of the protected sector was downgraded to the precariat. Most of this happened after 1985 which was when I finished writing *Global Formation*. The growing inequality within the core, as Jenn and Marion and others have noted, has important political consequences and is one of the main forces behind the rise of right-wing populist movements and parties in Europe and the United States. But the fat in the system left over from the New Deal reforms and the boom years after World War II continue to be important factors differentiating the global core from the non-core. The core has become somewhat peripheralized, but the differences from the non-core are still significant. Globalization has not produced a homogenized global class structure in which there is no longer a core/periphery hierarchy. The world is not flat. As Jenn and Marion note, the global class structure and the core/periphery hierarchy have changed, but huge global inequalities remain, and continue to be a significant context for both economic and political developments.

The growth of inequality within the core has produced movements that seem to further sanctify the rule of capitalist property rather than challenging it. The growing importance of the color line mentioned by Wallerstein and the increasing awareness of global inequalities in the core,

[17] In 2016 we held a workshop at the University of California-Riverside on systemic spatial bounding that was supported by the International Studies Association.

[18] Marilyn Grell-Brisk and I have recently written an article on combined and uneven development that discusses how Trotsky's concept works when the scope of analysis is enlarged to compare world-systems and to study the very long-term processes of sociocultural evolution (Chase-Dunn and Grell-Brisk Forthcoming).

[19] Bair got her BA degree at Johns Hopkins and then joined the Sociology graduate program at Duke University where she worked with Gary Gereffi. Her work on commodity chains and reorganizations that have occurred in the international division of labor with regard to the organization and ownership of firms and labor relations pays close attention to major theoretical issues in the analysis of the evolution of global capitalism. In recent years, she has been pursuing a number of these issues in collaborative work with Werner, a geographer.

spurred by mass migration of economic and civil war refugees, have stimulated racist, nationalist and zenophobic counter-movements. The potential also exists for an organized response from unions, displaced workers, oppressed racial and ethnic groups and environmentalists but the anti-organizational movement culture that has been the heritage of the New Left in the World Revolution of 1968 undercuts the emergence of an articulated response from the New Global Left.

A Perfect Storm in Palo Alto

Al Bergesen's essay (this section) describes what I would prefer to call, following Marshal Sahlins, the structure of the conjuncture. The world revolution of 1968 hit Palo Alto right after the Sociology Department at Stanford had been restructured around an experimental theoretical research program inspired by Imre Lakatos's (1978) philosophy of science. The Department was strong on sociological social psychology but weak on macrosociology so they hired John Meyer and Mike Hannan. Out of this conjuncture came several other major contributions to social science. Buzz Zelditch, Bernie Cohen and Joe Berger were producing a profound theoretical research program on status characteristics and expectation states (Berger, Cohen and Zelditch 1971).

John Meyer was in the process of formulating his Weberian take on an emerging global culture that has become known as the world polity or world society perspective (Meyer 2009). Mike Hannan was reinventing Amos Hawley's human ecology for explaining the evolution of formal organizations (Hannan and Freeman 1993).

Al Bergesen's description of the elements that came together in my dissertation include the world revolution of 1968, the theory construction approach of the Stanford graduate program, John Meyer's quantitative empiricism inherited from Paul Lazersfeld (which led me to search for a key variable that would capture international economic dependence) and the panel regression research design contributed to the Meyer-Hannan cross-national research project by Mike Hannan. Regarding the key variable, I came upon Net Factor Income from Abroad in the International Monetary Fund's *Balance of Payments Yearbooks*, and subcategory of this called Debits on Investment Income (DII). Debits on investment income is an accounting item set up by Harry Dexter White, the main U.S. organizer of the International Monetary Fund, to help track global investments. It is a yearly estimate of the amount of profits made on foreign investments within a national economy. Assuming an average rate of profit, DII allows for the estimation of the total stock of foreign direct investment within a national economy. When this is calculated as a ratio to GNP it yields an estimate of the degree to which a national economy is dependent on foreign investment—so-called "capital penetration." I coded DII from the collection of Balance of Payments Yearbooks at the Stanford Library. Better operationalizations of investment dependence were to become subsequently available.

The panel regression model had been developed by David Heise (1970) in order to disentangle reciprocal causation in which two variables are causes of one another. This was the case with both educational expansion and economic development studied in the Meyer-Hannan project and for my study of investment dependence and economic growth. Panel regression uses measures at different time points to separate out the two different causal effects and makes it possible to examine the effects of different time lags. We found that investment dependence had short-run positive effects but long-run negative effects on economic development.

The world of cross-national quantitative analysis has moved on and the issue of capital penetration effects has become more complicated. Glenn Firebaugh's (1992, 1996) studies claimed to show that the negative effect of investment dependence on economic growth is a statistical illusion caused by the fact that the positive effect of foreign investment on growth is smaller than that of domestic capital investment. Issues about the time lags of effects, the kinds of penetration that have negative effects and that the negative effects may vary across time periods and in different world regions, as well as the important advances that have been made in cross-national quantitative methods, mean that this subject should be revisited.

Sun Burning Out Like a Match

Peter Grimes's essay (this section) is a path-breaking theoretical formulation that describes how complexity theory explains a great deal about physical, biological and sociocultural evolution. Peter[20] focusses on the importance of the capture and control of energy for the emergence of complexity. He notes that it is out on the edge between high-energy and low-energy regions that positive feedback loops allow some entities to climb back up the down staircase of entropy to erect greater complexity and hierarchy. These are the physical, biological and sociocultural upsweeps of complexity. With deep knowledge of both natural and social sciences, Peter is able to discover important similarities across phase transitions of very different kinds. His scope of comparison is truly cosmocentric and encompasses what physicists tell us was the beginning of time (the big bang – the modern creation myth) to the present and with interesting implications about the future. Peter is working on a book that will unify science by detailing the similarities, the differences and the interconnections between phase transitions. Watch this space.

The Hegemonic Sequence and the Future of Global Governance

Ho-Fung Hung's essay (this section) on hegemonic transitions and the contemporary geopolitical and geoeconomic situation suggests that the comparative and evolutionary world-systems perspective may be useful for understanding the possible forms that global governance may take

[20] I supervised Peter's dissertation at Johns Hopkins and we have been co-authors and close friends since 1982.

in the 21st century. Ho-Fung[21] points out that Chinese investment in U.S. Treasury Bonds is the major element supporting the U.S. dollar as world reserve currency. The continuation of the ability of the U.S. federal government to print world money enables huge government expenditures without raising taxes. This phenomenon has been called "dollar seignorage" by Michael Mann (2013: 268-273). Despite the fact that the U.S. has a huge trade deficit and has lost its centrality in the production of manufactured goods, the financialization of the global economy built around the U.S. dollar as global money has slowed the rate of U.S. hegemonic decline and sustained the role of the U.S. as the biggest military power in the world. Ho-Fung argues that the Chinese Communist Party is the mainstay of continuing U.S. hegemony because China is heavily invested in the export model of development and because the dollar and U.S. Treasury Bonds are still the most stable investment for the huge volume of trade surplus generated by Chinese exports to Europe and the United States. Ho-Fung contends that China's massive investment in low-yield U.S. Treasury bonds is "tantamount to a tribute payment through which Chinese savings have been transformed into American consumption power." The question is how much longer will dollar seignorage continue, and what will happen to global governance when it finally collapses. A multipolar structure of global economic and military power seems likely. What we do not want to do is what happened in the first half of the 20th century.[22]

After Capital Penetration, More Capital Penetration

Jeff Kentor got his Ph.D in Sociology at Johns Hopkins in 1998. He and Andrew Jorgenson are the founding co-editors of *Sociology of Development*, published by University of California Press. Much of his career was spent at the University of Utah, and it was from there that he sent Andrew Jorgenson to UC-Riverside in 2001. Jeff is now chair of the Sociology Department at Wayne State University. His essay (this section) cites some of the more recent publications that have come out of the capital penetration tradition. His essay also mentions the taped interview that he and Andrew conducted with me at UC-R on June 7, 2017 in which I tell my academic story. Thanks to Jeff and Andrew for the opportunity to do this.

My Intellectual Dad

John Meyer's kind letter to Jeff Kentor recounts some of the story told above. I wrote what is above before I had read it. John saved my occupational life and his inspirational mentoring has also produced several cohorts of graduate students who have gone on to productive careers in sociology.

[22] Discussion of the current situation and future options is in Chase-Dunn and Inoue 2017

I only want to add one bit to his account. Despite that the senior sociology faculty at Stanford was somewhat less than sympathetic to my revolutionary urges, when I was arrested for disturbing the peace and resisting arrest (a felony) at Stop the Draft Week in Oakland in 1967 they bailed me out of jail. I thanked them then and I thank them now. It took many more years to stop that war, but it was done. John is a great sociologist who has inspired me with his dedication to research and his attention to mentoring. I have tried to pass these things on.

Figure 4. IROWS Colleagues at College Building South (Alexis Alvarez, Rebecca Alvarez, Nelda Thomas, Chris Chase-Dunn, Lulin Bao and Hiroko Inoue)

Gender, Tunisia, the Arab Spring and the World Revolution of 20xx

Valentine Moghadam's essay (this section) discusses the relevance of the notion of semiperipheral development and world revolutions for explaining local and transnational social movements that have emerged in the last decade. Moghadam is an expert on the global feminist movement and on Middle Eastern and North African (MENA) societies. She takes a refreshingly political-economic approach to understanding global social change. Her essay focusses mostly on Tunisia, but she

also discusses the important role of that women have played in democratic socialist social movements in both the core and the non-core (see also Schaefer 2014). Her analysis of both the hopeful aspects and the tragedies of the Arab Spring movements is a valuable contribution to our effort to comprehend the contemporary world revolution. Tunisia has indeed been an inspiring example for democratic socialists, but most of the rest of the Arab Spring movements have shown the limitations of Habermasian discourse and Ghandhian civil disobedience in situations in which repressive states, imperial rivalries and powerful reactionary counter-movements are willing and able to use violent repression in politics. The New Age values of the New Global Left are at a big disadvantage when politics get nasty. The demise of the Latin American Pink Tide conveys a different lesson. The Pink Tide was a wave of progressive redistributionist policies that swept Latin America (Chase-Dunn. Morosin and Alvarez 2014) but this welfare depended on raw materials extractivism. The Pink Tide arose with the commodity boom fueled by China but now it is foundering as commodity prices have fallen.

Val tries to put the best face on the neglect of gender analysis in my work. I agree with what she says about the importance of unpaid female labor in core/periphery relations. If I could do it over again I would pay more attention to this issue and to the ecological aspects of world-systems. Though it may be too little too late, I can mention that my textbook (Chase-Dunn and Lerro 2016) is better on both counts (gendering and ecological issues) and that I have recently devoted attention to the issue of why monogamy became the predominant form of marriage in modern global culture, even for rich and powerful men (Chase-Dunn and Khutkyy 2016). In critiquing the evolutionary psychology explanation of Walter Scheidel (2009a, 2009b) Dmytro Khutkyy and I propose that monogamous polities could outcompete polygynous ones because they had greater interclass solidarity and hence were better at warfare. The idea that the rules apply to the powerful was well as those without power does not produce equality for either men or women, but it is preferable to a moral order in which the powerful can do whatever they want. I am not sure if this helps fill my gendering gap but it shows that I do think about these things.

Urban Studies, Settlement Systems and World-Systems

Mike Timberlake (this section) reviews the development of urban studies during the globalization awakening and provides a helpful and accurate survey of the IROWS research on settlement systems. Mike arrived at Johns Hopkins as a postdoc not long after I was exposed to urban geography and together we began to think about the world city system. His valuable book, Urbanization in the World Economy came out in 1985. We began corresponding with urban geographer Peter J. Taylor and attended conferences with others working on world cities (Saskia Sassen, Janet Abu-Lughod, etc.). His essay also provides a helpful and accurate survey of the comparative and quantitative research literature on cities and urban systems that has been carried

out by colleagues who were inspired by, or participated in, our early studies of cities in the modern system. The only thing I would like to add to Mike's overview is a mention of the efforts we have made to improve the estimates of the population sizes of premodern cities (see Pasciuti 2002 and Pasciuti and Chase-Dunn 2002). As to whether I am an urban sociologist, I should say that I have come to think of myself as one after studying settlement systems since 1980 and teaching a lower division course called "The City" since 2000.

Intersocietal Dynamics and Sociocultural Evolution

Jon Turner's essay (this section) summarizes the comparative evolutionary world-systems perspective and proposes some modifications. Turner is a famous sociological theorist who coaxed me into moving to Riverside in 2000. His scope of comparison is anthropological and we share an interest in the sociocultural evolution of human societies and in comparing human social organizations with those of other species (see Turner and Machalek 2017). Turner prefers the term "inter-societal dynamics"[23] and he contends that core/periphery relations are not as important as they have been purported to be. He also contends that, while whole-system intersocietal dynamics are important, they may not be the most important for explaining social change.

Jon Turner's essay provides an opportunity to clarify a few matters. He contends that small-scale systems should be called intersocietal systems rather than world-systems. We have tried to make it clear that our use of the term "world" refers to the set of interaction networks that are important for reproducing and/or changing the institutions of everyday life. Those connections constitute the relevant world in which people live. When communications and transportation technologies were less developed "the tyranny of distance" was stronger. The relevant "world" of direct and indirect interaction links for people in any locale did not extend as far across space as it did after intercontinental travel had become easier. This is what we mean when we speak of "very small world-systems." [24]

Jon also contends that the core/semiperiphery/periphery structure does not work very well for small-scale systems. We agree, but we have introduced the distinction between core/periphery differentiation (a situation in which polities with different degrees of population density are interacting with one another) and core/periphery hierarchy, in which one or more polities are dominating or exploiting other polities (Chase-Dunn and Lerro 2016:23). And we make it clear

[23] We designate polities as subsystems of world-systems because they are easier to bound spatially than are societies.

[24] Randall Collins (1992) was willing to use the term world-system in connection with small-scale kin-based systems.

that it should not be assumed that all world-systems have core/periphery hierarchies just because the modern system does.[25]

Turner's summary of our iteration model and the study of upsweeps are clear and helpful exposition, and his elaboration of his own models for understanding how warfare works as a selection mechanism driving sociocultural evolution is a valuable contribution. He praises the value of simulation modeling, and I agree.[26] Our SetPol project is working on a multilevel model that we hope will be an improvement of the whole-system iteration model by including the processes that are operating **within** societies, as does Turner's Figures 1 and 2 (and Turchin and Nefadov's [2009]"secular cycle" model), as well as processes operating at the level of whole world-systems (Chase-Dunn and Inoue 2018). [27]

Regarding Turner's contention that the work of the world-systems theorists has been distorted by the assumption that the contemporary capitalist system will be transcended by a socialist world society,[28] we can note that Wallerstein (2011) has not predicted how the structural crisis that is now brewing will turn out, and that Chase-Dunn and Lerro (2014: Chapter 20) describe three possible outcomes for the next few decades, one of which is similar to Turner's prediction – "distintegration of the existing world system to something less integrated than it is today, with very active geo-political and geo-economic dynamics ruling a conflict-ridden world." We call this "collapse." While this is certainly a possible outcome, one of the findings from our studies of earlier upsweeps and downsweeps is that downsweeps (collapses) do not last very long. So the issue of what will follow a possible collapse is an important consideration. We agree that human history is partly open-ended and so nothing is inevitable, but some outcomes are more likely than others. And of the probable outcomes, some are much more desirable than others. Undo pessimism is probably just as distorting as undue optimism.

Thanks to Jeff Kentor and Andrew Jorgenson for organizing the ASA session and for putting together this collection of essays addressing my work. And thanks to Jackie Smith for the opportunity to publish this in the *Journal of World-Systems Research*. This brief version of my academic memoirs leaves out the issue of how most of my personal life interacted with my

[25] Chase-Dunn and Lerro (2016:23) say "It should be an empirical question in each case as to whether core/periphery relations exist. Not assuming that world-systems have core/periphery structures allows us to compare very different kinds of systems and to study how core/periphery hierarchies themselves emerged and evolved."

[26] Thanks to our UC-Riverside colleague Bob Hanneman and a group of graduate students at UC-Riverside we have published two simulation modeling projects. One develops the iteration model in the context of small-scale world-systems (Apkarian et al 2013) and the other is a representation of Randy Collins's theory of battle victory (Fletcher et al 2012).

[27] This multilevel model is motivated by our finding that only half of the urban and polity upsweeps were caused by non-core marcher states. The other half must have been due to processes operating within polities.

[28] Stephen Sanderson (2005) mounted a similar criticism of the world-system perspective. See also Chase-Dunn and Lawrence (2010)

professional life, but that will have to wait for another occasion. Let me also thank my parents, my brother Bill, my wife Carolyn Hock and my daughters Cori, Mae and Frances for all their love and support. And, as my friend Gunder Frank would have said, the struggle continues.

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Any conflicts of interest are reported in the acknowledge section of the article's text. Otherwise, author has indicated that she has no conflict of interests upon submission of the article to the journal.

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Sociological Racism: An Appreciation of Aldon Morris' *Scholar Denied*

Aldon D. Morris. 2015. *The Scholar Denied: W.E.B. Du Bois and the Birth of Modern Sociology*. Oakland, CA: University of California Press. 320 pages, ISBN 978-0-5202-7635-2 Cloth ($34.95)

This is not a traditional review. I was deeply immersed in the evolution of *The Scholar Denied*, carefully reading drafts of chapters, and party to more email conversations than I can count about its shape, substance, and analysis. And I have also become a part of the initiative inspired by Morris' book that seeks to reintegrate Du Boisean analysis into the sociological canon (Schwartz 2017a; 2017b). So I am writing what I choose to call an 'appreciation' because I believe that Morris' accomplishment—sifting a mountain range of evidence, building a multi-themed narrative, and synthesizing initially dispersed observations into a compelling perspective that has real implications for how social scientists approach their work—should be made accessible to the broadest possible audience. And I also want to share my conviction that this book can provide real impetus for the decades-old effort to integrate the Du Boisean perspective (at long last) into the sociological canon, where it is sorely needed. I hope this commentary will give the reader just enough evidence and argument to whet (but not satisfy) your appetite for *The Scholar Denied* — and for a delicious feast of Du Bois' scholarship.

Even though the book is structured as an engrossing biographical narrative, it is actually a multilayered endeavor that combines (and revises) wisdom from venerable scholarly areas — notably intellectual history, social theory, sociology of science, and social movements — with insights useful to currently vibrant conceptual developments, notably intersectionality, critical race

theory, and world-systems theory. To accomplish these connections, *The Scholar Denied* offers us a series of (temporally consecutive) narratives around Du Bois' involvement in (and exclusion from) various key moments in the history of sociology as a discipline. This modular approach allows Morris to use his compositional skill to leaven out (of an ocean of evidence) key dynamics that are central to his larger analysis, without robbing the all-important events of their historical context. (As an additional virtue, the method simultaneously allows non-specialists to access the argument while permitting specialists to hone in on crucial evidence).

Let me start out by tracing a key thread of the narrative history —how W.E.B. Du Bois was expelled from mainstream sociology —and then rely on this narrative as a platform for pointing to some of the key contributions of the book. The story starts with Du Bois' first appointment as a sociologist: a non-tenured research position at the University of Pennsylvania, then one of a handful institutions that recognized sociology as an independent discipline. Most people with a passing knowledge of the history of sociology (or Du Bois' biography) know that it was at Penn that Du Bois planned, executed, and published *The Philadelphia Negro*, the pathbreaking study that is still in print and still widely read as an enduring masterpiece of sociological analysis. But I think hardly anyone knows —I didn't before I read early drafts of *The Scholar Denied* —that *The Philadelphia Negro* was the first comprehensive community study ever conducted in the United States, and that it pioneered a tool-kit of methods that have become the standard for rigorous social science. And only a tiny group of Du Bois aficionados know that, once published it was fully appreciated, even acclaimed, for its path breaking methods, rigorous analysis, and dramatic rethinking of the accepted academic wisdom about the structure and functioning of urban society. Moreover, the scholarly community generally acknowledged his spirited documentation of the racism practiced against the African-American community in Philadelphia. And, finally, in some cases, reviewers even mentioned the mountain of evidence he produced (and the inductive analysis he presented) that (in retrospect definitively) disconfirmed scholarly dogma that the condition of African Americans reflected inborn racial inferiority.

This acceptance of Du Bois' work as a major contribution to scholarly discourse during the "nadir" of post-Civil War race relations was a huge surprise to me and should be to all of us: that Du Bois was accepted as a new and powerful voice in the world of academic "social science," which was, at that time, beginning to assert its influence over scholarly discourse. Morris meticulously documents this moment of prominence inside academe by reporting the scholarly response to *The Philadelphia Negro*, replete with positive reviews and invitations to present his work in various forums. And, ultimately, over the next 20 years of so, sociologists and other social scientists in the elite institutions conferred upon him the sincerest form of acclaim: imitation and appropriation. By the late 1920s, community studies built on *The Philadelphia Negro* template had become the *sin qua non* of sociological analysis.

But this brief moment of acceptance into "the community of scholars" was a prelude to the first of many chapters in Morris' narrative of denial. In the late-19th century (like today) the publication of an acclaimed and pioneering study by a (white) junior scholar constituted a passport into a tenured job at an elite institution; then, in due course, access to the resources and influence commensurate with that status; and, ultimately, canonization as a venerated pioneer. But Du Bois was a black scholar advancing an anti-racist perspective that challenged the powerful white supremacist orthodoxy hegemonic at Penn and elsewhere in the academic world. So his appointment at Penn came to an abrupt end, and despite his standing as a first rank sociologist, no other white university in North America would hire him.

It was this moment, even before the beginning of the 20th century, which marked Du Bois' expulsion from the community of white —and mainstream —sociological scholars in the United States. As Morris shows, this "casting out" of a founding father of modern sociology was quickly institutionalized, engineered at first by the social Darwinist "founding fathers" of the American Sociological Society, and later under the leadership of Robert Park and the University of Chicago sociology department. The exclusion meant that Du Bois (and subsequent generations of African-American scholars) was not welcome on white campuses, professional meetings, and funding agencies, and that his scholarship (and that of other anti-racist Black and white scholars) was excised from mainstream books, journals, and classrooms. Before reading *The Scholar Denied*, I had no idea how explicit and systematic the exclusion was, and I hope that the world gets to digest Aldon's careful analysis of how this nexus of exclusionary practices and institutions was *constructed.*

The ossified discriminatory structure built to beat back Du Bois' personal and scholarly challenge to the establishment, which congealed into the systematic exclusion of Black scholars and anti-racist perspectives, prevailed without much erosion for at least half a century. *The Scholar Denied* offers us not only a revealing dissection of this discriminatory structure, but also the analytic tools for recognizing and defeating its contemporary equivalents.

Morris' account of Du Bois' reaction to this exclusion is another revelatory moment in *The Scholar Denied.* In response to his academic assassination, Du Bois applied the soon-to-be-martyred Joe Hill's dictum: "Don't Mourn, Organize." He accepted an appointment at the under-resourced, historically-black Atlanta University, which soon became the institutional home of the Atlanta School, a generation of (du Bois-trained) scholars practicing activist, insurgent sociology. For more than a decade Atlanta University was the most (yes, the most) productive center of innovative and rigorous sociological research in the country, and perhaps the world. Moreover, the exclusion of the Atlanta School's perspective from officially sanctioned sociological discourse —most particularly the core journals and the funding sources for empirical research —constituted an occasion for the construction of counter-institutions, impelling Du Bois and his colleagues to

create what we now call Public Sociology. They substituted indigenous energy and expertise for foundation funding, and developed new scholarly outlets that reached well beyond the academic ghetto. Among their many innovations was the iconic NAACP organ *The Crisis,* which transmitted state-of the-art research from scholars to activists without the distorting mediation of the mass media; the introduction of rigorous social science onto the world stage through a major exhibition at the Atlanta World's Fair (and a host of other public venues); and the building of enduring bridges to scholarly outlets in the less racist and therefore more accessible European academic community. (Perhaps the irony of all ironies occurred when Max Weber —even then the most respected sociologist in the Global North —declared Du Bois "the most important sociological scholar in the Southern States of America…with whom no white scholar can compare.")

Morris' account and analysis of the (counter-) institution building of Du Bois and the Atlanta School offers the reader fresh insights into the relationship between the content of scholarship and its institutional setting. The story of the Atlanta School fully illustrates this interaction, and I want to call out one aspect of this account with particular relevance to social movement theory. The narrative arc of *The Scholar Denied* details how Du Bois and his colleagues pioneered scholarly insurgency (and its production of what Morris calls liberation capital), a kind of social movement in which the resources for scientific investigation derive from activist commitment rather than institutional resources. Sociologists studying the history of the AIDS pandemic, the spread of GMO agriculture, and other crises where collective resistance must rely on evidence-based challenges to scientific orthodoxy, will find *The Scholar Denied* a source of theoretical and practical analysis, useful in constructing scientific insurgencies that utilize liberation capital.

The Scholar Denied is as much a biography of the discipline of sociology as it is a biography of W.E.B. Du Bois. This is exemplified in Morris' meticulous analysis of the process by which Robert Park and the University of Chicago sociology department consolidated and perpetuated the exclusion of Du Bois and the Atlanta School from the guiding ideas of the discipline. While adopting (without attribution) Du Bois' methodology, the Chicago school rejected and suppressed the substantive ideas of the Du Boisean paradigm, thus misdirecting several generations of American sociologists into fruitless attempts to perfect distorted perspectives on race relations, social movements, and other areas of scholarship. Morris vividly illustrates this distortionist impact in the area of race relations by contrasting Robert Park's rejection and Max Weber's acceptance of Du Bois' perspective on the social construction of race, a contrast that repercussed through the next fifty years of research and theorizing. One of the worst elements of the Chicago School's misdirection derived from Robert Park's 'cycles of assimilation; theory, which denied the existence of structural discrimination and dismissed any potential for anti-racist agency in the black community. After several decades in which this imposed orthodoxy prevented mainstream sociology from developing any useful understanding of racism, the Civil Rights movement shook

its dominance and opened the door to further development of Du Bois' social constructionist viewpoint.

In focusing on the contrast between Du Bois' and Park's analysis of race relations, Morris also displays a virtue that sets *The Scholar Denied* apart from other works on Du Bois, and other works that seek to understand the dynamics of scholarly trajectories. The rich combination of historical scholarship with classic literary "explication de texte" produces fresh interpretations of familiar texts, yielding insights into the pernicious impact of Parks' assimilation theory. But it also yields insights into Du Bois' underappreciated analysis of race as a social construct, and points to many other underexploited conceptual and theoretical contributions in both famous and neglected Du Bois texts. *The Scholar Denied* should amplify and inspire attention to Du Bois and Atlanta School scholarship, and therefore provide evidential, conceptual and analytic tools for applying the Du Boisean perspective to the sort of public sociology that Du Bois anticipated and practiced.

My goal and hope in writing this commentary is that current and future generations of social scientists will relate to *The Scholar Denied* —and, even more urgently, to Du Bois' scholarship — as foundational for education, research, and theorizing about social life, and especially for organizing popular movements to challenge the intersectional forms of immiseration that Du Bois devoted his life and work to illuminating and eliminating.

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Review of *How the West Came to Rule*

Alexander Anievas and Kerem Nişancioğlu. 2015. *How the West Came to Rule: The Geopolitical Origins of Capitalism*. London: Pluto Press. 386 pages, ISBN 978-0-7453-3615-2 Paper ($40.00).

How the West Came to Rule reexamines a captivating but unsolved dispute in comparative historical sociology: the historical origins of capitalism in Europe. This is an extensively debated topic, but most discussions fail to provide a genuinely new answer to this venerable question. Anievas and Nişancioğlu are a refreshing exception. Their arguments are clear and straightforward: First, they aim to explain why previous studies have not adequately explained capitalism's origins in Europe: to a large degree, past explanations—whether from a world-systems, Marxist or neo-Weberian angle—have been trapped in a Eurocentric perspective. Second, the authors are at pains to provide a new theoretical and historical approach by strongly emphasizing a geopolitical dimension that they call 'internationality.' For the authors, Europe's exceptionalism cannot be grasped through a holistic and singular conception of Europe as a social-political-economic system Rather it must be sought in the "interconnected and sociologically co-constitutive nature of Europe," (43) which is characterized as uneven and combined development. In other words, the rise and emergence of capitalism in Europe cannot be explained without reference to the international context.

Anievas and Nişancioğlu's arguments go one step further than scholars such as Kenneth Pomeranz. For example, in *The Great Divergence*, Pomeranz emphasizes two fortuitous factors in England's rise. One is coal deposits, which contributed to the production of iron and the development of the steam engine. The other is resources from the New World, including precious

metals, and manpower, which allowed massive economic profits to be reaped from an expanded trade in sugar and cotton. While he recognizes that access to New World resources enabled England's quantum leap, Pomeranz downplays the importance of exploitation elsewhere, such as India and China, and fails to consider how commercial and non-commercial interactions between Europe and Asia contributed to the great divergence of the nineteenth century. *How the West Came to Rule* addresses some of these omissions.

The first and the most important part of Anievas and Nişancioğlu's work deals with the problem of Eurocentrism, tracing it via a wide-ranging and critical review of world-systems and Marxist scholarship. Treating the rise of Europe as a self-generating phenomenon has resulted in a superficial and one-dimensional perspective on this phenomenon so central to the field of comparative historical sociology. We take for granted a particular framing of this question, and its obverse: why was Europe the site of capitalism's emergence, and why did other countries not experience a similar lead forward? Yet what is implied in this question? Western countries are dynamic ab initio; hence, Western-centred modernity is natural, while non-European countries are static and incapable of self-transformation. As a result, although Eurocentric arguments vary widely, they share a strong belief: Europe's exceptionalism is an internal property reflecting endogenous capabilities. The focus on a singular European history strengthens a causal chain in accounting for Europe's exceptionalism, and obscures the contributions of non-Western societies to Europe's rise. By rejecting extra-European determinations or internationalist historiography, past studies have found Europe's great achievements in solitary social, economic, political and technological progress.

Wallerstein's account of the modern world-system is a typical example. According to Anievas and Nişancioğlu, Wallerstein's modern world-system is an a priori notion—that is, it is taken for granted. Wallerstein does not explain how it is organized, where it comes from or how Europe's extraordinary rise happened. Assuming that Wallerstein tends to take the Europe-centred world economy for granted, his recognition of Europe's exceptionalism hides wittingly or unwittingly Europe's second-mover advantage—that is, development occurring long before the 15th century. In contrast with Abu-Lughod's (1989) argument that benefits derived from non-Western sources fueled Europe's rise, Wallerstein was only interested in explaining the capitalist world-system as originating in Northwestern Europe. As Anievas and Nişancioğlu stress, without a deep consideration of the international or intersocietal relationship between the West and non-West, Wallerstein's modern world system does not escape from Eurocentrism.

Based on the essential concept of internationalist historiography, Anievas and Nişancioğlu reveal how the nomadic Mongol Empire played an important role in ushering in an epochal shift in European class relations in the 13th century. The expansion of the Mongol Empire facilitated international trade and cultural exchange, while also stimulating Italian city-states' economic

development. Europe, as a latecomer, reaped advantages, such as "mathematics, navigational invention, arts of war and significant military technologies" (67), from trading with Asia. Not only did Europe actively receive Mongols' advanced civilization, but it also received the Black Death, which originated from the arid plains of Central Asia. Although this had devastating consequences throughout the whole of Europe, it triggered the terminal crisis of the feudal mode of production, thereby causing a fundamental shift of class relations in feudalism. The causal chain is thus: 1) the arrival of the Black Death -> 2) high mortality -> 3) sharp decrease in population and thus labor -> 4) an increase in wages -> 5) the development of labor-saving machineries or technologies, spurring the development of new types of productive forces and changing class relations-> 6) resulting in the critical breakthrough from feudalism to capitalism in Northwestern Europe.

One fascinating discussion in this book concerns "the Ottoman-Habsburg Rivalry'. As Anievas and Nişancioğlu note, "the duality of Euro-Ottoman relations—both belligerent and collaborative" (120), was a prime mover for understanding Europe's privileges of backwardness. Europe took advantage of the international trade established by the Ottoman Empire. The expansion of the Eurasian trade route during the Pax Ottomana not only provided Western Europe with "the transmission of social and technological knowledge" (109) but also enhanced its access to Eastern products. This international trade between the Ottoman Empire and Western Europe, however, brought forth conflicting results. The Ottoman Empire, which had a strong and stable centralized authoritarian regime, along with a tributary system, gave merchants few chances to rise. On the contrary, Western Europe, which had a "fragmented, parcelized, and therefore also highly competitive" (104) economic landscape, helped promote the rise of the merchant-entrepreneur class. In addition, military struggles between the Ottoman Empire and the Habsburgs in the 1600s triggered the rise of the Reformation and elicited the breakup of the Hapsburg Empire. This military event paved the way for the dismantling of the Christian countries and accelerated the process of state-building by promoting geopolitical competition in Europe.

Not only did Pax Ottomana give Northwestern European countries the critical momentum leading to feudalism's disruption and breakup, but it also let them open a new sea route. For Northwestern Europe, the invention of the Atlantic sea route was necessary to avoid the Ottoman Empire's powerful influence on Mediterranean routes. As the Ottoman Empire, with its "conquests of the Black sea, Red Sea, and much of the Mediterranean" (115) controlled access to the seas, European traders had to find another trading route that was free from the Ottomans' maritime hegemony. Consequently, the Ottoman blockade of the European merchants' international activities, ironically, promoted Europe's discovery of the New World. More significantly, "with the conquests of the eastern Mediterranean and its subsequent blockade, the Ottomans reconfigured the entire European balance of power, bringing with it a structural shift from the

commercial dominance of Adriatic city-states such as Genoa and Venice to the Northwestern European states positioned on Atlantic coast" (116).

As noted in chapter 5, the so-called European miracle, which was succeeded by the coercive and relentless exploitation of the resources of the Atlantic, was a decisive moment for Western Europe. The critical step towards global dominance in Europe originated from the deepest exploitation of the Atlantic trade. In the chapter titled "Atlantic Sources of European Capitalism," Anievas and Nişancioğlu discuss how Europe transformed Africans into slaves in the plantation system, how Europe exploited American resources and, ultimately, how the economic advantage that came with the expansion of the Atlantic trade contributed to Europe's rise and global governance. In so doing, they challenge not only explanations for Europe's exceptional economic prosperity that display "a methodological internalism (in which European development is conceptualized as endogenous and self-propelling)" but also attendant "assumptions of historical priority (which posits the endogenous and autonomous emergence of modernity in Europe)" (127).

Anievas and Nişancioğlu's analysis of capitalism's historical origins in Europe, which is based on Trotsky's idea of uneven and combined development, allows us to break the trite, obsolete and slanted explanations within macrohistorical sociology about the ascendancy of the West. Through a sustained critique of world-systems and Marxist theory, this book profoundly challenges accounts of Europe's rise as self-generating. Their contribution requires us to rethink the decisive roles of non-Western regions in Europe's great divergence, and to appreciate the geopolitical origins of European capitalism.

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Review of *Expose, Oppose, Propose: Alternative Policy Groups and the Struggle for Global Justice*.

William K. Carroll. 2016. *Expose, Oppose, Propose: Alternative Policy Groups and the Struggle for Global Justice*. London: Zed Books. 236 pages, ISBN 978-1-7836-0603-0 Paper ($19.95)

Expose, Oppose, Propose: Alternative Policy Groups and the Struggle for Global Justice is the new book by the renowned sociologist William K. Carroll. In this recent contribution, Carroll turns his attention to the political roles of a key set of civil society organizations, which he calls "transnational alternative policy groups" (TAPGs). The goal is to analyze whether these groups are facing up to the challenge of "producing and promulgating counter-hegemonic strategies, policies and visions capable of winning broad popular support and of serving as cognitive and cultural resources for a political shift: a transition from episodic defensive resistance to responsible radical proactivity" (7).

The book brings together a passionate commitment to this political agenda of change-from-below with rigorous research that combines social network data and in-depth interviews. It makes the book an important read not only to those who sympathize with Carroll's political views, but for anyone interested in the dilemmas faced by the organizations he studies and, in fact, by anyone interested in debates about global governance and social justice.

The book is organized in eight chapters. These chapters can be read separately, but they complement each other very nicely, with surprisingly little repetition across the manuscript. The book presents readers with a rich account of the main challenges TAPGs face and how they are

responding to them, the knowledge being produced by these actors, the practices they implement in building this knowledge, and their goals.

With the help of colleagues who feature as co-authors of three of the eight chapters, Elaine Coburn and J.P. Sapinski, William Carroll takes on the daunting task of presenting an in-depth analysis of sixteen key TAPGs, located in all regions of the world. In selecting the groups to be studied, the author made a conscious effort to divide them evenly between the global North and the global South. The goal is not to have a representative sample of TAPGs, and probably most readers will ask themselves why Carroll did not include other cases (I, for one, could name several interesting cases from Latin America). However, those that did get included in the book constitute undoubtedly a diverse and important group within the universe of organizations targeted by the author—that is, those whose mission is to produce "alternative knowledge." The list ranges from the Rosa Luxemburg Foundation to the Third World Forum and Focus on the Global South.

Carroll situates these TAPGs in the broader field of "global civil society" by presenting data on their ties with hundreds of other organizations (chapter 3). He also shows the broader networks of ties between TAPGs and think tanks and nongovernmental organizations, foundations, international governmental organizations, and "alt-media organizations" (chapters 5 and 7). The main source of the network data presented in the book is the Yearbook of International Organizations (YIO), sometimes complemented by other sources, such as organizations' webpages and interviews. However, as the author readily admits (footnote 2 on page 84), the YIO data can be incomplete and even inconsistent at times. Most importantly, ties among organizations were loosely defined as any type of tie in the YIO dataset, so much so that in the sociograms presented along the book it is often unclear what these connections mean and what we can conclude from them.

These problems of missing data and na under-elaborated definition of "ties" would be more important ones if the book relied solely on social network analysis to draw its conclusions. However, this is not the case. Discussion of the insights derived from the social network analysis is interwoven with the author's own insights and with countless quotes from the interviews.

No stone is left unturned by Carroll in these interviews. He asked tough questions, for instance on the issue of funding, to which he received candid responses. In fact, the book is filled with thoughtful quotes from high-ranked individuals in the selected organizations. In some cases, this candidness shows how deep divisions within the left run, and the enormous distrust these individuals and organizations have of some of the largest international NGOs.

In fact, the section entitled "Nuance in Understanding NGOs" (chapter 5) is an especially interesting part of the book. As the title promises, it offers a refined and critical analysis of the so-called "NGO-ization" process. Quotes from interviewees show contradictory reactions when asked about this process, from sweeping declarations on how "you can't trust" some of the largest

international NGOs, to more subtle arguments on the need to identify "particular kinds of apolitical organizations whose goals increasingly get defined by their funding." instead of talking about NGOs *per se* (132-133).

The topic of the potential impacts of new digital technologies on the work of TAPGs is mentioned briefly in chapter 7. However, in spite of acknowledging the relevance of these new platforms, Carroll does not engage in the debates about whether or not these initiatives are having a positive impact on the mobilization and construction of knowledge. But maybe this is a topic for Carroll's next book.

Many of the challenges discussed in this book are faced not only by TAPGs, but by civil society organizations in general, including grassroots social movements and labor unions. It should not be read, however, as a book that offers a single path ahead. In fact, the contrary is true: it denies that one, clear way ahead exists. As an interviewee stated, "we have a common vision in that there is not a common vision" (195). And that is a good thing.

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Review of *Global Production Networks*

Neil M. Coe and Henry Wai-chung Yeung. 2015. *Global Production Networks: Theorizing Economic Development in an Interconnected World*. Oxford, UK: Oxford University Press. 267 pages, ISBN 978-0198703914 Paper ($35.00)

Geographers have long bemoaned the treatment of space as merely context for the action at the center of the analyst's gaze. Much work in geography has sought to disabuse scholars of this bad habit by demonstrating how space is both an active, structuring force and element of contingency in social processes, especially social change. Contemporary work on global production is no different. As readers of this journal are no doubt aware, in the mid-1990s, sociologist Gary Gereffi proposed a reformulation of Hopkins and Wallerstein's generative commodity chain concept to gain analytical purchase on contemporary arrangements of transnational production. The resulting global commodity chain (GCC) framework initially identified three dimensions. The first two — 1) the input-output organizational structure that transformed raw materials into finished goods and 2) the geographical configuration of that structure—were largely descriptive in nature. The framework's primary analytical task was to determine chain governance, which described both how particular actors, so-called lead firms, gained control in the chain, and how returns were appropriated and distributed along the chain. A fourth dimension, institutional context, was later added, but governance remained the primary focus.

A parallel program of analysis emerged in the discipline of geography. The geographers, as is our wont, were at pains to demonstrate that space mattered: the territoriality of global production —in particular, the relationship between regions, suppliers and lead firm—was more than a descriptive dimension. Beginning from this premise, the original global production network (GPN)

framework was built around three conceptual categories: value, power and embeddedness. Geography mattered in this framework in two principal ways. Value, equated essentially with various forms of rent, was disaggregated into creation, enhancement and capture. This last idea of value capture explored whether the value 'created' and 'enhanced' in production networks benefited the locations where these activities were situated. In addition, and related, the framework considered territorial embeddedness, or the degree of a GPN firm's commitment to a particular location and the policies that would strengthen or erode this attachment. For both value capture and territorial embeddedness, GPN scholarship prioritized institutional context, especially non-firm actors at multiple scales, as a significant explanatory variable for understanding outcomes for supplier regions in global production networks.

The present book under review represents the combined efforts of the two main proponents of GPN, Henry Yeung and Neil Coe, to synthesize their framework into a theory of development, which the authors label GPN 2.0. The authors begin with an assessment of their initial framework (now GPN 1.0), its strengths and weaknesses vis-à-vis cognate versions, and then make a case for a theory of global production networks. They argue that no existing approach, including GPN 1.0, amounts to more than a heuristic framing that highlights some aspects over others. What global production analysis cannot do, according to the authors, is identify the causal mechanisms of GPN formation and change. Thus, the ambition of GPN 2.0 is to develop a "dynamic theory" that will "enhance the ability of GPN thinking to contribute to *explanations* of patterns of uneven territorial development in the global economy" (22, emphasis in original). In order to accomplish this goal, the authors identify firm organizational strategy (intra-firm coordination, inter-firm control, inter-firm partnership, and extra-firm bargaining) as the proximate dependent variable of what they call competitive dynamics: optimizing cost-capability ratios, sustaining market development and working with financial discipline. The organizational strategies are proximate dependent variables because the principal conceptual goal is to move from the analysis of the interaction between competitive pressures and firm strategies to understanding outcomes for regional economic development through what GPN scholars call strategic coupling. Strategic coupling denotes the developmental potential of coordination between supplier firms and regional institutions to secure beneficial participation in global production networks. In short, regional development—defined here as the prospects for regions plugged into GPNs through their supplier and services functions to improve their economic condition—is the "ultimate dependent variable" in the framework (67).

The GPN 2.0 framework shares some important resonances with the theory of global value chain governance proposed by Gereffi et al. (Gereffi, Humphrey and Sturgeon 2005). The latter moved away from chain-level governance types and instead drew upon transaction cost economics to identify five ideal types of firm coordination. Although derived from different explanations, Gereffi et al.'s and Coe and Yeung's types of firm coordination have significant overlap: intra-

firm coordination is analogous to hierarchy, inter-firm control to captive governance, and inter-firm partnership to relational and modular governance. Coe and Yeung add a crucial extra-firm coordination type that centers upon firm strategies to negotiate with non-firm actors in order to secure a position in a given network or industry. Thus, even though Coe and Yeung share the microsocial perspective advanced by much global value chain literature, they place non-firm institutional actors at the core of the analysis. Another difference from much value chain work is GPN 2.0's ambition to include finance as a potentially significant driver of firm coordination strategies, a move that may account for specific ways that financial imperatives become the tail wagging the "production" dog.

But is the ambition outlined in the opening chapter achieved? In short, is GPN 2.0 a theory of uneven development? The authors offer well argued critiques of the main operational concept of development, so-called economic upgrading, in the cognate chain/network literatures, many of which I share (170-173). Economic upgrading refers to the possibility for firms to change what they do or how they do it in order to obtain greater benefits. The authors instead propose that the best base unit of analysis for development is firm 'value capture trajectories.' This concept includes the wide range of ways that firms may 'capture' more or less value (as surplus above costs and normal profits) over time. The concept shares a similar erasure of labor as in much economic upgrading literature; indeed labor in GPN is an extra-firm institution. The lengthening of the time horizon is a useful intervention, however, since one significant deficit of economic upgrading studies has been the generalization of an empirical finding at a particular time to a general pattern. Built into this notion of trajectories are the vicissitudes of growth and decline, not as anomalous cases, but rather as indicative of a range of possible outcomes of firm enrolment in global production networks. The authors then move to the core problem: aggregating up the various value capture trajectories in a given region to determine the causal development outcome, defined as economic growth, of the regional-global nexus. Coe and Yeung define three modes of strategic coupling between regions and global networks—indigenous, functional and structural — which describe the relative dependency or autonomy of a given region in relation to a global network (184). Again, like value capture trajectories of firms, forms of regional coupling are dynamic, emphasizing change over time.

While Coe and Yeung's comprehensive discussion of regional development offers an excellent state of the art, is it, to repeat, a theory of uneven development? The framework certainly offers increased specificity by multiplying types of outcomes and lengthening the time horizon, and is highly applicable to the variety of contexts in East Asia that clearly inspire it. It has the advantage of being able to include other types of non-production forms of specialization, such as logistics hubs and offshore jurisdictions, increasingly key to global production networks. Despite these contributions, the framework suffers from its firm-centered premise, which undermines its

explanatory power. Similar to value chain analysis, the unevenness of development is presumed to be an outcome of the actions of firms, i.e., capital, albeit in this case, firms-in-institutional/regional contexts. Coe and Yeung expressly reject hierarchy in the global economy as a useful starting point for an analysis of uneven development, although, drawing on Ben Brewer, they acknowledge that such hierarchy exists (179). They justify this unfortunate move because they equate hierarchy with rigid structural determinism. Thus, the possibility to marshal the rich empirics and analysis of global production into a dynamic, spatiotemporal understanding of power hierarchies in the global economy is lost. The framework does not allow one to consider how the position of regions that are, for example, coupled indigenously to global networks, and thus benefit from more value capture and autonomy, condition the possibility for other regions to occupy that position; or whether structural coupling, essentially locking a region into a low value capture trajectory, is a condition for the other modes of coupling associated with so-called high value paths. Indeed without considering how unevenness is not only produced but also combined, the ideal types outlined risk constructing a developmentalist imaginary: stages that regions traverse, albeit not only forwards, but also potentially backwards (e.g., 188). Other limitations follow from firm- and growth-centrism (marginalization of distribution questions, labor, geopolitics, etc.), but space precludes elaboration here.

In short, Coe and Yeung's framework continues to sideline a systematic understanding of how uneven development is reproduced, through what mechanisms and at what scales. To that end, the book falls short of a theory of uneven development. Nonetheless, for readers who are interested in expanding their understanding of how space matters to global production arrangements, particularly at the regional-global nexus, the book will be a valuable resource.

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Review of Poor States, Power and the Politics of IMF Reform

Mark Hibben (2016) *Poor States, Power and the Politics of IMF Reform: Drivers of Change in the Post-Washington Consensus*. London: Palgrave Macmillan. 185 pages, ISBN 978-1-1375-7749-8 Cloth ($129.00)

The book examines the major policy initiatives and interventions of the International Monetary Fund (IMF) in Low-Income Developing Countries (LIDCs) in the post-Washington Consensus era. Hibben analyzes the driving factors of IMF LIDCs reforms, including stakeholder interests, and the policy tools that it has available to achieve its objectives. He examines scholarly debates regarding the IMF's post-Washington Consensus reforms on development policy and its ideological influence. Hibben underscores the degree of disagreement that exists among different actors—predominantly powerful states, LIDCs, NGOs and IMF staff—on the issue of macroeconomic policy and development. Unlike the Washington consensus period, notable for its "one size fits all" orthodoxy, the post-Washington Consensus period accommodates greater flexibility. The author reviews both policy changes and continuities between these two periods, particularly with regard to the IMF's engagement in the policy of LIDCs.

Following an overview of the IMF's history and organizational structure, Hibben considers the IMF's activities via three primary approaches to international political economy: Principal Agent, Constructivist, and Historical Structuralist (specifically, neo-Gramscian) theories. As a rational choice Principal Agents (PA) model would expect, IMF policy reforms in LIDCs mainly serve the interests of the powerful states (the principals), with IMF management and staff serving as agent. According to this perspective, the IMF's reforms and policy prescriptions are externally induced by the powerful states. However, as the author notes, this approach also views

international organizations, including the IMF, as enjoying some degree of institutional and legal autonomy. Taking into consideration the assumptions of PA theory, Hibben explains that the disagreement *among* powerful states creates room for the agents to support or resist policy reforms in the IMF.

Unlike the PA model, Constructivist theory, which drives from sociology, argues that most policy and institutional reforms emanate indigenously from Fund management and staff (agents). The triggering factors of policy reforms for the Constructivist approach include prevailing policy failures, an institutional crisis of legitimacy, crises external to the fund, and widespread criticism of certain policies. Hence, the Constructivist theory contends that organizational culture, norms and the dynamics of the economy influence IMF policy reforms and decisions.

Hibben also attempts to highlight IMF policies and reforms for LIDCs by drawing on Historical Structural theory, which is enjoying a degree of influence in both international relations and international political economy. A neo-Gramscian approach examines the relations between ideas, institutions, material capabilities, historical contest, and cooperation among the world's physical and ideational forces. Accordingly, the author posits the IMF as an institutional tool designed by hegemonic powers to smoothly and consensually sustain the status quo of global capitalism. Similarly, from the neo-Gramscian perspective, the IMF is understood as an institution of global governance that is backed by global elites who facilitate reforms, such as inclusive growth and pro-poor policies, in order to shore up the prevailing order.

Moving on, Hibben reviews the major economic schools of thought influencing IMF policy choice and operation. From its inception in 1945 to the post-Washington Consensus period, the IMF has been influenced by different theories which justify and reflect the prevailing economic rationality of that time. From 1945 to the 1960s, Keynesianism influenced the IMF to advocate expansionary fiscal policy and distributive justice. In the late 1960s-1970s, it was guided by the neoclassical synthesis, which calls for countering recession with short-term interventions but in the context of long-term liberalization. Hibben also mentions the influence of the Monetarist approach, running from the late 1960s to the late 1980s, proposing a limited money supply and free markets as the keys to successful economic performance. The fourth school of thought which Hibben identifies as influential in IMF policy, from the late 1970s to the global economic recession of 2008, is the new classical economics, which advocates contractionary monetary and fiscal policy to adjust inflation. Finally, Hibben untangles the new Keynesianism as one of the influential schools of thoughts in the IMF policy response from the mid-1980s to 2008, which argues for the use of inflation targets and monetary and fiscal policy reforms to reduce market failure.

In his focused case studies, the author analyzes the Highly Indebted Poor Countries (HIPC) Initiative and the Enhanced Highly Indebted Poor Countries Initiative (HPIC II). In both cases, the role of individual IMF staff and NGOs are more visible than during previous IMF reforms. Hibben

contends that the HIPC and HIPC II initiatives, which aim to link debt relief with poverty reduction and growth, enjoy strong support from all stakeholders.

After reviewing the IMF's LIDC reforms, the author explores the motives of the IMF and other concerned groups in advocating this reform agenda. The reforms pursued in the wake of the 2008 global crisis, which neo-Gramscians call "inclusive neoliberalism" and the author describes as a "developmental model," is basically intended to undermine the critics of global capitalism, social movements, and counter-hegemonic social forces. Consequently, the IMF's strategic decision to integrate elites from LIDCs and certain elements of civil society into decision-making dialogues regarding concessionary lending and other policy reforms successfully absorbed resistance directed at the institution.

As a general principle to the IMF's institutional structure and specific to IMF LIDCs policy reform, Hibben categorizes stakeholder involvement in decision-making into two major tiers: "primary" and "secondary" actors. In the process of IMF LIDCs policy agenda and reforms, Hibben categorizes the managing director, powerful states, and IMF staff as "primary actors" and LIDCs, NGOs, the U.S. congress, and World Bank presidents as "secondary actors." He researched four cases of IMF LIDCs reform from 1996-2010: HIPC, HPIC II, Poverty Reductions and Growth Facilities (PRGF) and other credit facilities.

Hibben claims that the 2008 financial crisis led to the revival and reformation of the classical Keynesian approach of fiscal and monetary policy. The center-left position, which was inspired by the United Kingdom and France and challenged by the United States and Germany, backs the IMF managing director and its staff position on "pro-poor" concessionary lending arrangements and mitigating the adversity of global capitalism on the poor. Similarly, Hibben repeatedly affirms that policy reforms and adjustments within IMF LIDCs are highly influenced by IMF managing directors and its staff, apart from powerful states.

An historical review of the politics of loan conditionality in poor states is also offered by Hibben. During the Bretton Woods period, the IMF's policy towards LIDCs was marked by a tendency to ease loan conditionality requirements. According to neo-Gramscian scholars, the 1960s-1970s' "crisis of capitalism" resulted in a dramatic shift in political ideology and economic policies to the right. However, the author argues that the policies adopted in the wake of this rightward shift provoked resistance, subjecting the IMF to a "crisis of legitimacy."

Hibben emphasizes the IMF's ability to respond to moments of crisis. The broad-based critiques of the Washington Consensus by states, social movements, NGOs and elites led to a shift at the Fund from structural adjustment and market driven policies to "pro-poor" and participatory IMF LIDCs policies. The replacement of the Enhanced Structural Adjustment Facility (ESAF) by the Poverty Reduction and Growth Facility (PRGF) is presented by the author as a typical example of such a shift IMF policy. Hibben further highlights how the IMF replaced the PRGF in 2010

with three concessionary lending arrangements: the Extended Credit Facility (ECF), the Standby Credit Facility (SCF) and the Rapid Credit Facility (RCF). Even though the new lending packages are operationally tied to PRGF, this shift was a response to the global financial crisis (2008-2009) and the food and oil crisis of 2007-2008. Hibben convincingly contends that when it comes to loan conditionality, the Fund's current credit facilities and lending packages are more consensual than the earlier PRGF.

The author does an impressive job of concisely summarizing the three main theoretical frameworks and using them to explain IMF policy over time. In addition, he reviews the institutional structure of the IMF, the substance of key policy reforms, and the convergent and divergent interests among the main actors involved in these reforms. Yet Hibben fails to present the competing perspectives against the very IMF LIDCs policy reforms he reviews. Most notably, he does not present the perspectives of poor states that are critical of these reforms.

In conclusion, Mark Hibben examines IMF policy change in the post-Washington Consensus era using both mainstream and critical theories of IPE. As Hibben shows, the IMF draws fiscal and monetary policy frameworks from different theories, including neo-classical economics, monetarism, and new Keynesianism. The main contribution of this book lies in analyzing the IMF's work and its policy reforms towards LIDCs via three major approaches: PA, Constructivist, and Historical-Structural.

Through the PA framework, the author presents the cooptation and confrontation of interests among powerful states, LIDCs, NGOs and the IMF staff agents. Using the constructivist approach, Hibben explores how dynamic changes in economic ideas and development policy impact on LIDCs. And finally, through Gramscian perspectives, Hibben examines the "inclusive neoliberal" policy of the IMF towards LIDCs as a mechanism for buffering some of the consequences of global capitalism and thus undermining critiques of globalization and the IMF's role in particular. As the IMF's engagement with development policy and economic reforms increases, so too does the relevance of this work for both policymakers and scholars.

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