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Sugar, Slavery, and Creative Destruction:
World-Magnates and "Coreification" in the *Longue-Durée*

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Abstract

Recent literature in the world-systems perspective has refocused attention on questions of 'core' and 'periphery' in historical capitalism, yet rarely critically examines the underlying assumptions regarding these zones. Drawing on a developing dataset on the world's wealthiest individuals (the World-Magnates Database), we trace the development and expansion of sugar circuits across the Atlantic world from the sixteenth through the eighteenth centuries to explain how the sugar commodity chain leads us to rethink some prevailing notions of core and periphery. Namely, we challenge the notion that these zones consist of geographical spaces that, since very early in the development of the world-economy, became permanently specialized in the production of raw materials (periphery) or more sophisticated manufactures (core); and that labor forces have been trans-historically relatively free/better-paid in core activities and coerced/poorly-paid in peripheral ones. We argue that, prior to the nineteenth century, the world-economy is not only characterized by the uneven and combined emergence of various forms of labor exploitation, as usually argued within a world-systems perspective, but also one in which core-like and peripheral activities (that is, those providing access to relatively greater or lesser wealth) were not yet as clearly bounded geographically as they would become in the nineteenth and twentieth centuries. We find that a longue-durée *analysis of sugar production by enslaved labor illustrates not merely processes of peripheralization, but of what we call* coreification.

Keywords: Sugar, Slavery, Atlantic, Historical Capitalism, Core, Periphery, Semiperiphery, Peripheralization

Recent scholarship in the world-systems perspective has refocused attention on questions of 'core' and 'periphery' in historical capitalism (Karatasli 2017; Karatasli and Kumral 2018; Pasciuti and Payne 2018; Clark and Beckfield 2009; Mahutga 2006; Jorgenson 2006; Babones 2005; Kentor 2000). While this literature engages in vigorous debates regarding classificatory schemas, no recent work (to our knowledge) critically examines the underlying assumptions regarding these zones. In this contribution, we explore sugar production by enslaved labor from the sixteenth to the late-eighteenth centuries to challenge commonly held assumptions: namely, the notion that these zones consist of geographical spaces (mainly, precursors of national states) that, since very early in the development of the world-economy, became permanently specialized in the production of raw materials (periphery) or more sophisticated manufactures (core); and that labor forces have been trans-historically relatively free/better-paid in core activities and coerced/poorly-paid in peripheral ones.

Although the concepts of core, semiperiphery, and periphery are central to world-systems analyses, there has been a persistent analytical bifurcation in how these concepts have been used. Since the beginning of this perspective, world-systems scholars have emphasized that the tripartite differentiation results from the mix of changing economic activities contained within various territories (e.g., nations). For example, Immanuel Wallerstein (1974; 1979) argues that through changing mechanisms and with shifts in their location, some economic activities (core-like) produce comparatively high profits and thereby derive a greater share of the wealth generated by the world division of labor. Other activities (peripheral) feature low-profits and derive the least benefits from the world division of labor. Such a depiction emphasizes change over time in the activities providing access to greater or lesser shares of wealth (e.g., textile manufacturing had been a "core" activity but eventually became "peripheralized"), in the geographical location of these activities (e.g., with countries having the potential to "move" between zones), and in the specific mechanisms producing unequal distributional outcomes (e.g., colonialism played a central role up to the nineteenth century, but eventually became less relevant). In other words, which economic activities are core, and which ones are peripheral, as well as where these activities are located, has world-historical specificity.

But alongside this understanding of core and periphery as involving ever-changing and connected processes of production and accumulation, there has been a parallel tendency to use these categories as entailing persistent attributes, centered around the idea that an exploitative relationship between core and periphery is always manifested simultaneously through spatial location, economic specialization, and forms of labor control. While this "categorical" approach nominally adheres to the notion that core and peripheral refer to processes and activities rather than fixed spaces or states, its adherents tend to assume teleological continuities in the spatial location of the "core" and "periphery"—with the imperial centers of the early capitalist world-economy evolving into wealthy national states, and colonial outposts becoming poor ones.[1]

[1] Besides the normative appeal of its emphasis on ever-expanding exploitation and polarization, this "categorical" approach has been compelling because it helps simplify research tasks. It lends itself to the classification of "cases" into the relevant categories by drawing on easily available indicators (for example, share of agriculture in GNP or exports becomes an easily available proxy for peripheral status). From such points of view, the entrenched tendency to portray core and peripheral areas as national territories is not only understandable, but useful.

Using a "world-historical" approach, with its greater emphasis on global, relational processes, is more difficult: for example, no activity can be presumed to be core-like or peripheral universally across time. It is problematic to *a priori* or retrospectively assume which economic activities have been "core" or "peripheral"—from a more world-historical perspective, whether activities are core or peripheral (i.e., the profits they yield), is contingent upon constantly changing forces of production and competition (Arrighi 1990; Arrighi and Drangel 1986; Karatasli 2017).[2] This is why Giovanni Arrighi (1999: 125) indicates that world-system analysts,

> must be prepared to unthink what many…have come to regard as the quintessence of world-systems theory. This is the idea that, in spite of their extraordinary geographical expansion, the structures of the world capitalist system have remained more or less the same ever since they first came into existence in the 'long' sixteenth century… [This] hypothesis does not stand up to historico-empirical scrutiny, and even worse, it prevents us from getting at the heart of the capitalist dynamics, both past and present.[3]

We argue in this contribution that in global sugar circuits prior to the nineteenth century we find not only a world-economy characterized by the uneven and combined emergence of various forms of labor exploitation, as usually argued within a world-systems perspective, but a world-economy in which "core" and "peripheral" activities (that is, those providing access to relatively greater or lesser wealth) were not yet as clearly bounded geographically as they would become in the nineteenth and twentieth centuries. Between the sixteenth and late-eighteenth centuries, there was a gradual process of differentiation, resulting from the uneven ability of relevant actors (e.g., workers, enterprises, governments) to protect and enhance their relative command over resources and well-being. For much of this period, coercive labor exploitation was in fact the defining characteristic of some of the most innovative and profitable (or, core-like) economic activities at the time.[4]

We begin with a review of our World-Magnates Database, which sets the direction of this paper and illuminates patterns to be explained through historical research. This section provides

[2] Such an emphasis on the continuous transformation of products and production techniques as a defining characteristic of historical capitalism can be found in Marx (1867) and Schumpeter (1942).

[3] Building from Terence K. Hopkins, it is useful to conceive of classificatory schemas as very preliminary steps in the research process. Categorical methods should "serve, not to govern the structure of design as it [conventionally] does, but instead, in preliminary work, to help isolate subjects for detailed inquiry or, in summarizing work, to help collate the result of several detailed inquires" (Hopkins 1982a: 32). Moreover, "[p]ut sharply, the cases necessary for the statistical [categorical] portion of inquiry must be presumed essentially homogenous (members of a sample of a universe); the instances necessary for the historical portion must be presumed essentially heterogenous (members respectively of universes of one)" (Hopkins 1982a: 43). This is similar to Abbott's (1991, 2001) suggestions that narrative accounts are better suited than quantitative causal models to map the singularities of social change, and to Baronov's (2018) distinction between "analytical" and "holistic" approaches.

[4] As synthesized by Fogel (1989: 10), "[i]t was virtually uninterrupted economic success for more than 200 years that made [modern slavery] thrive and grow to monstrous proportions."

the stylized facts of the temporal and geographical development of sugar production by enslaved labor. Next, we explain how the development of the sugar commodity chain leads us to rethink some prevailing notions of core and periphery—arguing that a *longue-durée* analysis of sugar production by enslaved labor illustrates an example, not of early peripheralization, but of what we might call coreification, which we define as the processes by which critical nodes in commodity chains (e.g., in production and distribution) are transformed to provide access to extraordinary levels of wealth, through arrangements that temporarily shield these nodes from competitive pressures. The final section further elaborates this argument by focusing on the processes of innovation and Schumpeterian "creative destruction" that characterized the development of the sugar commodity chain.[5]

The Sugar Commodity Chain: A Brief, Stylized Account

It is hard to exaggerate the key role of sugar in the world-economy during the formative stages of the modern world-system. The mere scale of the sugar circuits was impressive. The world sugar market attained a considerable degree of integration already in the sixteenth century, and production of sugar grew in importance in the subsequent centuries. This is not a new claim—dating from Mintz's classic *Sweetness and Power*, scholars of modernity have long understood the importance of sugar production (and, specifically, the transformation of sugar from a luxury to a consumer good) in the foundation of the world-economy. Sugar "has been one of the massive demographic forces in world history" (Mintz 1985: 71). By the mid-1700s, as indicated by Blackburn (1997: 403), "sugar overtook grain as the most valuable single commodity entering world trade. Around mid-century total annual American exports were worth £7.5 million at wholesale prices in Europe; if the commerce in the increasingly sought-after by-products–rum and molasses—is added, the total rises to £9 million, or nearly a fifth of European imports."[6] Moreover, sugar was the principal staple associated with slavery: "[b]etween 60 and 70 percent of all Africans who survived the Atlantic voyages ended up in one or another of Europe's sugar colonies" (Fogel 1989: 18).

The importance of the sugar commodity chain for wealth accumulation between 1500 and 1800 is identified in our World-Magnates Database, comprised of the wealthiest individuals in historical capitalism. In brief, the social sciences have lacked the longitudinal and global data that can trace how processes of creative destruction have shifted the frontiers of wealth accumulation over time. To reassess key social science assumptions and address the lack of appropriate data on the issues at hand, we advance a global database that can be used to provide a more empirically-based account of the specific activities and spatial locations that have served as epicenters of wealth accumulation in the modern world-system. The dataset is comprised of individuals—

[5] In its most basic sense, Schumpeter (1942: 83) defines "creative destruction" as a "process of industrial mutation that incessantly revolutionizes the economic structure from within, incessantly destroying the old one, incessantly creating a new one." We expand on this concept in the following sections.

[6] Galloway (1989: 88) indicates that in the seventeenth and eighteenth centuries, "[f]or England, France and Portugal sugar was by far the most important colonial import: in the case of England, each year after 1660, sugar exceeded the combined value of all other of its colonial imports; in 1774, sugar accounted for half the value of all French imports from her West Indian colonies and, over the colonial period, sugar made a half of Brazil's exports."

historical equivalents of today's billionaires—who can be used as an indicator of epicenters of wealth accumulation, and hence serve to map out unfolding processes of creative destruction (see Korzeniewicz and Payne forthcoming). Due to the riches of these individuals, they left behind an imprint in the historical record that is accessible through appropriate bibliographical and data searches. From these searches, we have currently compiled data on approximately eight-hundred world-magnates operating between 1500 and 1930. This is not an encompassing and definitive list of the world-magnates—nor is it intended to be. Just as maps of the physical universe are always incomplete, so too are maps of historical capitalism.[7]

In the Schumpeterian sense, these world-magnates offer insights into processes of creative destruction because these individuals are the primary beneficiaries of the creation of new epicenters of wealth accumulation. In the world-systems sense, world-magnates help identify the most profitable activities in the world-economy and can serve as a proxy for understanding the development of core- and peripheral- activities and areas (Korzeniewicz and Payne forthcoming).[8] The rise and fall of world-magnates can help identify how processes of creative destruction are clustered temporally, spatially, and/or in specific production, trade, and investment networks. Such an indicator can be extremely productive, systematically grounding Schumpeterian notions of creative destruction in historical data and tracing, over time and on a global scale, the changing configurations of innovation.[9]

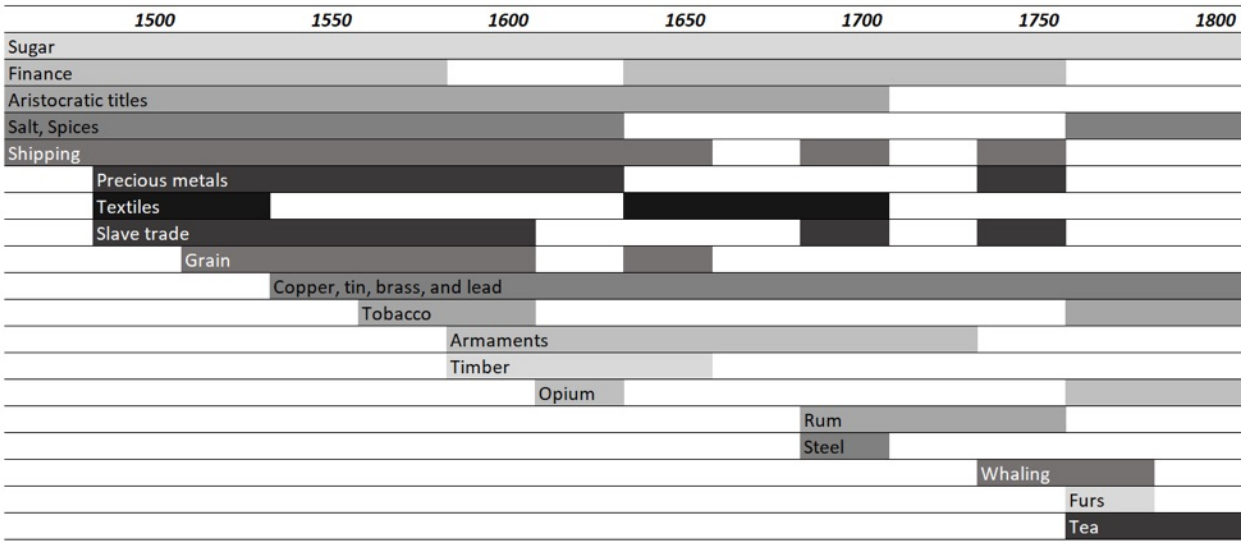
As shown in Figure 1, as early as the sixteenth, but particularly in the seventeenth and eighteenth centuries, the sugar commodity chain (with all its backward and forward linkages) served as one of the most important foundations of both financial and material wealth accumulation for these world-magnates. The earliest merchants and financiers in the mid-to-late 1500s invested liquid capital in sugar (and other colonial) trade at a time when most riches were invested in illiquid landholdings. Then, in the mid-1600s, we start to see world-magnates who are invested not in the trade of sugar, but sugar production itself—owners and operators of sugar plantations in the New World. These dominate the world-magnates' sugar-based activities through the mid-1700s, when plantation owners disappear from the data and merchants appear once more.

[7] For more information on our data and procedures, see our online appendices available at: http://www.world-magnatesdatabase.com/

[8] Classifying activities as core or peripheral based on their relative yield (i.e. their economic impact) builds from a long history of world-systems studies in this area. Arrighi (1985: 244) wrote that, because core-like activities yield greater profits than peripheral activities, "residents of the [core] must command a large share of the total surplus produced in the world-economy while residents of the [periphery] must command little or no such surplus [...]. [T]his difference must be reflected in a [...] differential between the per capita GNP of residents in the two types of states." Arrighi and Drangel (1986) empirically examined the relative yield of economic activities (though not the activities themselves) to confirm that this was, in fact, the case. Karatasli (2017) updated and extended this method.

[9] This amounts to a version of what McMichael (1990) calls "incorporating comparison." Such a method begins through the study of the parts and, by juxtaposing them together, creates an understanding of the whole. We aim to explicitly do this using 'epicenters of wealth accumulation' as the parts which we bring together to illuminate the characteristics of the whole—in this case, highlighting processes of creative destruction in the historical development of capitalism. Such a method overcomes functionalist comparison methods that have a preconception of the whole.

Figure 1: Stylized timeline of wealth-generating activities of World-Magnates, 1500-1800



Source: World-Magnates Database (Korzeniewicz and Payne forthcoming)

But the prominence of sugar circuits did not represent a static paradigm. The expansion of the sugar commodity chain between the mid-fifteenth and late eighteenth centuries involved the interrelated rise and decline over time of various centers of agricultural production and manufacturing: Madeira and the Canary Islands, São Tomé, Brazil, Barbados. This spatial fix is evident in our World-Magnates Data: for example, one of the earliest individuals in our data is Bartolomeo Marchionni (1449-1523), an Italian merchant operating out of Lisbon. He made his riches in sugar production in Madeira. Later, we see the Rodriguez d'Evora family (circa sixteenth century), and individuals like Ottavio Centurione (circa 1640) becoming exceedingly wealthy from sugar production in Brazil. Finally, by the mid-late seventeenth century, we begin to see individuals such as James Drax (1615-1662), Jean Pellet (1694-1772), and William Beckford (1709-1770) whose sugar riches were based in Barbados and the English Caribbean. In the sequence at hand, the rise of new regions within the sugar commodity chain entailed the decline of established areas of production, making "the story of each of the sugar regions [...] a story that is both comparative and interrelated at the same time" (Schwartz 2004a: 13). The data on world-magnates thus points us towards two phenomena which prompt further research: the centrality of sugar production in the early modern world-system and the succession of regions which became, over time, epicenters of growth of sugar production and commercialization.

While there were previous centers of sugar production and commerce in the Mediterranean and Asia, the growth of these activities in Madeira and the Canary Islands in the fifteenth century brought forth some patterns that would later prevail on an even larger scale as the commodity chains came to expand elsewhere. Most importantly, sugar production in Madeira and the Canary Islands involved a "system of a few mills and a large number of cane growers, both dependent on a coerced labor force" (Schwartz 1985: 10). Additionally, many investors in sugar production in Madeira and the Canary Islands, as well as the skilled personnel initially used to establish sugar mills, were from other regions—most importantly, Genoese, but also Catalan and Flemish merchants—all "anxious to encroach on the Venetian near-monopoly of Levantine sugar

production" (Blackburn 1997: 109). Thus, here already, "[t]he foreign merchants, wealthy millowners, technical specialists, and a captive, ethnically distinct work force are all recognizable characters in the scene that sugar set throughout the Western world" (Schwartz 1985: 11).

On the other hand, "on Madeira [...], the full plantation complex was not yet apparent in the sixteenth century; slave forces were limited, properties were often small, and a class of small farmers who grew cane but did not own mills were also characteristic of the island" (Schwartz (2004a: 16). Moore (2003: 100) argues that, more importantly, sugar production in Madeira and the Canary Islands entailed "a "metabolic rift" whereby nutrients flowed out the countryside and into the cities at a geometrically increasing volume and rate," generating rapid ecological degradation (e.g. soil depletion and erosion). What's more, existing research suggests that the use of enslaved labor was not as extended in Madeira or the Canary Islands as it would become later in São Tomé and Brazil (Vieira 2004: 58). Facing new opportunities for expansion elsewhere (e.g., São Tomé), and suffering the impact of soil depletion, sugar production in Madeira or the Canary Islands rapidly declined: in Madeira, for example, "[b]y the 1530s the sugar economy on the island was in full crisis and the inhabitants were abandoning their cane fields and turning toward the planting of vineyards" (Vieira 2004: 48).[10]

The major difference between São Tomé and both Madeira and the Canary Islands is that in the former, "the Portuguese finally abandoned Mediterranean forms of land tenure and labor in favor of large plantations worked by African slaves" (Galloway 1989: 58). Thus, H.S. Klein (1999: 14) points out that in São Tomé, "[b]y the 1550s there were some sixty mills in operation on the island producing over 2,000 tons per annum and some 5,000 to 6,000 plantation slaves, all of whom were Africans," and Schwartz (1985: 13) indicates that "[i]n the early sixteenth century, São Tomé brought together the technical skills and organization of the Mediterranean sugar complex and combined them with a constant labor source on a scale formerly impossible." More broadly, Klein (1999: 14) argues that "[i]n terms of plantation size, the universality of slave labor, and production techniques, this was the Atlantic island closest to what would become the American norm."

In São Tomé, the difficulties encountered in promoting European colonization, the lack of a sizable local population, and the proximity to mainland Africa each provided incentives for a much more extensive use of enslaved labor, and indications are that the sugar mills were considerably larger than those that had characterized Madeira and the Canary Islands. However, the characteristics that provided for São Tomé's comparative advantages would over time become a constraint. For example, its proximity to mainland Africa (as well as the geographical characteristics of the island) provided opportunities for resistance by enslaved Africans. By the late-eighteenth century, the Portuguese colony began to suffer at the hands of revolts by enslaved

[10] Other variables contributed to the declining importance of Madeira and the Canary Islands, including the "impoverishment of soils," the 1526 plague, and perhaps insect blight (Vieira 2004: 48). Moore (2009; 2010) argues that such environmental changes were much more significant than competitive pressures in leading to the decline of sugar production in Madeira and its subsequent relocations throughout the world: "[t]he extractive and agricultural character of frontier industrialization under conditions of ceaseless capital accumulation meant that not only was ecological exhaustion a fact of life in these areas, but that ecological exhaustion was a major impetus to further capitalist expansion and to the system's cyclical fluctuations" (Moore 2000: 412).

Africans and foreign invasions (Galloway 1989: 60). Combined with the difficulties encountered by Europeans seeking to colonize the area, who faced high mortality rates due to tropical diseases, sugar production in São Tomé eventually would come to be perceived as beset by significant disadvantages, particularly compared to emerging opportunities in the territories of the Americas newly "discovered" by Europeans.

Although showing evidence of growth decades earlier, "[t]he Brazilian sugar industry, concentrated in the captaincies of Bahia and Pernambuco, flourished after 1570. From that date to the middle of the seventeenth century Brazilian sugars dominated the European market" (Schwartz 2004b: 161). The rapid rise of Brazilian production is illustrated by estimates of the origin of sugar supplies in sixteenth-century Antwerp: In 1552-3, 51 percent of sugar came from São Tomé and no significant share from Brazil; By 1590, 86 percent came from Brazil and barely 2 percent came from São Tomé (Stols 2004: 260). By this time, competition from Brazilian sugar undercut prices from elsewhere by up to 50 percent (Galloway 1989: 54).

For entrepreneurs aiming to meet growing demand within this world market, the territory we would eventually come to know as "Brazil" offered significant comparative advantages for sugar production. Some of these advantages related to the environment—soil conditions, rainfall rates, the accessibility of the region to transatlantic trade routes, the availability of natural resources for use as raw materials. These comparative environmental advantages were combined with the rapid incorporation of enslaved labor into sugar production in the late sixteenth century. Thus, "In the mid-1580s one third of Pernambuco's labor force was African. By the 1620s Brazil's sugar zone was a land of blacks and mulattos rather than Indians and mestizos" (Lang 1979: 29). Similarly to Madeira and the Canary Islands, wage workers and small and medium farmers were part of the arrangements that prevailed in the sugar industry, but as in São Tomé, enslaved Africans played a much more predominant role (Vieira 2004: 61).

Gradually over time, the profitability of sugar production in Brazil was overtaken by the British Caribbean. One key reason for this change was the Portuguese-Dutch conflict in Brazil, which interrupted trading and production activities (Batie 1975: 15; Green 1988). Moreover, although producers from Brazil were able to establish a niche early on by producing a higher-grade sugar than elsewhere, one of the consequences of this characteristic was that there were few incentives for investors in Portugal to focus on sugar refining, an activity that became centered in Antwerp first, later in Amsterdam, and eventually in France and England. In turn, these refiners were eventually able to mobilize protectionist measures in their own favor, further limiting opportunities for the white sugar producers in Brazil.

Eventually, planters in Barbados found ways to gain a competitive edge vis-à-vis Brazilian enterprises. Indeed, in the seventeenth century, there "was a shift in the center of sugar production, away from the Spanish and Portuguese Atlantic islands and Brazil to the British Caribbean, as the tiny island of Barbados became, for a while, the world's leading sugar producer" (McCusker and Menard 2004: 289). The turn to sugar production in Barbados was swift, taking place over little more than a decade (between the mid-1640s and mid-1650s), when the growth of sugar production in Barbados "enabled [the island] to become the most prosperous 17th-century insular colony on the globe" (Batie 1976: 1). For Dunn (1969: 4), "[a]lmost certainly the exports to England from

this small island of less than one hundred thousand arable acres were more valuable in 1680 than the total exports to England from all the North American colonies."

Once Barbados came into the sugar industry, prices for the lower qualities of sugar underwent a long decline. By the 1720s, in Brazil, competition led to a general inflationary trend and stagnation (Schwartz 1985: 163). The growth of producers in Caribbean shut off Brazil from several European colonial markets, while increasing the cost of key supplies (e.g. enslaved labor). The process by which this occurred was complicated and gradual. Sugar commanded relatively high prices in the first half of the seventeenth century, as the Portuguese-Dutch conflict in Brazil disrupted an important supply source for several decades (Batie 1975: 15; Green 1988). Planters in Barbados had certain characteristics that positioned them well to profit from these opportunities: landholdings were large, planters were able to move away from the leases to small and medium farmers that had been the norm to a greater extent just a few years earlier, and African enslaved labor came into "abundant supply" as a result of the disruptions of production in Brazil (Green 1988: 404). Simultaneously, fortuitous political circumstances contributed to the shift towards large-scale sugar production: the civil conflict in England in the 1640s curtailed "normal communications between England and the Caribbean," restricted the previous access of island planters to British indentured servants, and likely opened opportunities in islands such as Barbados for Dutch competitors (Green 1988).

As limits were reached to the continued expansion of plantations in Barbados, production and exports of sugar expanded in the British and French Caribbean particularly after the mid-eighteenth century (Blackburn 1997: 405). Producers of sugar in the French and English Caribbean benefitted from restrictive mercantile policies in their home countries that "effectively relegated Brazilian exports to Portuguese and Mediterranean markets" (Galloway 1989: 86).[11]

It is relevant to note that "[t]he slave population and sugar economy of Barbados had reached a plateau" around the middle of the eighteenth century (Blackburn 1997: 405), indicating that limits had been reached for the horizontal expansion of production. In this context, "The planters turned [...] to increasing the value-added of their final product by 'claying' the *muscovado* … Some enslaved Africans had to be trained for the skilled work of claying, but in an old colony with an experienced labour [...] force this posed no problem. Consequently, planters earned more from crops the size of which rose little" (Blackburn 1997: 405-6).[12]

Sugar, Wealth and *Coreification*

How are we to understand the recurrent spatial relocation of sugar production by enslaved labor over the course of several centuries? One tack would be to portray this process primarily as

[11] The growth of sugar production during this period was slower in the Spanish Caribbean, as it "was hindered by a constant drain of people and financial resources to the mainland, where gold and silver seemed far more glamorous than sugar" (Schwartz 1985: 16). There were some efforts to establish sugar production in Española, Puerto Rico, and Cuba, but these remain modest through the sixteenth and even seventeenth centuries. It was only in the nineteenth century that the Spanish Caribbean would experience a rapid expansion of sugar production in Cuba, with the growth of *ingenios* that incorporated the latest technological innovations (Tomich 1990: 203).

[12] Planters from Barbados would play a role in the eventual expansion of plantations elsewhere in the West Indies, in the Guianas, and in the continental United States (see Dunn 2000; Roberts 2016).

the outcome of expansionist colonial policies aiming to transform external arenas into sources of cheap raw materials. But there is an alternative lens through which to understand this spatial relocation. This expansion of the sugar circuits can be understood as an expression, not simply of peripheralization, but of what we might call coreification.

As indicated earlier, seventeenth and eighteenth-century elites in the sugar commodity chains gained access to extraordinary levels of wealth. Fogel (1989: 24) notes that "throughout the eighteenth century, the great slave plantations of the sugar colonies, with profits averaging about 10 percent on invested capital, were the largest privately-owned enterprises of the age and their owners were among the richest of all men." Sokoloff and Engerman (2000: 221) indicate that "[t]he economies that specialized in the production of sugar and other highly valued crops associated with extensive use of slaves had the highest per capita (including slaves) incomes in the New World." Compared to much of the rest of the New World, in 1774, "[t]he West Indies evidenced the highest level of per capita wealth and income" and goes on to note, "and also the greatest degree of inequality" (Garcia S. 1993: 54).

The expansion of the sugar commodity chain in time and space provides an indicator of the extent to which innovations and the wealth they secured provided incentives for other actors to replicate such strategies.[13] From this point of view, that the expansion of sugar circuits in Brazil (for example) was successful and profitable is demonstrated precisely by the emergence of competitors trying to capture key niches in the sugar commodity chain by mobilizing both business enterprises and state forces. The new institutional arrangements in areas that had been more marginal to world trade circuits (e.g. the Caribbean) yielded both success in capturing new niches of production and a relative decline for the older and more established areas of the commodity chain. At a micro level, this was sometimes manifested in the physical movement of individuals (and/or their capital) from one location to another.

Thus, the patterns of growth of the sugar commodity chain suggest we must abandon the preconception that coercive labor arrangements have always been intractably tied to inefficient forms of organization of production and markets, associated with a stagnant periphery.[14] In Latin America and the Caribbean, enslaved labor was used in plantation agriculture, a high-yielding activity that constituted a world epicenter for the creation and accumulation of wealth. Sugar

[13] As noted long ago by Adam Smith (1976: 128), "The establishment of any new manufacture, of any new branch of commerce, or of any new practice in agriculture, is always a speculation, from which the projector promises himself extraordinary profits. These profits sometimes are very great, and sometimes, more frequently, perhaps, they are otherwise; but in general they bear no regular proportion to those of old trades in the neighborhood. If the project succeeds, they are commonly at first very high. When the trade or practice becomes thoroughly established and well-known, the competition reduces them to the level of other trades" (I, Ch. X, Pt. 1, p. 128). This is the process that Schumpeter focuses on through the concept of "creative destruction."

[14] One influential narrative, developed primarily within the field of economics, argues that plantation agriculture left as its legacy institutional systems of high inequality that eventually came to impede growth. In this narrative (e.g., Acemoglu, Johnson and Robinson 2002; Coatsworth 1993; Engerman 1981), these institutions stand in stark contrast to those that prevailed in areas such as New England, where the simultaneous development of greater equity, democracy and property rights provided a stronger stimulus for economic growth in the nineteenth century and thereafter. Ultimately, according to this interpretation, the social arrangements characteristic of areas with a greater early prevalence of wage labor proved more compatible with the fundamental logic of a capitalist world-economy. The relational issues emphasized in our own contribution call for a very different narrative.

plantations represented, in their own time, what Joseph Schumpeter (1942) would characterize as innovative activities, yielding extra-ordinary levels of wealth. The "extractive institutions" provided crucial competitive advantages to the elites benefiting from such arrangements, and they did so by providing an effective basis with which to promote wealth maximization and economic growth for several hundred years.

In the Schumpeterian model, the introduction and clustering of innovations constantly transform existing economic and social arrangements, and drive cycles of prosperity (characterized by intense investment in new productive opportunities) and depression (characterized by the broader absorption of innovative practices and the elimination of older activities). In this pattern, what might constitute innovative characteristics at any one point in time might eventually evolve into constraints that provide competitive opportunities for others at a later point in time. The growing competitive pressures (or peripheralization) of some products and activities entailed a process of change that evolved over time. This is an important modification of prevailing interpretations. Most often, certain activities and modes of labor exploitation are treated as if they were always peripheral (characterized by greater competitive pressures) or core-like (characterized by institutional arrangements shielding them from competitive pressures). Thus, for example, the production of sugar with enslaved labor is treated by many as peripheral from its inception, and the refinery of sugar with wage-labor as core-like.

Instead, we would argue that at key points in the expansion of sugar production and trade, the production of sugar with enslaved labor in Latin America and the Caribbean had many of the features associated with core-like activities—notably, the key role of innovations as a means of deflecting competitive pressures and the high command over wealth secured through these activities. It is only over the centuries considered in this paper that such activities were subjected to greater competitive pressures through the uneven development of new arrangements of political regulation that became clearly differentiated by national boundaries.

To the extent that peripheralization entails exposure to the greater competitive pressures (or even "destructive" forces) entailed in creative destruction, we should take stock of its parallel and necessary counterpart: what we call coreification. Coreification entails the processes by which commodities and critical nodes in their respective chains of production and distribution come to yield extraordinary levels of wealth, shielded (e.g., through innovation or any other "creative" forces) from competitive pressures. In this sense, coreification is the process through which activities become (or remain) core-like. Coreification is as crucial a dimension of creative destruction as peripheralization. As in peripheralization, the precise character and location of the processes entailed in coreification changes over time, rendering creative destruction a world-historical, relational phenomena subject to empirical study. We analyze this process of coreification for sugar production by enslaved labor in the next section.

Sugar and Creative Destruction

This line of interpretation has been precluded because much of the existing literature tends to portray sugar plantations as lacking in innovation. For example, Schwartz (2004a: 4) indicates that "[t]he traditional slave-based sugar estates [...] did not prove to be very committed to technological innovation or to adapting mechanical improvements in order to lessen the burden and cost of labor.

Their ratio of productive factors of capital, labor, land, and technology remained relatively stable over long periods of time." Similar conclusions have been advanced, among others, in the classical works by Prado (1967) and Furtado (1963). Such arguments belie a very narrow conceptualization that is often rooted in the assumption that only wage labor relations yield conditions that lead employers to pursue increasing productivity in a search for a higher surplus. But many of the features of the expansion of sugar circuits represented what Joseph Schumpeter (1942) would characterize as innovative efforts, yielding extra-ordinary levels of wealth. These innovations were not limited to technological changes in the organization of the labor process, but included a broader range of spheres. Schumpeter (1942: 68) wrote of revolutionary innovations which "periodically reshape the existing structure of industry by introducing new methods of production [;] new commodities [;] new sources of supply [; and] new trade routes and markets to sell in…" In this sense, we can understand innovation in organizational, technological, and geographical spheres.

\Spatial Innovation

Historically, the introduction of "new commodities" and the opening of "new trade routes and markets to sell in" (Schumpeter 1942: 68) have often entailed spatial innovations. This was clearly the case with sugar and slavery—where the commodification of nature and labor intertwined with territorial expansion and new movements of capital(ists).[15] Over the course of the period under consideration, this spatial innovation was driven in part by states' efforts to expand territory as a power-enhancing strategy.[16]

Lang (1979: 29) argues that the agricultural settlement of Brazil was pursued by the Portuguese king as a strategy to check the expansion of French interests, and that important royal subsidies (e.g., enslaved Africans provided at "one-third the usual customs duties") were provided to make plantation agriculture feasible. Schwartz (2004b: 161) points out that "*engenhos* were exempted from the tithe (*dízimo*) for ten years by a series of laws designed to stimulate the industry, and [...] many *senhores de engenho* found ways to continue to avoid taxation thereafter." In the early settlement of Brazil by the Portuguese, land incentives and tax exemptions were provided to potential builders of *engenhos*, who were supposed to establish fortified defense and process cane from surrounding areas.

Such observations highlight the fact that the pursuit of specific strategies of accumulation of wealth was at times the outcome of the pursuit of greater power. In the pursuit of power by states, competitive advantages and disadvantages were generated by means of shifting patterns of political regulation. In fact, from this point of view, the pursuit of changing strategies of colonization and colonial expansion by states (in competition with other states) was itself an important aspect of innovation over time. For one example from our world-magnates data, Bartolomeo Marchionni (1449-1523) was a Florentine banker and merchant who operated

[15] This is a process that shares some similarities with what many have called the "spatial fix" (Harvey 2001; Silver 2003; Moore 2000, 2003). While these authors emphasize the movement of *capital* across space, we understand both capital mobility and state-led territorial expansion as forms of geographic innovation during this period.

[16] Thus, Giovanni Arrighi (1994: 32-34) argues that the pursuit of territorial expansion by state rulers—despite not being governed by a capitalist logic—often generated profitable opportunities for capitalist expansion.

primarily from Portugal. He was eventually known as the "richest banker in Lisbon," but got his start as the chief merchant in sugar from the Madeira islands. He used the riches he accumulated from this trade to become a chief financier of exploratory voyages to Guinea, Brazil, and India. In 1500, a joint enterprise under the command of Pedro Alvares Cabral "discovered" Brazil. Eventually, Bartolomeo Marchionni became the first merchant to ship enslaved Africans to the Indies. His trajectory highlights the importance of colonial expansion in capitalist innovation.

Through the period considered here, "the market for protection increased" (Lane 1979: 47), and some states were more effective than others at providing protection and regulating markets. For example, the perceived success of the Dutch East India company made Dutch commercial policies, broadly, a model to follow (Davies 1970: 17). On the other hand, as in the case of the Royal African Company in the last quarter of the seventeenth century, some elites had initial success in securing political support for regulation of the trade of enslaved Africans, only to soon find political tides reverse and opponents unite in promoting more open trade. Success would come to be measured, for example, in the extent to which sugar production and trade could develop into an important source of fiscal revenues for states. According to Blackburn (1997: 173), "Taxes were paid on Brazilian sugar both at the port from which it was dispatched and at its Portuguese destination… Over time the incidence of these duties drifted upwards as royal officials exploited the strength of Brazil's trading position. Brazil's sugar trade in 1627…account[ed] for 40 per cent of total revenue."

One of the primary mechanisms through which sugar markets came to be regulated was by the extension and/or restriction of commercial preferences by the European states. For example, "[b]y the 1640s [...] the rise of competing sugar economies, first on Barbados, and then in the Dutch and British Caribbean, and the introduction of exclusionist policies, such as the English Navigations Acts of 1651, changed the relationship of Brazilian sugar to its traditional markets. Whereas Brazilian sugars had supplied about 80 percent of the London market in 1630, by 1670, that figure had dropped by half" (Schwartz 2004b: 166). Later, by the early 1800s, several European countries, such as France, would introduce tariffs on the higher grades of sugar: thus, in Martinique, for example, "high protective duties and a virtual monopoly of the French market encouraged colonial planters to produce low quality sugar. Indeed, metropolitan sugar refiners forced up the surtax on the higher grades of colonial sugar to prevent competition from the colonies and to satisfy their own demand for raw sugar" (Tomich 1990: 187). In this sense, the relative ability of certain nodes in the commodity chain to capture wealth was directly constrained by the ability of other actors within this chain to deploy political power in their favor. Thus, "the often sordid business of factional politics was itself a kind of entrepreneurship" (Gettleman 1959: 213).

More directly, markets were also regulated by the ability to deploy military force. For example, access by the planters and merchants of Brazil and São Tomé to sugar markets in Europe were severely disrupted by the fighting between the Portuguese crown and the Dutch through much of the first half of the seventeenth century. On the other hand, there were persistent conflicts within and between many different layers of the colonial system. Fights broke out among colonizing elites from the same imperial power—such as the conflicts between Sir William Courteen and the Duke of Carlisle in the 1620s in Barbados. There were also tensions in the relationship between the colonists and the imperial centers—local sugar elites often complained about taxes, trade

restrictions, or territorial expansion strategies (Koot 2007; Roberts 2016). As in the adaptability with respect to other elements of production, elites, here too, were able to adapt to (while striving to change in their own favor) changing political and military circumstances.

We should note that commercial preferences and the deployment of force also produced unexpected effects. Just as they benefitted those to whom preferences were extended, they also provided opportunities to those who could find innovative ways of securing profits that bypassed restrictions (or took advantages of trade disruption). For example, piracy and contraband long served as a strategy to bypass the restrictions on trade imposed by the Spanish and Portuguese crowns (Galloway 1989: 87). Moreover, while the Dutch successfully undermined Portuguese control over Atlantic trade, they were not able to secure themselves a monopoly over this trade, and instead opened markets to competitors (Davies 1970). In fact, when some efforts were made by the West India Company to establish a trade monopoly on sugar from the Americas, individual Dutch entrepreneurs opposed this monopoly, and successfully established their own alternative circuits of trade (Green 1988: 413). Likewise, the Royal African Company in the 1670s and 1680s briefly succeeded in establishing monopolistic controls over the trade in enslaved Africans between Africa and the Caribbean, only to give way to less regulated trade after the late 1690s (Pettigrew 2013). As illustrated by these instances, there were limits to the ability of imperial interests in the metropoles to impose restrictive policies upon the same elites that drew much of their own legitimacy from colonial authority.[17]

Unintended effects were also present in relation to war: the efforts by the Dutch to challenge the Portuguese in Brazil unwittingly reinforced some aspects of sugar production and trade in that same area. This can be seen in the efforts of the Dutch after many *engenhos* are destroyed or rendered idle during the 1630s: "The Dutch West India Company (WIC) eventually confiscated many of the mills abandoned by those Portuguese who joined the resistance or who fled to Bahia. These properties were then sold to Dutch or Portuguese investors as the Company sought to vertically integrate the industry by controlling the production as well as the commercialization of sugar" (Schwartz 2004b: 166). Braudel (1984: 233) argues that, in part as a result of the difficulties of the large Dutch ships in reaching "the shallow inlets on the coast where the smaller Portuguese vessels came and went as they pleased, [..t]he odd paradox of the Dutch occupation of the sugar-producing Nordeste was that it interrupted the flow of Brazilian sugar to Amsterdam, where it had previously been plentiful; and the price went up as well."

Organizational and Technological Innovation

Beyond the shifting balance of forces between colonizing states, the period under consideration also entailed technological and organizational innovation, largely characterized by a growing differentiation between enterprises and states. In the initial expansion of private property in Brazil, the entrepreneurial production of sugar was not differentiated from the deployment of

[17] Thus, "[a]fter 1689, when colonists witnessed the growing strength of the British Empire and realized that the advantages of a centrally controlled empire— privileged access to markets and protected shipping—outweighed the costs of regulation, they finally were willing to abandon the demands for free trade that they had made since the 1650s" (Koot 2007: 163).

force: one and the same individuals (e.g., the *donatários*) carried out both. However, there was a rapid change towards greater specialization. For example, the eventual appointment of a governor-general, who "was concerned with war and police, not directly with the organization of sugar production" (Lane 1979: 43). By the 1630s,

> [t]he new *senhores de engenho* were of humbler social extraction than those who had built mills in the sixteenth century; sugar-making was no longer the special preserve of viceroys, aristocrats, merchant princes and powerful religious orders, even if the latter had some fiscal privileges (Blackburn 1997: 173).

In the process, there were new tensions in the relationship between governments and elites. For example, plantation elites and sugar merchants, who had originally been given significant subsidies in taxation, reacted strongly to the increase in taxes introduced by local authorities in response to conflicts with the Dutch: regardless, "by 1648, over 80 percent of taxes in Pernambuco were derived from sugar production and commerce" (Schwartz 2004b: 170). More broadly, this is indicative of the relationship between the projection of political power and the pursuit of economic interest. Here, it is important to take into account that most studies have portrayed the plantation system in terms of the growth of a single world division of labor: but one should tie this also to the rise of a multiplicity of states, along with the practices (e.g., growing importance of law, bureaucratic policy-making) that were part and parcel of this rise.

The extent of technological innovation that characterized sugar production has been underestimated.[18] As we argued above, these underestimations may be engaging in *a posteriori* thinking, projecting the fact that sugar production eventually came to be viewed as a peripheral activity. In contrast, Schwartz (1985: 125) writes:

> [t]he Brazilian system (for sugar production) was in the seventeenth century considered the best as was evidenced by the desire of other colonial powers to copy it. Portuguese sugar masters and other specialists were employed in Mexico in the period between 1580 and 1640, and the English in Barbados learned how to make clayed sugar by sending people to Pernambuco to acquire the needed skills. Only in the mid-eighteenth century, when the Brazilian sugar economy was in crisis and Caribbean rivals had developed some new techniques, did the Brazilian sugar industry begin to acquire a reputation for being traditional and backward; even then, the charge was undeserved.

In addition, the work of enslaved labor was increasingly coordinated in a flowing labor process. As such,

> [I]t is not surprising that contemporaries referred to the *engenhos* as *fábricas*, for they were in many ways precursors of the modern factory in their organization.

[18] See Engerman (1973).

> With the possible exceptions of mining and shipbuilding, no other activity in the sixteenth century combined so complex a process by integrating technology, management, and labor under conditions remarkably like the modern assembly line (Schwartz 1985: 152).

Mills were located close to the cane fields, and quick transportation of the cane was required immediately following the harvest (Galloway 1989: 16). Upon its download, the cane was pressed (through instruments that became more complex and effective over time) to extract its juice. The juice, in turn, was then subjected to various stages of heating and/or boiling (requiring large amounts of fuel), to separate raw sugar separated from molasses (see Galloway 1989; Tomich 1990). This heating process required considerable skills from the overseeing personnel to ascertain the right amounts of time and heat required to produce an optimal product (Galloway 1989: 57). The raw sugar would then be subjected to various refining procedures to remove impurities and produce white sugar.

The innovative character of sugar production in Brazil involved the type of sugar being produced in this region. One of the characteristics of sugar production in Brazil is that it produced a higher grade of the commodity than what characterized the Atlantic islands earlier, or Barbados later (Schwartz 2004b: 179). The white sugar produced in Brazil was referred to as "clayed" sugar. Galloway indicates that the procedure could be found used in Morocco prior to the fifteenth century: "sugar was 'clayed' by placing waterlogged clay over the top of the [raw sugar] cones. The water from the clay percolated through the sugar, leaching out the lingering traces of molasses and made a sugar loaf that was whitest near the clay and graded into dark brown at the base." While crude, claying was a refining process that allowed sugar producers and merchants in Brazil (but also eventually in the French and British Caribbean) to capture greater profits that those available if limited to the export of raw sugar. Moreover, as we discuss below, the existing information does suggest that the eventual displacement of Brazilian producers was attained only gradually through the combined impact of greater specialization of Caribbean producers in raw sugar, and of European intermediaries in refining.

Other technological innovations included the circa-1610s introduction of the vertical three-roller mill in Brazil, producing fewer impurities in the sugar juice than horizontal rollers, and requiring fewer steps in the initial processing of the cane (Schwartz 2004b: 163). According to one estimate, the average production by enslaved labor in Brazil rose from 0.25/0.40 tons to 0.5 tons a year after the introduction of the new technology (Barrett and Schwartz 1975: 542). These technological changes and the subsequent increased profits led to an expansion of the industry: "[b]etween 1583 and 1612 the number of sugar mills grew from 115 to 192; by 1629 there were around 350 mills, capable of producing from 15,000 to 22,000 tons each year" (Blackburn 1997: 173).

Later, plantations in Barbados adopted a battery of cauldrons (rather than a single one) for the process of clarifying and evaporating the cane juice until its transformation into raw sugar (Galloway 1989: 77). This innovation facilitated the enlarged scale of production that characterized sugar production in Barbados and eventually additional innovations were introduced (Galloway 1989: 97-8). Moreover, rather than a mere transplantation of existing techniques,

planters in Barbados transformed the extent of integration of various stages of the sugar labor process: prior sugar production "had always been organized according to what we might call the dispersed system, in which smaller farmers grew sugar that was processed at a large mill owned by a neighboring planter [...]. Barbadians discovered that they could increase efficiency by concentrating growing and milling through an integrated system of production" (McCusker and Menard 2004: 297). Adopted between 1650s and 1680s, during which time there was some "persistence of the dispersed system," as there were some constraints in adopting "what would eventually become the integrated plantation's hallmark and the major source of its productivity advantage over the dispersed system: gang labor with its lock-step discipline and liberal use of the whip to force slaves to work as hard as possible" (McCusker and Menard 2004: 301). These changes included a more extensive use of enslaved Africans, who in the 1660s and 1670s became more numerous than the previously prevalent indentured white servants (Beckles 1982).

Innovations in Enslaved Labor

Geographical relocation was an important dimension of these changes in enslaved labor processes. As indicated earlier, a crucial competitive advantage for sugar producers in São Tomé was their ability to use their proximity to mainland Africa to draw more heavily on an enslaved labor force than had been the case in Madeira and the Canary Islands. There is some evidence that over time, however, proximity to Africa also became a comparative disadvantage, as it provided opportunities for greater resistance among the enslaved workers (e.g. Schwartz (2004a: 10)).

Similar constraints emerged in Brazil. Sugar plantations were built with the deep and fundamental inequalities of slavery in the distribution of both wealth and power. Over time, the extent of inequality was altered both by the incorporation of actors who could make claim to intermediate social standings (e.g., as smaller farmers in Barbados or white European colonists in Brazil), as well as the social mobility that occasionally characterized other actors over time (e.g., the rare ability of individual enslaved persons to eventually lay claims to special skills or even property, or the collective ability of some groups to claim political rights previously denied). These shifts entailed greater social heterogeneity, within a set of social arrangements that were simultaneously characterized by a very high level of inequality.[19] Such processes of mobility might have been one of the constraints that in each case tended to erode the relative competitive position over time.[20]

In this sense, the concept of "enslaved labor" for an understanding of the logic of the development of the sugar commodity chain between the 1500s and the 1800s is just as broad a category as the concept of "wage-labor" would be to understand the developments of the past two hundred years. Just as the nature of "wage-work" in the twentieth century differed significantly from time to time and place to place and encompassed a wide range of occupations, so was the

[19] This was manifested at all social levels. For example, in the case of Brazil, Schwartz (1985: 268) points out that "[b]y the beginning of the eighteenth century, the Bahian elite had become a more heterogeneous group, and although sugar planters still predominated, there were other sectors of the economy and other professions that thrust men forward."

[20] To assess these issues more carefully, greater research is needed on patterns of stratification and mobility over the period under consideration.

case with enslaved labor. Slavery differed significantly over time and place, and likewise encompassed a very wide range of actual life experiences.

Coreification **Reprise**

Schumpeter (1942) purposefully did not restrict his notion of innovation to technological change or manufacturing. He emphasized that epicenters of wealth shifted constantly and are not associated with any particular array of products, market networks or institutional arrangements. New forms of raw material production, the capacity to engage in innovative forms of deploying territorial or political power, rent-seeking behaviors, or any other shift entailing "the setting up of a new production function" (Schumpeter 1942: 87) are just as likely to be a source of creation and destruction as any other innovation labeled by some as more "productive." From such a perspective, we argue, the territorial expansion of plantations, the incorporation of enslaved labor into production, and shifts in the patterns of commercialization of sugar, were all significant instances of Schumpeterian innovation that translated into coreification during the period under consideration.[21]

Of course, one might question whether the rhythm of innovative transformation that characterized the sugar commodity chain was as intense as suggested by Schumpeter's (1942: 82) characterization of capitalism as a process of "mutation… that incessantly revolutionizes the economic structure from within, incessantly destroying the old one, incessantly creating a new one." The patterns of development observed in this article suggest that just as core and peripheral activities only became clearly differentiated over a period of centuries, so might the rhythms of innovation have accelerated over time in their temporal span: change might appear to have moved only slowly in the sugar commodity chain when compared to technological transformations in the nineteenth century, but the same holds for the latter when compared to the shifts undergone by the information industry over the last twenty years. In this sense, the speeding up of social-time itself is part and parcel of the changes at hand.

The drive behind these innovations came from a variety of sources. These included landowners, merchants, and entrepreneurs who found opportunities for capturing wealth and engaging in upward social mobility by engaging in sugar production and trade, as well as farmers and small producers seeking to make a livelihood, persons of African origin resisting their enslavement, governments seeking to enhance their ability to rule, and states pursuing territorial expansion. The geographical relocation of sugar production and trade entailed a broad range of actors who, deploying all kinds of strategies to enhance their social and/or political standing, each contributed (sometimes intentionally, most often unintentionally) to world-historical change.

[21] This is what is implied in Engerman's (1973: 59) characterization of slavery: "free land is not a sufficient condition for the existence of slavery. It is, rather, the cause of a demand to institute slavery. Free land, and labor scarcity, lead the landowners to adjust by forming a cartel rather than bidding up wages. The cartel response is a set of institutional arrangements permitting forced labor, and it is important to examine the ability of the cartel to form and hold together, as well as the nature of the political system which permits these *institutional innovations* to be enforced" (emphasis added). From a different perspective, focusing on the interaction between colonialism and underdevelopment, similar points about property relations are made by Walter Rodney (1972).

Conclusion

The narrative presented in this contribution belies the idea that nodes in a commodity chain are, by virtue of their location in a hierarchical network, "core" or "peripheral." Instead, we emphasize that a better understanding of these commodity chains requires a focus on substance over formalism, or how various dimensions of creative destruction are manifested in particular times and places. As indicated in this paper, the expansion of the sugar commodity chain can be understood as driven by successive innovations in overlapping spheres, including technological changes in the organization of production from field to refinery, in forms of labor control, in geographical expansion and relocation, in the organization of consumption markets, and in the networks involved in trade.

The large-scale production of agricultural commodities through the deployment of enslaved labor comprised major innovations that characterized capitalism for at least three hundred years. These innovations yielded significant levels of wealth. Hence, to capture the meaning of creative destruction for world-systems analysis, we need to focus not just on peripheralization, but coreification. For the *longue durée* of historical capitalism, neither peripheralization nor coreification are tied to specific commodities, productive activities, forms of labor control, or geographical areas. Building from Schumpeter, we have argued in this paper that peripheralization and coreification are two sides of a single flexible process, a process of creative destruction, that is at the heart of historical capitalism.

Eventually, the innovative features of the sugar commodity chain as a whole became subjected to the same tensions that we identified in the sequence of its expansion. What constituted a competitive advantage in earlier periods, by the nineteenth century would develop into rigidities —e.g. technological lags or limited domestic markets—that would provide competitive opportunities to alternative patterns of social organization centered around wage labor and greater access to property rights.

Nevertheless, we have aimed to challenge major assumptions at the heart of the use of 'core' and 'periphery' in world-systems analyses. First, we challenge that these activities have been geographically contained by national states which have always had core or peripheral specializations, by showing that productive activities only gradually became bounded by national boundaries. The case of sugar production by enslaved labor shows that core-like activities existed in the same colonial outposts that would eventually be dubbed 'peripheral' states. Second, we challenge that wage-labor is inherently more core-like than coerced labor by showing that both production by and systems of enslaved labor themselves were incredibly innovative for hundreds of years. The elites engaged in these activities reaped incredible wealth and sought nearly constant transformation of production and exchange in order to increase profitability. As such, we conclude not only by confirming the long-standing world-systems claim that production by enslaved labor in colonial outposts was compatible with historical capitalism, but also by finding that such arrangements were at the core of capitalist innovation and expansion.

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