



## Research Note

### Measuring the Impacts of Colonialism: A New Data Set for the Countries of Africa and Asia

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#### Abstract

*We present a new dataset with 15 indicators for the political, economic and social impact of colonialism. This dataset and our four indices for the impact of colonialism create for the first time the opportunity to compare directly the levels of colonial transformation for a sample of 83 African and Asian countries. Some of our exploratory findings on the interrelation of the dimensions show that in British colonies political domination was in general less direct and less violent. Plantation colonies experienced more investment in infrastructure and more violence during decolonization. The correlations between indicators for economic distortion (trade policy, trade and FDI concentration) show that the economic re-direction of some colonies towards a more exclusive exchange with the metropole country was an interdependent process. In general, a more intense political domination came along with a higher level of economic transformation. If an area was transformed economically, however, a social transformation was likely to take place too, but these processes should not be confounded. In areas that were politically united for the first time under colonialism, economic distortion and social transformation were more profound.*

**Keywords:** Colonialism; political, economic and social impacts; Africa; Asia



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### Introduction and Background<sup>1</sup>

Research from a world-system perspective stresses the importance of long-term historical factors, but it has been confined to indirect measuring of historically earlier factors than those present in the postcolonial era. Influential was the article by Lenski and Nolan (1984), focusing on the long-term effects of social-evolutionary development levels on the postcolonial economy and society. However, both precolonial and colonial factors could only be measured indirectly. A remedy to the first flaw was the Atlas of Precolonial Societies (Mueller, et al. 1999). Based on this new data set, Lenski and Nolan's findings could be confirmed on a more elaborate level and with a larger sample (Ziltener and Mueller 2007). However, the second flaw persisted, as the impacts of colonialism were not measured with the same level of sophistication. The authors admitted that the problem had remained unsolved and that "it should be addressed by future quantitative-empirical research" (Ziltener and Mueller 2007:400). Since colonialism has shaped core-periphery-relations (cf. Sanderson 2005:186-187), it is rather surprising that, in contrast to the situation of postcolonial dependence, "colonization has not been a central concern to world-system theory" (Boswell 1989:180). As a consequence, we simply do not know which aspects of colonialism have been relevant in terms of long-term effects—the "open veins" (Galeano 1973), i.e. the level of exploitation of resources, or investment, taxes, and trade policies, direct or indirect rule, schooling and proselytization—all of them or only certain ones?

From a world-system perspective, the modes of integration of the postcolonial economies in the periphery into the world economy are crucial. The discussion of how foreign direct investment (FDI) in form of transnational corporations and their affiliates affect economic and social development in their host countries since independence started the 1970s (Bornschiefer, Chase-Dunn, and Rubinson 1978; Chase-Dunn 1975), and this has been a topic ever since (Herkenrath and Bornschiefer 2004). We go a step back and have a look at the different levels of economic dependence of colonies by differentiating between those with a strong unilateral dependence on the metropole country regarding trade and investment and those without. We contribute to a wider and more thorough consideration of colonial factors and their relevance for postcolonial development.

New indicators to measure length, depth, and different impacts of colonization have to be developed in order to define the different "legacies" of colonialism. As a first step, the temporal boundaries of colonialism were coded for 83 Countries of Africa and Asia (Ziltener and Künzler 2013:292-296). A dimensional analysis within the same research survey (Ziltener and Künzler

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2013:297-305) revealed a complex web of interrelations of political, economic and social factors, a challenge for any attempt to measure the impacts of colonialism. We have analyzed the existing body of literature in our research survey (Ziltener and Künzler 2013). Until recently, empirical-quantitative research has dealt inadequately with the problem of the multidimensional impact of colonialism, typically using simple country-dummies (British vs. French colonies etc.). Some authors argued that colonial powers introduced different kinds of institutions (legal systems, extractive institutions etc.) which ultimately determined the post-colonial development of the former colonies (cf. Acemoglu, Johnson, and Robinson 2001, 2002; Grier 1999; Mahoney 2003). In research practice, this usually takes the form of one-dimensional concepts, completely neglecting different *levels of colonial transformation*. We see this article as a contribution to dealing with the impacts of colonialism in a more complex manner. We analyze the variation in the forms of colonial domination as the first step in our effort to make the different aspects measurable.

**Table 1. Dimensions of colonial transformation (CT)**

<b>1. Political transformation</b>	<b>2. Economic transformation</b>	<b>3. Social transformation</b>
1.1. Form of domination 1.2. Violence 1.3. Instrumentalization of ethnolinguistic/religious cleavages 1.4 Gradualism in the transfer of administration	2.1. Trade policy 2.2. Trade concentration 2.3. Investment concentration 2.4. Investment in infrastructure 2.5. Plantations 2.6. Mining 2.7. Gold/silver/diamonds	3.1. Colonial immigration 3.2. Success of missionary activities 3.3. Work immigration 3.4. Partition

We propose to use four indicators for the political dimensions of colonial domination, seven for the economic and four for the social dimension (see table 1). The first three sections discuss the background and construction of these indicators and present some descriptive statistics, following the structure of table 1. Based on these 15 indicators, we constructed indices for the political, economic and social impact of colonialism which we discuss in part four, followed by discussion of a combined index for the impact of colonialism. This new data set creates for the first time the opportunity to compare directly the levels of colonial transformation of the countries of Africa and Asia. The full set of precolonial and colonial variables is available at [worlddevelopment.uzh.ch](http://worlddevelopment.uzh.ch), and the dataset may be found at <http://dx.doi.org/10.7910/DVN/UQZFYA>; links provided throughout the text add additional illustrative tables.

### **Indicators for Political Transformation by Colonialism: Form of Political Domination (DOMFORM)**

Beyond the mere length of time of colonialism, the intensity of political domination is a crucial aspect: without a significant reduction of the level of political sovereignty, we would not even speak of colonialism (Ziltener and Künzler 2013:292). From a sociological viewpoint, the historical pattern of foreign control does not depend on the official claim or de jure control. We treat all so-called “mandates” as colonies. On a scale of five increasing levels of political domination, we coded for every country in the sample the maximal impact:

- 0 = no colonial domination / not applicable
- 1 = semi-colonialism
- 2 = indirect rule with little interference in internal affairs
- 3 = indirect rule with strong interference in internal affairs
- 4 = direct rule

*No colonial domination* was coded only from Mongolia, which was in the 19<sup>th</sup> and 20<sup>th</sup> century mostly under Chinese supremacy and thus not under ‘modern’ colonialism. All other countries of our sample had an experience of being dominated by one or several colonial powers.

We call the “weakest” form of colonial domination *semi-colonialism*, characterized by the reduction of political sovereignty through “unequal treaties” or similar arrangements. These treaties usually were forced at gunpoint or were the results of wars. They were non-reciprocal and included elements like

- the opening of ports to trade, the ending of state monopolies and of certain interdictions of commerce (as in the case of opium in China)
- special trade/tariff concessions, most-favored-nation status
- the change of diplomatic traditions and communication rules according to European standards, e.g. exemption of Europeans from court rituals deemed to be humiliating, acceptance of a European language as diplomatic language
- the ending or lowering of travel and residency restrictions,
- extraterritoriality (geographical zones, administration, jurisdiction)
- freedom of religion, i.e. the right to preach Christianity openly and to exert missionary activities, while giving the country’s administration the duty to protect persons and facilities involved

- a de facto partition of the country into mutually exclusive spheres of influence (as in the case of Persia between Britain and Russia, or of China as coordination among several colonial powers).

These instruments were used mainly in dealing with the pre-colonial states and empires in Asia, where “the presence of large, antique, yet still death-defying political structures meant that indigenous authorities could not be taken over without promoting internal disorder, incurring massive expense and risking international conflict“ (Cain and Hopkins 1993:397). Examples are the Bowring Treaty (1855 Britain-Siam), the Tianjin Treaty (1858 Britain-China)<sup>2</sup> and the Harris Treaty (1858 US-Japan). The group of (present) countries coded as semi-colonial consists of Afghanistan, Iran (Persia), Japan, Saudi Arabia, Thailand and Turkey (as the core area of the Ottoman Empire), i.e. 7% of the cases in the sample.

With our concept “five increasing levels of political domination” we overcome most of the problems that approaches working with a “col/non-col” binary are confronted with.<sup>3</sup> We do not consider it appropriate to code “more technologically advanced non-European countries” including Turkey, Iran, China, and Japan “as never colonized by Europeans” (Ertan, Fiszbein, and Putterman 2016:182, also Heldring and Robinson 2012:2). In some cases, diplomatic relations became successively more unequal, as in the cases of the series of treaties of Britain with the small emirates at the Persian Gulf, which makes it difficult to define the exact onset of semi-colonialism/colonialism. The next level of intensifying political domination is defined by claims of exclusive rights over the foreign relations of an area/country, the posting of an advisor or resident at a court, the defense against third countries or by bringing parts of the administration under direct control. This form of colonial domination is usually called “indirect rule,” because traditional rulers stay in power and institutions remain at least formally unchanged.<sup>4</sup> However, “indirect rule” had a strong impact on the political sphere, as a Furnivall (1941:9) argues in the case of Dutch rule in Indonesia who “subverted the native principle of rule, and drained the vitality of social life.” Because the category “indirect rule” covers a large number of colonies, we

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<sup>2</sup> We base this on Auslin’s (2004:21) assessment: “The crucial change in Sino-Western relations came with the 1858 Tianjin treaty imposed by Britain after the Arrow War. This new treaty was vastly more punitive and intrusive than the Treaty of Nanjing and materially reduced Chinese sovereignty.”

<sup>3</sup> Cf. Ertan, Fiszbein, and Putterman (2016:170) who consider colonization to have begun “once 20% or more” of the territory of a today’s country is deemed by sources to have been “largely under the control of the colonizing power”.

<sup>4</sup> In general, the caveat by Trocki (1999:80) applies: “While the legal status of the prior institutions could be taken as a formal guide to the presence of a system of direct or indirect rule, in practice there was often little to distinguish the systems. During this period, legal niceties were respected only at the convenience of the colonial power, though such technical points once again became of importance when questions arose regarding the structure of the post-colonial state. (...) indirect rule often signified no more than a transitory stage between the inception of a colonial presence and the development of a more comprehensive administrative machine.”

differentiate between *indirect rule with little interference in internal affairs* (level 2) and *indirect rule with strong interference in internal affairs* (level 3). This is somewhat arbitrary, but the experience of coding the impact on traditional institutions and processes clearly confirmed the importance and practicability of this distinction.

In cases where the area of today's country was politically divided and experienced different forms of domination over a longer period, as in the case of the Malay peninsula with directly ruled "settlements," federated and unfederated Malay states with British residents, but different degrees of interference in internal affairs, we coded level 3 in view of the experience of the majority of the population. We "balanced" the coding in cases of several groups of the population with significantly different experiences, e.g. level 3 in a case with two major groups with direct rule and level 2 in one with indirect and little interference. One example for this is Cameroon, where in the British part and the northern French part administration was based on local authorities as the Lamibé and Sultans, while in the southern French part the administrative was clearly direct.

We did not code traditional empires (Mughal, Ottoman, Omani etc.) as colonialism (cf. Ziltener and Künzler 2013:292). Here we are confronted with the problem how to code areas/regions that were part of one of these empires and therefore were politically dominated already before "modern" colonialism. The partition of the Ottoman Empire by European powers led to new entities for which new political "centers" had to be created, and which led to economic fragmentation: "The creation of these new political entities entailed the creation of new national economies as well, each with its own boundaries, and each with its own centralized system of laws, taxes, and fiscal management. One result was the growth of separate national markets (...), another the development of barriers to the large movement of goods and labor that had been such a prominent feature in the last years of the Ottoman Empire" (Owen and Pamuk 1999:51).

The problem gets even more complicated because the political reality of these empires often did not match the symbolic discourses and rituals of imperial unity. For instance, in the case of the Ottoman Empire, the Egyptian regime of Muhammad Ali (reg. 1805-48) was "virtually autonomous" (Lewis 1995:301). Tunis and Morocco also enjoyed a certain degree of autonomy. It was only in these areas that the option of "indirect rule" through traditional institutions and dynasties was available (and therefore level 2 or level 3-codings). In others, colonialism not only created new political entities, but also founded completely new "dynasties." These cases were coded as *direct rule* (level 4), as was the creation of chieftaincies without historical precursors. Eighteen countries of 83 were coded level 2 (22%), 27 level 3 (33%) and 31 as level 4 (37%). This means that more than two thirds of the countries in our sample experienced strong colonial political intervention, with or without the dissolution of pre-colonial political institutions. As will be discussed later, the intensity of political domination correlates with level of colonial violence as

well as with some indicators of economic transformation. British colonies were in general ruled less directly (annex 1).<sup>5</sup>

### **Level of Colonial Violence (VIOLTOT)**

Colonization was confronted with a broad variety of resistance, triggering often, but not exclusively, violent reactions by the colonial power. We must distinguish between defensive wars fought against the incoming colonialists and later protracted rebellions. In many instances the initial war was fought with the traditional military system (cf. Ranger 1969:312). This primary resistance was motivated by the goal of preserving autonomy and sovereignty and was often led by traditional elites. However, in this context we are less interested in the character or amount of resistance than the varying impact of colonial violence against these resistance movements, measured with our variable (VIOLCOL).

Without denying possible links between different resistance movements, we divided subsequent forms of resistance into two forms: resistance against colonial domination and exploitation (VIOLRES)—sometimes referred to as “secondary resistance,”—and violence during decolonization (VIOLIND). VIOLRES is an indicator for the resistance against measures of colonial domination such as taxation, expropriation, forced cultivation, forced recruitment or forced labor, which was—even when seen economically ineffective—only slowly and unevenly phased out.<sup>6</sup> This form of resistance is often carried out by peasants, workers and/or women or, quite common in sub-Saharan Africa, messianic movements. It is often labeled as “rebellion,” “insurrection,” “revolt,” “uprising” or “mutiny.” It has a time lag to the colonial conquest, although the distinction is not always clear cut: What for some groups is primary resistance can for other groups be resistance against domination, and a variety of motives may converge into one anti-colonial movement. In cases where the centers of resistance were under colonial rule for some time, such as in the case of the famous “mutiny” in British India (1857/58), we coded VIOLRES, otherwise VIOLCOL.

The third form of violence (VIOLIND) occurs during decolonization. Having a varying degree of rural and urban mass participation, decolonization movements tend to be led by younger

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<sup>5</sup> There is one article with a comparable aim at coding different levels of political domination in the colonial era (Lange 2004). However, Lange measures the extent to which British colonial rule depended on customary legal institutions for the regulation of social relations, by dividing the number of colonially recognized customary court cases by the total number of court cases in 1955. This is an indicator very different from our coding, and our samples overlap only in 22 cases (British colonies). There is no statistically significant correlation between his indicator and DOMFORM. On the other hand, the correlation between his later estimates of the “level of colonialism” (Lange, Mahoney, and vom Hau 2006:1414), defined as “the extent to which a colonizing power installs economic, political, and sociocultural institutions in a colonized territory”, and DOMFORM is highly significant (0.71, N= 23 British colonies).

<sup>6</sup> While it was in the French colonies abolished by law in 1945, it lasted even longer in the Portuguese empire (Austin 2015:10).

educated elites. Some movements took up armed struggle for independence, while others relied on other means as strikes and demonstrations. Yet others opted for peaceful resistance. We coded for the three variables different levels of colonial violence: *no colonial violence* (level 0), *moderate colonial violence* (level 1) and *massive colonial violence* (level 2). For VIOLCOL and VIOLRES, *moderate colonial violence* is characterized by small numbers of casualties among the local population, limited length of resistance and limited economic effects for the local population. In contrast, *massive colonial violence* caused heavy casualties and persisted for a considerable time. It is often characterized by the purposeful destruction of the sources of livelihood (crops, domestic animals, and/or infrastructure), resulting in years of hunger and misery for a significant part of the population. For violence during decolonization (VIOLIND), the armed suppression of isolated acts of violence and/or of riots, strikes or demonstrations were coded as *moderate colonial violence*, while armed wars of independence were coded as *massive colonial violence*. Peaceful resistance is thus not measured, neither is the psychological impact of colonial violence which is emphasized by Ranger (1969), but not measurable in a comparative perspective. As we are interested in the impact of colonial violence, we are neither considering the casualties and expenditures among the colonial troops nor wars among colonial powers, as during World Wars I or II.

The total level of colonial violence (VIOLTOT) was measured by adding the values of the three violence-related variables and can thus vary between 0 and 6. Examples for countries with maximal violence are Algeria, Angola or Vietnam. Fiji, Jordan or Kuwait were not exposed to significant direct, open colonial violence. Most countries are in between. The total level of colonial violence correlates significantly and positively with the form of political domination (table of relations between political domination and violence available [here](#)). It also correlates in general positively with the length and intensity of political domination as well as with some indicators of economic transformation (annex 2). However, violence during decolonization seems not to be influenced by directly political factors, but it correlates with the existence of a plantation economy. As is documented in annex 1, the level of violence was in general lower in British colonies than in others and the onset of colonialism was usually more violent in sub-Saharan Africa compared to North Africa and Asia.

### **Colonial Instrumentalization of Ethnolinguistic/Religious Cleavages (ETHNFUNC)**

Colonial powers instrumentalized ethnolinguistic and/or religious cleavages mainly in three areas: army/police, administration/education, and in the economy. In all colonies, the upper layers of the administration were staffed by officials from the metropole. The colonial powers however used ethnolinguistic and religious cleavages to different degrees to occupy the lower layers and special functions (“martial races,” administrators etc.). As important as this aspect of colonial domination is, it is difficult to measure its impact. Going beyond a simple differentiation between a

*low/moderate impact* (level 1) and a *significant/strong impact* (level 2) would be hazardous. For more than one third of our cases, we found indications that there was a strong impact of colonial policy on occupational specializations along ethnolinguistic and/or religious lines. For another 15 cases, there was a low/moderate impact.

Related to this variable is the coding of colonially induced work immigration (for the army, infrastructure project, plantations etc.) because the colonial policy in this regard followed similar considerations. The difference is that with the variable ETHNFUNC we measure the degree to which colonial policies intentionally as well as unintentionally created and/or reinforced such occupational specializations along ethnolinguistic and/or religious lines while WORKIM mainly catches the quantitative aspect of colonially induced immigration.

As significant bivariate correlations show, the instrumentalization of ethnolinguistic and/or religious cleavages usually took place in more directly ruled colonies, in colonies with a higher dependence on investment from the metropole, with more successful missionary activities and, unsurprisingly, in colonies with a higher level of ethnic heterogeneity and work immigration (annex 2). It was more often applied in sub-Saharan Africa than in Asian and North African countries (annex 1). This might be related with the lower levels of ethnic heterogeneity in the latter countries.

### **Gradualism in the Transfer of Administration (INDTRANS)**

In September 1958, Guinea was the only French territory in West Africa overwhelmingly rejecting the French constitutional project and opting for immediate independence: “France was quick to retaliate, withdrawing civil servants, severing aid, trade, and development agreements, absconding with government files, and sabotaging whatever the departing officials could not take with them” (Schmidt 2007:178). This discontinuity in the administrative institutions was a heavy burden for the newly independent Guinea. A similar institutional discontinuity has in other cases been caused by massacres targeting expatriates. In Mozambique or the Belgian Congo, most European civil servants fled or were chased away immediately before or after independence. In contrast, there are countries with an extreme gradual transfer of administrative authority to local civil servants accompanied by training and meritocratic promotion, resulting in considerable state capacity. In Botswana, efficiency of administration was clearly put before Africanization (Künzler 2004:162-163). Just after independence in Malaysia still 44.5% of civil servants were British, in Pakistan 34.2%, in Ceylon (Sri Lanka) 18.9%, in India 7.3%, while in Burma they all left with independence (Braibanti 1966). According to Kerbo (2005a, 2005b), the way the colonial power left the country (such as the extent of planning and preparation for independence) was indeed crucial for the further

development in East and Southeast Asia.<sup>7</sup> While our main concern is the transfer of bureaucracy, we also considered the transfer of the judicial system and the security forces, but not the transfer of legislative.

The transfer of administration is an important aspect for the development of post-colonial institutions that has been somewhat neglected so far. We therefore introduce a variable (INDTRANS) measuring the gradualism in the transfer of administration:

0= not applicable/planned, coordinated and very gradual transfer of administration (52 cases)

1= short initiation, no conflicts (16 cases)

2= very quick, disruptive, disorderly transfer (15 cases).

Of course, a planned and coordinated transfer of administration is not possible in the case of armed conflicts/war of independence. INDTRANS correlates highly with indicators for the level of violence, but also a more direct rule seems to have impeded a gradual transfer of administration (annex 2). Of all economic indicators, only the trade-related ones (TRADEPOL, TRADECON) have a significant relationship with INDTRANS: The closer the colonial economy was related to the metropole, the less likely a gradual transfer (annex 2). British colonies experienced a gradual and orderly transfer of administration more often than others (annex 1).

### **Indicators for Economic Transformation by Colonialism**

Political domination did not lead automatically to economic changes. To make profit beyond occasional plundering and traditional ways of taxation, a *mise en valeur* (capitalizing on the colony/valorization) was necessary, which proved to be difficult in many cases. Because of their ubiquity and the variety of forms applied, we were not able to code the main aspects of economic colonialism: the degree of expropriation (especially of land), and of financial exploitation. Only recently attempts have been undertaken to compare colonial taxation systems based on historical records (Frankema and Waijenburg 2014). We consider this a major gap in our coding of the impacts of colonialism. However, we measure these effects indirectly: The colonial population had to pay for higher costs if there were more wars, more violence, more investment in

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<sup>7</sup> Kerbo (2005b:147): “It is particularly important within East and Southeast Asia to compare how each country was treated by the colonial powers and how these colonial powers left the country. The end of British colonialism, for instance, was at first comparatively tame for both Malaysia and Burma. In Malaysia, the British stayed on for several years to provide advice on running the newly independent nation and to fight communist insurgents. Burma, however, became mired in conflict after the British abruptly left the country. Primarily because of internal conflicts the British helped rekindle as they left the country, Burma immediately degenerated into political violence and remains in suspension with a military dictatorship repressing any needed reforms.”

infrastructure or more trade distortions. We focus on the seven indicators mentioned in table 1 to measure the colonial impact on the economy.

### **Trade Policy (TRADEPOL)**

Colonies were seen as a way of ensuring markets. Trade flows have always been closely monitored by colonial governments and trade policies were changed frequently in order influence them. In the Great Depression of the 1930s, all colonial empires tried to introduce protectionist measures. Therefore, it is difficult to code colonial trade policies 1850-1950 beyond a simple “general opening” vs. “more distortive.” We followed the definitions of Mitchener and Weidenmier (2008), but made no distinction between “preferential tariff policy” and “tariff assimilation/customs union”:<sup>8</sup>

- 0= not applicable (5 cases in which no colonial influence in trade policy was discernible)
- 1= predominantly ‘open door’ policy (43 cases)
- 2= preferential tariff policy, policy of tariff assimilation/customs union with metropole country (35 cases, of which 21 were French colonies, 3 Portuguese and 3 Japanese)

French colonies more often experienced a distortive trade policy than British ones (annex 1). Some other relations with colonial indicators become evident (annex 2): The more direct colonial rule (DOMFORM), the more distortive the colonial trade policy, and the more likely anti-colonial resistance (VIOLRES). Beyond that, trade policy (TRADEPOL) also correlates significantly with foreign presence (FORPRES), nature of authority transfer (INDTRANS) and trade concentration (TRADECON). Mitchener and Weidenmier (2008:2) emphasize for the period 1870-1913: “Being in an empire roughly doubled trade relative to those countries that were not part of an empire.” However, trade policies were not always effective, and these “colonial ties” have other causes than trade policies as well. Therefore, an indicator for the *factual* impact of colonial domination on trade flows is needed.

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<sup>8</sup> Mitchener and Weidenmier (2008:18-19): “The policy of tariff assimilation is a policy regime where the tariff rates on goods are the same in the metropole and the colony. Under this arrangement, the metropole and colony form a customs union. A preferential tariff system describes a trade policy where colonies and the mother country have differential tariffs, but non-empire goods are generally taxed at a higher rate. An ‘open door’ trade policy refers to a tariff regime where there is no distinction made between the products of the mother country and non-empire trading partners. In other words, a colony or metropole with an ‘open door’ trade policy does have not a preferential tariff policy or trade agreement (i.e., customs union) with some of its trading partners. The open door trade policy should not be confused with a free trade policy, however. Many countries with ‘open door’ policies levied duties to protect local industries or to raise revenue for the fiscal authority.”

### **Trade Concentration (TRADECON)**

Trade concentration measures the colony's trade with the metropole as proportion of total trade. The main source for this indicator is the International Historical Statistics Data Set (Mitchell 2007). Additional sources were the United Nations Commodity Trade Statistics (COMTRADE) Database (<https://comtrade.un.org/>) and, in very few cases, the literature on colonial/national histories. Due to the poor data quality for many colonies, we decided to classify the cases in five categories: 0 = trade concentration under 25%, no colonial trade effect is discernible, three quarter of goods exchanged with third countries/areas:

- 1 = trade concentration 25-40%, a moderate trade effect
- 2 = trade concentration 40-50%, a significant trade effect
- 3 = trade concentration 50-66.5%, a strong trade effect
- 4 = trade concentration 66.6-%, a very strong trade effect

Unsurprisingly, for the semi-colonial countries (except Persia) no colonial trade effect is discernible; these countries were usually opened for trade under 'most favored nation' clauses. Also, for many colonies with an 'open door' policy, trade with the metropole was not particularly strong. Together, 22 cases (27%) of our sample had no colonial trade effect (level 0), measured by a trade concentration of less than 25%. For the same number of cases we find a moderate trade effect (level 1) with a trade concentration of 25-40%. In 12 countries, trade concentration was 40-50%, representing a significant trade effect (level 2). A strong trade effect (level 3) with a trade concentration of 50-66.5% was experienced by 18 cases, and another 9 experienced a *very* strong trade effect (level 4), where more than two thirds of the trade went to the metropole. Among the 27 countries with a strong or very strong trade effect (one third of our sample), there are five British colonies, 14 French, two Italian as well as the Japanese colonies (Korea, Taiwan).

Again, French colonies experienced significantly more often a distortive trade effect than British ones (annex 1). In general, a high level of trade concentration was to be found in colonies with a high level of colonial investment and a disorderly transfer of administration (annex 2). There is a statistically significant relation between the intensity of political domination and trade concentration (table of relations between political domination and trade concentration available [here](#)).

### **Investment Concentration (FDICON)**

Similar to trade concentration, we categorize colonies regarding their dependence on direct investment from the metropole. The data situation, however, is very poor for the colonial period itself. As a proxy, we relied on the data provided by the OECD (1972), again complemented by

sources such as colonial/national histories and estimates. As in the case of trade concentration, we classified the cases in five categories:

- 0 = investment concentration under 25%, no colonial investment effect discernible, three quarter of investment from third countries/areas
- 1 = investment concentration 25-40%, a moderate investment effect
- 2 = investment concentration 40-50%, a significant investment effect
- 3 = investment concentration 50-66.5%, a strong investment effect
- 4 = investment concentration 66.6-%, a very strong investment effect

In 12 cases (15%), we found no colonial investment effect (level 0), in 8 cases a moderate investment effect (level 1), and in 9 cases a significant investment effect (level 2). Thus, in two thirds of the cases, more than 50% of investment came from the metropole: 10 had a strong investment effect (level 3) and 44 a very strong investment effect (level 4).

It seems that colonial domination strongly relates to investment flows. Countries in sub-Saharan Africa are more likely to have a high direct investment concentration than the ones in Asia and North Africa (annex 1). As annex 2 shows, there are significant correlations two indicators of political transformation (DOMFORM, ETHNFUNC), with several other indicators of economic transformation (TRADECON, GOLD, INVEST, PLANTAT) and two indicators of social transformation discussed below (FORPRES, MISSION).

### **Investment in Infrastructure (INVEST)**

The development of the infrastructure is both a prerequisite for and consequence of the *mise en valeur* of a colony. Harbors were crucial, as well as the transport links (railways, streets) into the interior, followed by local transport systems such as tramways, telecommunications, and gas, electric, and water works. Because of the different situations and needs for infrastructure, we decided not to refer to specific historical data (railway miles etc.) but to code more general colonial investment in infrastructure as “not significant/modest/huge:”

- 0 = no significant colonial investment in infrastructure / not applicable
- 1 = moderate colonial investment in infrastructure (e.g. some streets and bridges, not more than one railway line to the coast, only isolated irrigation measures)
- 2 = huge colonial investment in infrastructure (e.g. a railway net and streets linking major parts of the colony, sea harbor(s), and/or channels/irrigation measures in a significant part of the colony)

The means of financing these investments (public/private) does not matter here. Investment in infrastructure by non-colonial governments/agencies, e.g. the Ottoman railway system built before WWI, are not considered. Mitchell (2007) has been an important source for the coding of infrastructure, controlled by colony-specific sources and complemented for countries/areas not mentioned.

Apart from the semi-colonial countries and Mongolia, we found no significant colonial investment in infrastructure (level 0) in Bhutan, Nepal, three British colonies at the Persian Gulf, four French controlled areas in Africa as well as in Portuguese Guinea-Bissau and Italian Somalia. We coded a moderate colonial investment in infrastructure (level 1) were e.g. some streets and bridges were built, but not more than one railway line to the coast and only isolated irrigation measures. This is the case for one third of our sample (27 colonies), mainly landlocked African countries, areas in Western Asia that were colonially dominated only for a short period such as Syria and Lebanon as well as some Pacific island colonies. Finally, 39 countries (47%) experienced a huge colonial investment in infrastructure (level 2), measured e.g. by a railway net and streets linking major parts of the colony, sea harbor(s), and/or channels/irrigation measures in a significant part of the colony.

As expected, this indicator for the level of economic transformation correlates with many others, such as plantations, gold, mining, trade policy, trade concentration, investment concentration but also with foreign presence (FORPRES) (see annex 2). Also not surprising is the fact that colonial investment was higher in more directly ruled colonies (DOMFORM) that were held for a longer period of time (COLYEARS). Investment in infrastructure also seems to have triggered more anti-colonial resistance (VIOLRES), probably because it required a higher level of resource mobilization out of the colony. Regarding the level of colonial investment in infrastructure, there are no statistically significant differences between sub-Saharan Africa and Asian and North African countries and French and British colonies (annex 1).

### **Plantations (PLANTAT)**

It is common to distinguish between smallholder farms and plantations. According to Osterhammel:

Two diametrically opposed forms of enterprise, the farm household and the plantation were and still are the most efficient bases of the agrarian export economy. The farm household cultivates its own and/or rented land with family members and perhaps a small number of paid workers. The plantation is a large-scale enterprise, often remotely situated. Its construction requires substantial capital investments in land, machines, and plants and is kept in operation by often

incompetent wage laborers under the direction of a foreign management. Plantations are often owned by foreign stock corporations, which also manages the processing and marketing of the products. (Osterhammel 1997:76)

We followed this definitions, but coded not only the typical large-scale, foreign owned rubber, sugar, coffee etc. plantations as such, but also the large cattle, tobacco, corn etc. farms in Africa (including the French vineyards in North Africa). These were usually owned by permanent resident families (of European descent), produced for export and for local/regional markets, and employed many workers, but in smaller proportion to the total expenditure (Osterhammel 1997:77-78). Special cases are concessions allowing private companies the exploitation of wild-growing resources as timber or wild rubber. In both the French and the Belgian Congo, these companies used forced labor to collect rubber, and the impact of this system was similar to the impact of large-scale plantations. However, the central buying of wild-growing resources collected by individual gatherers has a different impact and is thus not considered as a form of plantation.

Historical data sets provide data for most important cash crops including plantation products but do not allow us to quantify the significance of the plantation economy in the countries of our sample. In almost all colonies, setting up some kinds of plantations has been tried, often unsuccessfully. Therefore, we code the presence of some small, isolated plantations as zero. Beyond that, we again apply a very simple distinction between countries with plantation economies of moderate and those with significant size. The latter does not necessarily mean that they dominate the economy, and in many countries a significant plantation economy co-existed with the smallholder agriculture.

0 = no or a some small, isolated plantations / not applicable

1 = plantation economy of moderate size (regarding areas occupied and share of total export)

2 = plantation economy of significant size (regarding areas occupied and share of total export)

We identify the following regions/countries as having a significant legacy of a colonial plantation economy:

- in sub-Saharan Africa: South Africa, Swaziland, Zimbabwe, Equatorial Guinea, Liberia, Mozambique, Angola, Kenya, Cameroon, Zaire;
- in North Africa: Morocco, Algeria, Tunisia, Egypt;
- in South Asia: Sri Lanka;

- in Southeast Asia: Malaysia, Indonesia, Vietnam, Cambodia, Philippines;
- in Oceania: Fiji, Papua New Guinea, Solomon Islands, Vanuatu.

These are 24 cases out of 83 (29%); 19 cases (23%) had a plantation economy of moderate size. A plantation economy usually developed in areas that were colonially dominated for a long time, in which significant investment in infrastructure was done and in which mining took place (annex 2). Furthermore, in plantations economies investment concentration was high, there were work immigration and missionary activities and decolonization was usually a difficult and violent process. There are no statistically significant differences between the regions (sub-Saharan Africa vs. Asia/North Africa) and British/French colonies (annex 1).

### **Extraction of Natural Resources (GOLD, MINING)**

Gold and diamonds have a high value in proportion to their weight and are thus easily exported (or looted) without special infrastructure. The exploitation of oil, coal or metals as copper, iron, tin, zinc and others need more investment in infrastructure, especially when going beyond small-scale traditional techniques. We coded these natural resources thus in one variable (MINING) and gold, diamonds and silver in another (GOLD). For both variables we used trichotomies.

0= not applicable

1= moderate colonial extraction

2= extensive colonial extraction.

We considered an extraction of large quantities over a lengthy period of time as “extensive colonial extraction,” while an extraction of medium or low quantities over a lengthy period or a large quantities over a short period (for example a short “gold rush”) was considered as “moderate colonial extraction.” The *UN Statistical Yearbooks* and Mitchell (2007) proved to be valuable but not exhaustive data sources. Fifteen countries in our sample scored high on both variables, while for 25 countries there was no evidence of colonial extraction at all. These cases have been carefully checked, like Syria, where petroleum was discovered after independence and no colonial involvement can be found. Botswana is among the countries where the colonial extraction was moderate. Again, an important commodity (diamonds) was discovered only after independence. During the colonial period, there has been only a short gold boom around Tati and some small mining (Künzler 2004:179).

Unsurprisingly, GOLD and MINING are related to a high level of colonial investment into infrastructure (annex 2). Extraction took usually place in colonies where also a plantation economy existed. MINING (but not GOLD) signified usually a higher presence of foreigners from the

metropole. The extraction of bullion (but not MINING) correlates with a higher level of violence during colonial domination (VIOLRES) and more missionary activities (MISSION). There are no statistically significant differences between the regions (sub-Saharan Africa, Asia, North Africa) and British/French colonies (annex 1).

### **Indicators for Social Transformation by Colonialism**

Regarding the social dimension of the colonial transformation of societies, we defined four processes as significant and operationalizable, the immigration of people from the colonizing country (FORPRE) and other colonies or areas for labor market reasons (WORKIM), the extent of successful missionary activities (MISSION), and the colonial drawing up of borders (BORDERS). Due to lack of comparable and consistent data, we could not define indicators for the colonial investment in health and education systems (e.g. colonial government expenditure data, or medical doctors per population). Life expectancy and literacy cannot be taken as indicators for colonial impact because they are determined by several other factors as well (cf. Ziltener and Mueller 2007). Also for more general effects of colonial domination, such as alienation (Fanon 1963; Césaire 2000) we could not find appropriate indicators measuring different levels of impact.

### **Colonial Immigration (FORPRE)**

Colonies can be distinguished regarding the presence of people from the colonizing country. While all colonies had officials, clerks, administrators, doctors, traders, and some military and religious personnel, they differed significantly in regard to settlers. Undoubtedly, a larger presence of colonial population has a stronger social transformation effect than a smaller one. Heldring and Robinson (2012:6) argue that in two sorts of colonies there is “a clear case to be made for colonialism retarding development,” one of them being those with “white settlement.” Lange, Mahoney, and vom Hau (2006:1426) even use the size of the European population as statistical proxy for the “level of colonialism.”

As many others, we defined the situation at the end of the colonial period as crucial, except in those cases where a big proportion of settlers had left some years earlier (usually due to wars, such as in Libya, where WWII drove most Italian immigrants home before independence in 1951). *Colonial* immigration, not citizenship, is decisive. To measure the presence of Europeans (Americans, Japanese) in the years before independence, we consulted the *UN Statistical Yearbooks* (various years), the *Demographic Survey of the British Colonial Empire* (Kuczynski 1977), the *Dictionnaire de la colonisation française* (Liauzu 2007), *Encyclopedia of Western Colonialism since 1450* (Benjamin 2007), the *Handbuch der Dritten Welt* (eight vol., ed. by Nohlen and Nuscheler 1992ff), and Maddison (2007:137) and we added colony-specific sources. Following the construction of other variables, we transformed the data into a pentatomy:

- 0 = colonial population under 1%
- 1 = colonial population 1-2%
- 2 = colonial population 2-5%
- 3 = colonial population 5-10%
- 4 = colonial population over 10%.

Only three cases of our sample had a colonial population over 10%, namely Algeria, Libya and South Africa. Also, all four level 3-countries are in Africa: Djibouti, Tunisia, Morocco and Angola. At level 2, we find among 11 cases (13%) also non-African colonies: Fiji, Vanuatu and the Japanese colonies Korea and Taiwan. Six cases had between 1-2% colonial population (Senegal, Equatorial Guinea, Republic of Congo, Mozambique, Egypt and Papua New Guinea), which makes the overwhelming majority of the cases in our sample (58, 70%) level 1-countries, with a very low number of immigrants from the colonizing country in relation to the dominated population.

Colonies with a higher level of investment in infrastructure, plantations and mining activities (INVEST, PLANT, MINING) as well as more protectionist trade policy (TRADEPOL) had more immigration from the metropole than from other countries (annex 2). There are no statistically significant differences between sub-Saharan Africa and Asian/North African countries and French/British colonies (annex 1).

### **Colonial Mission (MISSION)**

Because missionaries and missionary organizations had to report regularly on their activities, the data situation for this indicator of social transformation is better than for others. However, there are the recurring problems of the areas reported not corresponding to actual state boundaries. Furthermore, the number of converts reported by different churches is sometimes exaggerated. In certain cases the numbers combined exceed the (estimated) total population of the area. Most data come from the *World Christian Handbook* (Grubb and Bingle 1949, 1952), the *World Christian Encyclopedia* (Barrett, Kurian, and Johnson 2001), the *Dictionnaire de la colonisation française* (Liauzu 2007), *Encyclopedia of Western Colonialism since 1450* (Benjamin 2007), and the *Handbuch der Dritten Welt* (eight vol., ed. by Nohlen and Nuscheler 1992ff) and were checked by colony-specific sources and complemented for countries/areas not mentioned. The data (number of Christians per population) have to be controlled for older religious groups which have no relation with colonial missionary activities, e.g. the Copts in Egypt and Ethiopia, for the number of settlers (e.g., almost all of the 100,000 Catholics in Libya before WWII were immigrants from Italy) and for Christian work immigrants (e.g. in some oil-producing countries).

In general, missionaries of any Christian church were protected by the colonial government. In some areas, a protestant colonizing power followed a Catholic one (e.g., in Sri Lanka and parts of the Southeast Asian archipelago). Therefore, we coded all converts to Christianity as “impact of colonialism.” Again, we defined a year before independence as reference, because in some cases decolonization led to emigration of Christians. Therefore, we coded “percentage of Christians (Catholics, Protestants), years before independence.” Following the construction of other variables, we transformed the data into a pentatomy:

- 0 = no colonial missionary activities / not applicable
- 1 = colonial missionary activities with little effect (Christian population under 2%)
- 2 = colonial missionary activities with significant effect (Christian population 2-7%)
- 3 = colonial missionary activities with big effect (Christian population 7-50%)
- 4 = majority converted (Christian population over 50%)

Obviously, Japanese colonies (Korea, Taiwan, Manchuria) have to be coded differently. There were Christians under Japanese rule, in Taiwan mainly proselytized by American Presbyterians, while in Korea a process of “self-proselytization” had taken place in parts of the élite since late 18<sup>th</sup> century. In the 19<sup>th</sup> century, before the onset of Japanese colonialism, there were around 20,000 Christian converts in Korea (Kim 2005:100-103; Seth 2006:220-221). Under Japanese rule, coercive measures to assimilate (culturally at least) parts of the population were taken, including the participation at state-Shinto rituals. However, these had little effect on everyday religious practices. Therefore, Korea and Taiwan were coded as level 1-countries.

Thirty-seven countries in our sample (45%) did not experience a significant religious transformation (either with or without missionary activities; level 1 or 0), among them all Islamic North Africa and West/South Asia as well as the semi-colonial countries. There are 12 level 2-countries (15%), among them India, several Southeast Asian countries (Indonesia, Malaysia, Burma/Myanmar, Vietnam, Cambodia), five African countries (Burkina Faso, Ivory Coast, Sierra Leone, Senegal, Liberia) as well as Lebanon. Among the 25 level 3-countries (30%) are only two non-African countries, namely Sri Lanka and Papua New Guinea. Among the nine countries with the strongest impact of missionary activities (conversion of more than 50% of the population) are the Philippines, three Pacific Islands (Vanuatu, Fiji and the Solomons) and five African countries (Lesotho, Equatorial Guinea, Zambia, Swaziland, South Africa).

Consequently, there is a statistically significant, positive relationship between MISSION and sub-Saharan Africa respectively a negative one for Asia and North Africa (annex 1). As documented in annex 2, the religious impact of colonialism was stronger in areas that were longer under colonial rule (COLYEARS), that were economically more transformed (positive

correlations with FDICON, INVEST, PLANT, GOLD) and that experienced colonial measures related to ethnic heterogeneity (ETHNFUNC, WORKIM, BORDERS).

### **Labor Immigration (WORKIM)**

Beyond some special cases (such as Malaya and Southern Africa), there are no systematic data for colonially induced labor immigration. We had to make rather crude estimations based on colony-specific sources:

0 = no indicators for colonially induced labor immigration / not applicable

1 = low level of colonially induced labor immigration

2 = high level of colonially induced labor immigration (high figures, big groups; also cases in which some functional groups completely consisted of foreign laborers).

“Colonially induced” means that work immigration has not only been tolerated but encouraged, independently of permanent settlement in the colony. Work immigration has been encouraged by means such as opening markets, recruitment/deployment from abroad, providing permits/licenses for agencies, etc. Therefore, the migration of individual Lebanese traders to Africa or Chinese traders to Southeast Asia were not “colonially induced,” but the immigration of Chinese and Indian laborers into the tin mining areas of British-Malaya were.

For 42 cases (51%) in our sample we did not find any evidence for colonially induced labor immigration. In 20 colonies, some work immigration took place; 15 of these cases are in Africa, two at the Persian Gulf, three in Southern Asia (Indonesia, India, Vietnam). Areas with a high influx of work immigrants (21 cases) typically had strong mining activities and/or numerous plantations, in some cases, colonial governments deemed the local population as not willing or capable of certain economic activities. Among these are Cambodia, Laos (French-Indochina); the British colonies of Malaysia, Sri Lanka and Myanmar; Fiji and Vanuatu in the Pacific; the oil producing Qatar, Bahrain and Kuwait; in Africa 11 cases linked to colonial administration or infrastructure construction, or to plantation or mining work (Ivory Coast, Cameroon, Congo Rep, Ghana, Guinea-Bissau, Equatorial Guinea, Kenya, Senegal, Uganda, South Africa, Zimbabwe).

As expected, colonially induced labor immigration took place in colonies that were longer under colonial rule (COLYEARS) and that had a significant plantation economy, a high degree of trade concentration and a strong impact of missionary activities (annex 2). It also relates to colonial instrumentalization of ethnolinguistic and/or religious cleavages (ETHNFUNC). There is no statistically significant correlation with the colonizing country (British vs. French) or the region (sub-Saharan Africa vs. Asia/North Africa) (annex 1).

### **Unification and Partition (BORDERS)**

The present situation of ethnic, linguistic and religious heterogeneity in African and Asian countries is a product of coercive division and/or unification, in which colonialism played a major part. The importance of ethnolinguistic fragmentation for the explanation of post-independence economic growth rates is established by the work of Easterly and Levine (1997) using the index of ethnolinguistic fractionalization popularized by Mauro (1995). Englebert, Tarango, and Carter (2002:1099) measure for an African sample the suffocation by borders, or in other words “their propensity for bringing together peoples that historically lived under different, if not inimical, systems.” This measure is strongly related to group grievances and the likelihood of civil war. The forced unification is, according to Oliver (1991), more formative than the division of Africa by colonial borders. It is however already included in measures of ethnolinguistic fractionalization usually used in multivariate studies.

The second aspect of artificial borders, the “partition of preexisting political groupings,” is called “dismemberment” by Englebert, Tarango, and Carter (2002:193). They measure it as the “unweighted average proportion of groups astride a border” and it “equals one half the sum of the percentages of national populations that these groups represent on both sides of border.”<sup>9</sup> For a sample of 48 African countries, dismemberment is positively associated with the likelihood and intensity of boundary disputes. Alesina, Easterly, and Matuszeski (2006:8) go a long way to measure the fractal dimension of borders based on the assumption that “borders which are coast lines or squiggly lines (perhaps meant to capture geographic features and/or ethnicities) are less likely to be artificial.” Among the “most artificial” states identified by these authors (Alesina, Easterly, and Matuszeski 2006:13) there are countries like Chad, Mali, Niger or Sudan among others. These countries lie in the Sahara-Sahel belt of Africa and indeed have some ruler-straight borders. This is misleading, however, as these borders cut across areas thinly populated by mostly nomadic groups. A border line could be as squiggly as possible but would still cut across these groups. Furthermore, a border can be squiggly and follow a geographic feature as a river, but nevertheless divide, as the same people live on both sides of the river.

The examples of the Bakongo on the lower Congo River or the Lao along the Mekong show clearly that borders following a river are not automatically “natural” and less problematic than other borders. It is therefore advisable to rely on empirical observations in measuring the partition effect by borders. This is also the approach behind the second measure used by Alesina, Easterly, and Matuszeski (2006:12), “the percent of the population of a country that belongs to a partitioned group.” This measure is not correlated to the fractionalization measure, but is significant for the explanation of a number of political and economic variables. As there are no consistent data for

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<sup>9</sup> <http://www.politics.pomona.edu/penglebert/Borders%20appendix.doc>

our sample available, we followed this approach and measured the partition by colonial borders as follows:

0= not applicable

1= low/moderate colonial partition effect

2= significant/strong colonial partition effect

For Africa, the *Atlas of Precolonial Societies* by Mueller et al. (1999) was a useful tool for the coding. If more than 50% of the population belongs to groups partitioned by colonial borders the impact is considered strong; otherwise it is moderate unless there was no dismemberment as in the case of an island like Madagascar. In areas with strong traditions of state- and empire-building, colonial borders could not be drawn as arbitrarily as in those without. Most political units could be only dominated entirely or not at all. Colonial partition is therefore a rather rare experience in these areas, except for the non-sedentary or semi-nomadic ethnic groups (e.g. the so-called “mountain tribes” and “sea nomads”) which successively had to accept a new type of borderline enforcement.

In 19 cases (23%) of our sample, we did not find evidence that colonial borders were especially “artificially” drawn in the interests of colonialists, cutting traditional areas of settlement or of close interaction. These cases are mainly semi-colonial countries and islands, or cases in which the actual borders cannot be traced back to colonialism. Thirty-seven cases (45%) were coded as 1, i.e. a moderate impact of colonialism regarding partition; mainly the states in the Northern part of Africa as well as, Iran, Pakistan, Thailand, and the Philippines. In the clear majority of cases (46; 55%), colonial borders did have a distortive impact. This concerns the Asian part of the former Ottoman Empire (Iraq, Lebanon, Syria, Jordan), where—as mentioned above—the creation of new political entities entailed the creation of new national economies and legal systems (Owen and Pamuk 1999:51). In many cases, territories were arbitrarily detached, sometimes “bartered” among colonial powers, integrated into existing colonies and reconfigured (e.g. between British-Malaya and Dutch Indonesia or in French-Indochina with Cambodia and Laos). Most cases of “artificial” borders, however, are found in sub-Saharan Africa (37 cases). French colonies experienced significantly more often distortive borders than British ones, as did countries in sub-Saharan Africa, compared to those in Asia and North Africa (annex 1). In areas with “artificial” borders, occupational specializations along ethnolinguistic and/or religious lines developed more often (ETHNFUNC) and missionary activities were more successful (annex 2).

### The Construction of the Indices

In this section, the indicators for the three dimensions were combined into separate indices for political transformation, economic transformation and social transformation. Many indicators have different scales of measurement. Therefore, we standardized all indicators between 0 and 1, giving them equal weighting in the process of constructing the indices. To do so, we used the following formula:

$$\delta_{x_k} = \frac{x_k - x_{\min}}{x_{\max} - x_{\min}} = \mathbf{Q} = \{\delta_x | 0 \leq \delta_x \leq 1\}$$

$x_k$  is the value of one country for any of our indicators.  $x_{\min}$  and  $x_{\max}$  then denote the minimum and maximum for all country observations for the same indicator, respectively.  $\delta$  represents the standardized values for each indicator. In the next step, we use the mean to combine the indicators according to table 1 to get our three indices:

$$\eta_k = \frac{1}{n} \sum_{i=1}^n \delta_{i_k}$$

To make interpretation in quantitative studies easier in terms of one unit change/one percent change, we standardized the indices between 0 and 100 using the first formula again:

$$\zeta_k = \left( \frac{\eta_k - \eta_{\min}}{\eta_{\max} - \eta_{\min}} \right) \cdot 100 = \mathbf{N} = \{\zeta_k | 0 \leq \zeta_k \leq 100\}$$

Table 2 shows the resulting values for these three indices for the colonies in our sample. The three indices correlate significantly:<sup>10</sup>

- the Political Transformation (PT)-Index with the ET-Index 0.50,
- the PT-Index with the Social Transformation (ST)-Index 0.44,
- the Economic Transformation (ET)-Index with the ST-Index 0.51.

This means that, in general, political domination came along with economic and social transformation. However, the correlations are not that strong, which indicates that the three dimensions should be measured separately. Colonies in sub-Saharan Africa were more likely to experience a higher level of transformation, politically, economically and socially (correlations with PT-Index 0.37, ET-Index 0.38, ST-Index 0.58), than the Asian and North African ones.<sup>11</sup> The smallest difference to be found is regarding political transformation. That means that, although political domination was not much less intensive in Asia and North Africa, these economies and

<sup>10</sup> All correlations mentioned in this section are significant at the 1%-level, 2-tailed (Pearson correlation coefficients).

<sup>11</sup> Graphs (available [here](#)) ranking the countries of Africa (red) and Asia/North Africa (blue) according to their levels of political, economic and social transformation show the different effects of colonialism.

societies were more difficult to transform through colonialism. There are no highly significant differences between British and French colonies regarding the level of colonial transformation. However, British colonies seem to have been transformed a little less than others, politically and economically.<sup>12</sup>

**Table 2. Indices of Colonial Transformation – Country Values**

<b>Code World Bank</b>	<b>Country</b>	<b>Political trans-formation</b>	<b>Economic trans-formation</b>	<b>Social trans-formation</b>	<b>Colonial trans-formation</b>
AFG	Afghanistan	32	0	25	20
AGO	Angola	88	79	63	82
ARE	Unit Arab Emirates	29	14	13	20
BDI	Burundi	85	54	44	65
BEN	Benin	65	57	44	58
BFA	Burkina Faso	38	57	38	48
BGD	Bangladesh	82	43	6	46
BHR	Bahrain	32	14	25	25
BTN	Bhutan	24	0	25	17
BWA	Botswana	24	50	44	47
CAF	Centr. African Rep.	94	57	56	74
CHN	China	53	29	6	26
CIV	Ivory Coast	76	75	63	74
CMR	Cameroon	56	82	69	72
COG	Congo Republic	74	61	75	77
DJI	Djibouti	71	46	50	59
DZA	Algeria	71	86	44	71
EGY	Egypt	74	50	25	53
ETH	Ethiopia	76	79	13	53
FJI	Fiji	26	89	63	64
GAB	Gabon	53	61	56	68
GHA	Ghana	76	71	69	77
GIN	Guinea	47	68	31	54
GMB	Gambia	65	36	56	56
GNB	Guinea-Bissau	100	46	81	81
GNQ	Equatorial Guinea	82	64	81	81
IDN	Indonesia	91	82	50	79
IND	India	94	79	25	70
IRN	Iran	15	21	19	17
IRQ	Iraq	59	29	31	42
JOR	Jordan	71	14	31	41
JPN	Japan	15	7	0	8
KEN	Kenya	91	82	69	86
KHM	Cambodia	79	54	63	70

<sup>12</sup> Correlation British/PT-Index -0.28; British/ET-Index -0.27; British/CT-Index -0.26 (significant at 5%-level; N= 75, without semi-colonial countries and shared colonies).

**Table 2. Indices of Colonial Transformation (Continued)**

KOR	Korea Republic	59	86	19	58
KWT	Kuwait	18	21	50	32
LAO	Laos	79	29	56	58
LBN	Lebanon	82	21	38	50
LBR	Liberia	79	79	63	79
LBY	Libya	59	32	25	41
LKA	Sri Lanka	82	54	44	64
LSO	Lesotho	35	25	50	47
MAR	Morocco	44	54	38	47
MDG	Malagasy Republic	65	75	56	62
MLI	Mali	74	50	44	59
MMR	Myanmar	94	64	38	69
MNG	Mongolia	0	0	0	0
MOZ	Mozambique	65	64	63	68
MRT	Mauritania	68	43	19	46
MWI	Malawi	53	39	56	53
MYS	Malaysia	79	50	63	68
NER	Niger	88	39	44	65
NGA	Nigeria	47	64	56	60
NPL	Nepal	29	4	0	14
OMN	Oman	38	11	44	28
PAK	Pakistan	88	43	19	53
PHL	Philippines	53	100	38	68
PNG	Papua New Guinea	32	71	38	51
PRK	Korea Dem. Rep.	59	86	19	58
QAT	Qatar	18	14	25	20
RWA	Rwanda	79	39	44	58
SAU	Saudi Arabia	9	0	0	3
SDN	Sudan	88	54	31	61
SEN	Senegal	71	64	69	70
SLB	Solomon Islands	24	57	25	38
SLE	Sierra Leone	62	75	38	62
SOM	Somalia	85	32	38	57
SWZ	Swaziland	24	64	63	57
SYR	Syria	76	25	31	47
TCO	Chad	74	39	69	57
TGO	Togo	74	57	44	59
THA	Thailand	15	14	13	12
TUN	Tunisia	32	57	38	46
TUR	Turkey	18	7	19	15
TWN	Taiwan	65	57	44	64
TZA	Tanzania	71	68	44	65
UGA	Uganda	74	54	56	65
VNM	Vietnam	88	71	25	65

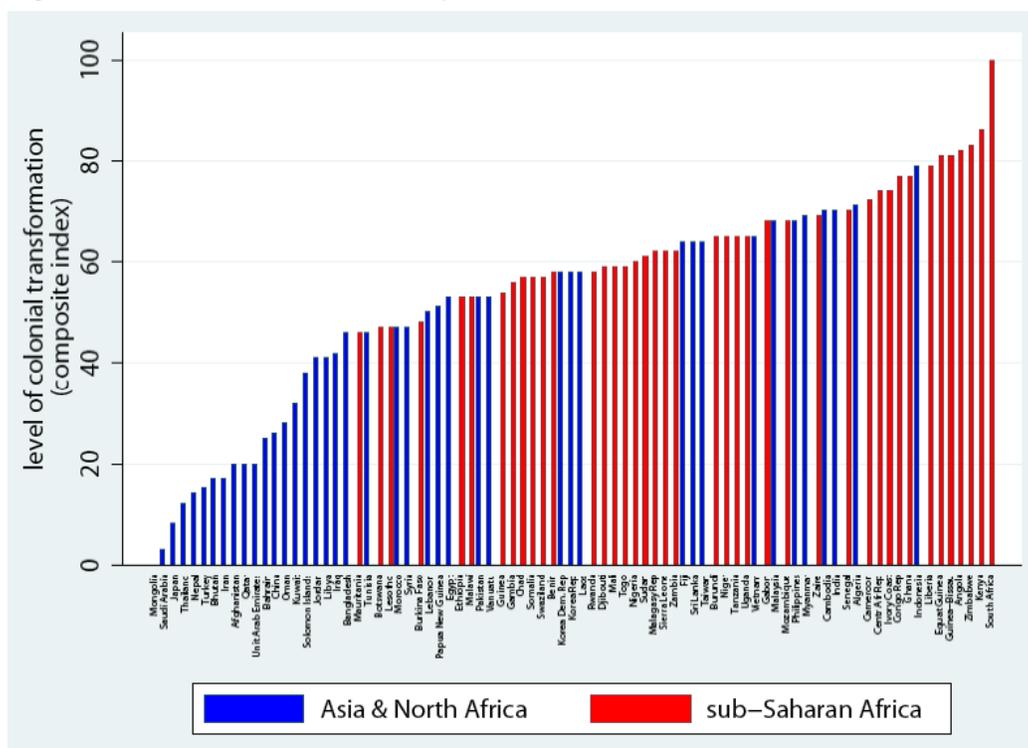
**Table 2. Indices of Colonial Transformation (Continued)**

VUT	Vanuatu	38	46	63	53
ZAF	South Africa	94	86	100	100
ZAR	Zaire (DR Congo)	68	82	44	69
ZMB	Zambia	65	46	63	62
ZWE	Zimbabwe	65	86	81	83

Source: Ziltener and Künzler Dataset (2008).

To measure the total impact of colonialism, the three indices were combined to our final result: the index for the colonial transformation. Again, table 2 shows the value for this index for all colonies in our sample. As the ranking of the countries of Africa (red) and Asia and North Africa (blue) according to their total level of colonial transformation in graph 1 shows, they have been transformed to very different degrees.

**Figure 1. Total level of colonially-induced transformation in Africa and Asia**



### Discussion and Conclusion

We started by admitting that the problem of colonization as “intervening variable” remains unsolved in recent research, including our own. The huge variety and diversity of colonial experiences that we found mentioned in the research literature and that we can confirm on the basis of our evaluation (Ziltener and Künzler 2013) is a challenge to all attempts at coding the factual impact of colonialism and therefore its “legacies.”

In our operationalization, we defined indicators for the main dimensions of the colonial impact, in the political sphere as well as in economy and society. Confronted with numerous data problems—including the recurring major challenge that the areas reported do not correspond to actual state boundaries—we decided to make sometimes crude estimates rather than exclude important aspects of colonialism. Apart from (more or less exploitative) forms of colonial financial organization, we were able to find or create data for all important aspects of colonialism for which variance has been reported in the previous research. As result, we present, to our knowledge for the first time, a multidimensional measure of the impact of colonialism. This opens up new avenues for comparative research, qualitative as well as quantitative.

Some of our exploratory findings on the interrelation of the dimensions confirm the results of research done by others, e.g. that in British colonies political domination was in general less direct, less violent and the path to independence more orderly. Plantation colonies experienced more investment in infrastructure and more violence during decolonization. The correlations between indicators for economic distortion (trade policy, trade and FDI concentration) show that the economic re-direction of some colonies towards a more exclusive exchange with the metropole was an interdependent process. In general, a more intense political domination came along with a higher level of economic transformation. If an area was transformed economically, however, a social transformation was likely to take place too, but these processes should not be confounded. Some findings relate to the research from a social-evolutionary perspective. In areas that were politically united for the first time under colonialism, economic distortion and social transformation were more profound. This might explain why colonialism in sub-Saharan Africa has left a heavier burden than in most Asian countries. This, however, has to be tested with multivariate methods elsewhere.

Our main result is that there is not one colonial experience. There is an enormous variance regarding the levels of distortion that countries and regions in Africa and Asia experienced. Violence and political domination did not lead necessarily to economic or social transformation. Many Asian societies displayed a strong resilience against the colonial inroads, which might well have to do with the fact that many of these have been part of the Eurasian world system for centuries before European hegemony. Only in a few countries of our sample, namely parts of sub-

Saharan Africa and the Pacific region, European colonialism meant first-time integration into the world system.

In many regards, European colonialism between 1860 and 1960 left much deeper marks than traditional, usually tributary forms of domination. Where a long-term *mise en valeur* was to be realized, infrastructure investment was huge, and labor migration from near and far significant. Some of the countries in our sample truly are creations of colonialism. There is no question that these “legacies” shape our world.

Overall, our data echoes the heightened interests in the study of colonialism among scholars from various disciplines over the last two decades. More specifically, we consider our data to advance existing research in three areas. First, the data cater to the dominant interest of scholars to investigate the effects of colonialism on economic development and trade relations (cf. Acemoglu, Johnson, and Robinson 2001; Grier 1999; Head, Mayer, and Ries 2010; Lange, Mahoney, and vom Hau 2006; Sousa and Lochard 2012) but also on democratization (cf. Lange 2004; Olsson 2009), conflict and state building (cf. Blanton, Mason, and Athow 2001; Lange and Dawson 2009, Wucherpfennig, Hunziker, and Cederman 2016), and policy outcomes (cf. Schmitt 2015). Second, recent research has also started to investigate the determinants of colonialism such as the timing or the mode of domination (cf. Ertan, Fiszbein, and Putterman 2016; Gerring et. al. 2011). More generally, our data provide the first opportunity to study how geographical conditions and pre-colonial societies affected different impacts of colonialism in a larger sample of countries. Third, we argue that the data enable scholars to create meaningful typologies of colonialism for their research questions, thereby overcoming the simple French vs. British dichotomy that has guided most empirical research about colonialism since Crowder’s article about indirect rule in 1964.

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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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## Annexes

**Annex 1. Interrelations between colonizer, regions and impact**

	UK	F	Sub-Saharan Africa	Asia/North Africa
colyears <sup>13</sup>				
violcol			+	—
violres	—			
violind				
violtot	—			
domform	—			
ethnfunc			+	—
indtrans	—			
gold				
mining				
tradepol	—	+		
tradecon	—	+		
fdicon			+	—
invest				
plantat				
forpres				
workim				
mission			+	—
borders		+	+	—

+ = positive correlation, - = negative correlation, no indication = no correlation.

British vs. French colonies: N= 75 (without semi-colonial countries and shared colonies).

Sub-Saharan African vs. Asian/North African colonies: N=83.

All indicated correlations significant at the 0.01 level, 2-tailed. Source: Ziltener, Künzler and Walter Dataset (2008).

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13 The variable COLYEARS is introduced in Ziltener and Künzler (2013) and measures the length of colonial domination. We find no significant correlation between the colonizing country (British vs. French) and COLYEARS for the countries of our sample. Also, there is no significant difference between the length of colonialism in sub-Saharan African and Asian/North African countries. But the length of colonial domination is related to some economic and social indicators of colonial transformation (annex 2): A longer colonial period means more colonial violence, more investment in infrastructure and more plantations, more work immigration and more religious conversions.

**Annex 2. Interrelations Between Types of Colonial Impacts**

	<b>c o l y e a r s</b>	<b>v i o l c o l</b>	<b>v i o l r e s</b>	<b>V i o l i n</b>	<b>vi o l t o t</b>	<b>d o m f o r m</b>	<b>et h n f u n c</b>	<b>in d t r a n s</b>	<b>g o l d</b>	<b>mi n i n g</b>	<b>tr a d e p o l</b>	<b>tr a d e c o n</b>	<b>f d i c o n</b>	<b>in v e s t</b>	<b>pl a n t a t</b>	<b>fo r p r e s</b>	<b>w o r k i m</b>	<b>m i s s i o n</b>	<b>bor d e r s</b>
<b>colyears</b>	—				X									X	X		X	X	
<b>violcol</b>		—			X	X													
<b>violres</b>			—		X	X		X	X		X	X		X					
<b>violind</b>				—	X			X					X		X				
<b>violtot</b>	X	X	X	X	—	X		X	X		X			X					
<b>domform</b>		X	X		X	—	X	X			X	X	X	X					
<b>ethnfunc</b>						X	—						X				X	X	X
<b>indtrans</b>			X	X	X	X		—			X	X							
<b>gold</b>			X		X				—	X			X	X	X			X	
<b>mining</b>									X	—				X	X	X			
<b>tradepol</b>			X		X	X		X			—	X				X			
<b>tradecon</b>			X			X		X			X	—	X	X					
<b>fdicon</b>						X	X		X			X	—	X	X		X	X	
<b>invest</b>	X		X		X	X			X	X		X	X	—	X	X		X	
<b>plantat</b>	X			X					X	X			X	X	—		X	X	
<b>forpres</b>										X	X			X	X	—			
<b>workim</b>	X						X						X		X		—	X	
<b>mission</b>	X						X		X				X	X	X		X	—	X
<b>borders</b>							X											X	—

X = Positive correlation between the two variables, significant at the 0.01 level, 2-tailed. Source: Ziltener and Künzler Dataset (2008).