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Slavery, Statehood and Economic Development in Sub-Saharan Africa*

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Abstract: This paper addresses the long-term impact of Sub-Saharan Africa's indigenous systems of slavery on its political and economic development, based on an analytical survey of the literature and data collected from anthropological records. We develop a theory to account for this based on the framework proposed by North et al. (2009), where indigenous slavery may have impeded the transition from a 'limited access state' centred around personal relations to an 'open access state' based on impersonal rule of law and widely shared access to public and private organisations. In a quantitative analysis we find that indigenous slavery is robustly and negatively associated with the quality of governance and with current income levels.

Keywords: Africa; Indigenous Slavery; Pre-Colonial Societies; Long-term Political Development; Economic Growth;
JEL codes: N17, P48

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I. Introduction

This paper contributes to an expanding literature which has recently sought to identify the impact of (pre-)colonial-era conditions on long-term development in ex-colonies (Grier 1999; Englebert 2000b; Acemoglu et al. 2001; Bertocchi and Canova 2002; Lange 2004; Fielding and Torres 2008). Specifically for Africa, Englebert (2002) attempted to link pre-colonial institutions to the quality of post-colonial states and to long-run economic development. Gennaioli and Rainer (2007) investigated how the structure of pre-colonial African societies affected long-term public good provision. Bolt and Bezemer (2009) studied how colonial-era human capital formation affects long-term economic growth in Sub-Saharan Africa. More recently, Huillery (2009) analysed to what extent colonial public investments continues to influence regional inequalities in French West Africa. Michalopoulos and Papaioannou (2011) examined the consequences of the partitioning of Africa by colonial powers in the late 19th century and the importance of pre-colonial institutions in shaping comparative regional development in Africa (2012).

A prominent argument in the African context is that its long-term economic development was hampered by the slave trades, or 'export slavery' - introduced by Arabs and Europeans, and greatly extended by the latter (Eltis and Engerman 2000; Manning 1983, 1990; Bairoch 1993; Nunn 2007, 2008; Whatley and Gillezeau 2011; Nunn and Wantchekon 2011). Others have assessed the impact specifically of New

World slavery (Engerman and Sokoloff 2002; Sokoloff and Engerman 2000; Mitchener et al. 2003; Nunn 2008).

The present paper extends the investigation to sub-Saharan African (hereafter African) *indigenous* slavery, by which we denote customs of slavery within African societies before, during and after colonization. We distinguish indigenous slavery from export slavery, although indigenous and export slavery also existed in symbiosis (Lovejoy 1983, 2000; Thornton 1998; Vansina 1989; Hilton 1985; Nunn 2008). We collect data from anthropological records on indigenous slavery and analyse its impact on long-run statehood and income development. That slavery and bonded labour systems can have persistent impacts over centuries has been shown in various contexts - see Nunn (2008), Klein (1998), Miers and Klein (1999), Ayittey (2006) and Perbi (2004) for Africa and Dell (2010) on forced labour in Peru and Bolivia. We find that present-day African countries with indigenous societies which historically had institutions of indigenous slavery, achieved lower levels of long-term economic growth. We explore plausible channels of influence, applying a conceptual framework based on North et al. (2009). We focus on the impact of indigenous slavery on the transition from restrictive institutions ('limited access state') where both the access to valuable resources (land, labour and capital), and the access and control of valuable activities (education, politics) is in the hand of a small elite, to an 'open access order' state where the access to resources, activities and political and economic power is open to society at large and subject to rules.

In the next sections we define and explore African indigenous slavery based on a review of the literature. In section V we assess its consequences on long-term income development. Previewing the results, we find a clearly negative impact of indigenous slavery on present-day income levels, also if we control for geographical

conditions, nationality of colonizers, export slavery and for the possible endogeneity of indigenous slavery to income development. We also address the 'compression of history' critique (see Austin 2008; Hopkins 2009) by exploring the effect indigenous slavery had on long term economic growth. Results suggest that indigenous slavery significantly depressed per capita income growth measured between 1950 and 2000.

In section VI we develop a theory about the possible channels through which indigenous slavery could have influenced long-term income development. We propose that it may have created social structures that impeded the development of 'open access states' where the access to the political system is open (democracy) and where social relations are impersonal, including rule of law and secure property rights. Instead, the institution of slavery created restrictive institutions where wealth and power are in the hands of a relative small elite who have an incentive to restrict economic and political opportunities for the masses (Engerman and Sokoloff 2002). This hypothesis is supported by empirical evidence, but also merits further research beyond the scope of this paper. Section VIII concludes with a summary, a stock taking of the results, a critical discussion of our findings in the context of the literature, and some suggestions for future research.

II. The Nature of African Indigenous Slavery

Slavery in Africa's history can be categorized into indigenous slavery and export slavery. The distinguishing feature adopted in this paper is whether or not slaves were traded beyond the continent[4]. Thus, African indigenous slavery includes both slavery

[4] A note on definitions is in order. Nunn (2008:139,159) uses the term 'Africa's slave trades' or 'external slave trades' to denote exclusively export slavery, using shipping records to gauge the extent of 'slave trade'. Nunn juxtaposes the 'slave trades' (both Islamic and Atlantic) to 'domestic slavery' (2008:159). It should be noted, however, that slave trade was rife also within the African continent (i.e. 'domestically'), and many traded slaves were never shipped and never left the continent. Nunn's (2008) study is thus about 'export slavery' as defined here. Perbi (2001) writes of 'internal' and 'external'

and the slave trade in Africa, which often occurred over long distances across the continent . Indigenous slaves in Africa were obtained by means of warfare, as a result of criminal penalties, by pawning (where debtors unable to repay their dues went into slavery, or sent dependents into slavery), by raiding and kidnapping, and as tribute paid by conquered nations (Klein 1998; 1978; Austin 2005; Goody 1980; Ayittey, 2006). The fundamental function of slavery was to 'deny outsiders the rights and privileges of a particular society so that they could be exploited for economic, political and or social purposes. Usually, outsiders were perceived as ethnically different; absence of kinship was a particularly common distinction of slaves' (Lovejoy, 1983:2). Identity came from the membership of a community, usually based on kinship. Captured slaves had generally little value when kept in their own area since they were more likely to escape as they knew the environment and could rely on their kin (Klein 1998: 2). A slave's value increased as he or she was moved, detached from kin and without social identity; this itself was one reason for long-distance trade.

Indigenous slavery was an ingrained feature of most African societies in recorded history (Thornton 1998; Klein 1998; Austin 2007, Goody 1980, Cooper 1979) . For example Perbi (2004), describing indigenous slavery in Ghana, takes the view that indigenous slavery predated the Atlantic slave trade, coexisted with it from the sixteenth to the nineteenth centuries and survived it through the early twentieth century (also Miescher, 2004:157).

Slavery has been studied in two broad frameworks: functionalism and (economic) rationalism. In the first school, Miers and Kopytoff (1977) argued that slavery in Africa was a response to chronic excess demand for labour in African

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slavery, where 'external' slavery involves slave trade within and beyond Africa. Our 'indigenous slavery' is the trans-African part of Perbi's (2001) 'external' slavery. Finally, we distinguish our usage from some authors who have denoted by 'indigenous slavery' African involvement in the export slave trades.

societies. In this view, people are a resource but not just an economic one: they were adaptable to a multitude of uses, also social and political. In the functionalist perspective therefore, indigenous slavery in Africa cannot be understood simply as commodification of people, or as Tuden and Plotnicov (1970:12) define it, as 'slavery as the legal institutionalization of persons as property' which is a more appropriate description of slavery in ancient Roman or the New World . Instead, Miers and Kopytoff (1977) view indigenous slavery in Africa as part of a continuum of social relationships within the kinship system, of which slavery was the most marginal (see also Goody 1980: 35 and Watson (1980)). Terms like (private) 'property' and (individual) 'freedom', they stress, are unhelpful to understanding traditional African society. Instead, slavery is defined more in terms of 'those without kin', and 'natal alienation'. With this framework comes a relative benign view on slaves' social status and living conditions.

Hopkins (1973), building on Nieboer (1900) and Domar (1970), argues that indigenous slavery was a more overt economic response to scarcity of labour especially in West Africa, where under conditions of simple agricultural technologies, 'the costs of acquiring and maintaining slaves were less than the costs of hiring labour' (Hopkins, 1973:25). This assumes the treatment of slaves as a commodity, since the slave was chattel. It also takes a dimmer view of slaves' living conditions. Klein (1978:601) suggests (based on fieldwork in Senegal) that this approach might be most appropriate in high-density slavery systems. Austin (2005: 160; 170) in the same vein suggests that nineteenth century Asante empire, an intensive user of slave labour, relied so heavily on slavery because substitution by wage labour was not economically viable.

Thornton (1998:74) in addition argues that slavery was prevalent in Africa because 'slaves were the only form of private, revenue producing property recognized in African law', and thus a means to obtain and maintain private wealth. Klein (1998: 15) links kinlessness and natal alienation (in the functionalist approach) and slaves as chattel or property (in economic rationalism): when slaves were thought of as chattel, alienation of slaves was easier. At the same time, the alienation of slaves strengthened the chattel relationship and thus the ability to exploit slaves.

III. Slavery, Trade and the Polity

Many have speculated that indigenous slavery was a precursor for (and facilitator of) export slavery, and that the existence of indigenous slave trade 'opened up ... societies to the temptation of the Atlantic trade' (Klein, 1978:605)[5]. Rodney (1966) and Lovejoy (1983) advocate this 'transformation thesis' (coined by Lovejoy), which argues that the development of the Atlantic slave trade extended the indigenous slavery and resulted in more people being enslaved and kept under increasingly deteriorating circumstances. In contrast, others have argued that in fact indigenous slavery may not have predated New World export slavery but that the Atlantic slave trade may have stimulated slavery within Africa. Nunn (2008:159) notes that "[w]hether the parts of Africa that were untouched by the Islamic trades had chattel slavery has been the subject of an old debate" (see also Rodney 1966; Fage 1962; Vansina 1989; Hilton 1985). But Austin (2008: 1006) argued that within the current

[5] This is not to suggest that export slavery started with the Atlantic slave trades. African slaves were acquired by the ancients Egyptians, the Greeks and the Romans and by mediaeval Europe, Arabia, the Ottoman Empire, and Asia. From the 1435 capture by the Ottomans of Constantinople which halted the flow of white slaves from the Black Sea regions and Balkans, mediaeval Europe turned completely to Africa for its slave labor (Perbi, 2001:3; McKay et al, 1992). In modern times, export slavery was towards the Oriental, Islamic and, especially, Atlantic worlds during the 15th to 19th centuries (Perbi, 2001:4).

specialist African literature, there really is no disagreement about whether 'domestic' slavery, pre-dated the Atlantic slave trade. The current debate is more about whether slavery was '[…] widespread and slave trading routine [..] or only common within a few societies before the Atlantic slave trade (see Thornton 1998 for the first argument, and Lovejoy 2000 for the latter; see also Cooper 1979, Goody 1980, Klein 1998). It is clear however that there was an intimate connection between slavery for export and for indigenous use. Ewald (1992:466) notes that 'the same networks taking millions of slaves out of Africa also transported others within the continent'.

Indeed, the indigenous slave trade from its earliest observations was part of pan-African trade in goods including salt, copper and dates from the Sahara and millet, sorghum, wheat, livestock, gum, shea butter, ivory and gold from West Africa. There were two major slave routes, one between North and West Africa, and one linking East, Central and Southern Africa. Important West African slave markets are recorded from as early as the year 1000. Ghana obtained slaves - mainly in returns for its abundant gold resources – from the 1st to the 16th century. Bono Manso and Begho in Ghana were important slave markets from AD 1000 to around 1750 (Perbi 2001:4); others were Ouagadougou in Burkina Faso and Bonduku and Buna in Cote d'Ivoire.

Slavery was not only an integrated part of trade relations but also of political relations between states. Almost all the states conquered by the famous Asante empire (in what is now Ghana) from 1700 to the end of the 19th century paid annual tributes in goods and slaves, between several hundred and a thousand (Perbi 2001:5). Also domestically, slavery lay at the core of Ghana's pre-colonial states, whose economy was almost totally dependent on slave labour (Perbi 2004:110; Austin 2005: 160). Likewise the Sudanese empires heavily depended on slave armies and slave administrators (Thornton 1998: 91).

IV. The Social Position of Slaves: High and Low Density Systems

A broad distinction can be made between high density slave systems, usually found in politically centralised and market oriented societies, and the low density systems of decentralised societies and traditional farming communities. Numbers of slaves were much higher in high density slave systems, where slaves sometimes even outnumbered the freeborn. They lived in separate villages and made up a large part of the population, often a majority. These slaves mostly did not live with the family of their owner but in separate compounds, in conditions were their membership in the owner's kinship system was a mere formality. Their role was to perform hard labour and they were closely supervised, with little face to face contact between slaves and their master. Emancipation from slavery was extremely rare and the status of children was close to that of the parents so that the high density system of slavery reproduced itself (Klein 1998). The archives of Senegal contain the account of the Governor-General in Bamako (now capital of Mali) who during a 1904 survey of slavery in Africa was the only administrator who actually went out and talked to slaves. He encountered consistent complaints about malnourishment among the Soninke slaves (recounted in Klein 1978:607). There was 'economic rationalization' resulting in harsh slave systems among the Soninke, Juula, Hausa and Swahili slaves comparable, Klein (1978) suggests, to New World slavery conditions.

In contrast in low density systems, slaves were integrated, in various ways, into the extended family of their owners by adoption or marriage[6]. They lived in the

[6] For instance, slaves in Tuareg society were often regarded as fictive children and used kinship terms to address members of the owner's family (Miers and Kopytoff, 1977: 391-403). Perbi (2001:8-9) details the different practices to assimilate slaves into owner families among the Makara and Bambara in Niger, the Wolof and Serer in Senegal and the Gambia, the Bajongo, Baluba and Lunda in Central Africa and the Sena of Mozambique. Only a few peoples are known to have not integrated slaves habitually in existing kinship structures (Perbi mentions the Batawana of Botswana; the Ila in Zambia; the Yao in East Africa; the Duala of Cameroon; and the Shebro of Sierra Leone).

same house as their master, participated in the same culture, engaged in regular face to face relationships with their master and family and masters often worked alongside slaves. Slaves were used for farming, domestic chores and in harems; for social prestige; for procreation; and occasionally for ritual sacrifice. They also worked in trade and industry and in the administration and military. The reason for recruiting slaves for these tasks was straightforward: slaves were kinless and powerless, so their wellbeing was closely tied to the family they served (Klein 1998: 7).

Assimilation of new slaves into the family was possible, though it could take up to two to three generations (Meillassoux 1991: 122; Klein 1998: 4). Born (as opposed to captured) slaves, being further integrated into their masters' kinship systems, could often marry, owned land or other property (like cattle or tools) and received legal protection. They generally worked on the master's lands for a given part of the day and could work on their own plots the rest of the day, typically for subsistence needs (Meillassoux 1991). Slave owners had no absolute power over their slaves and were not allowed to kill them at their discretion - only the king or chief could impose a death penalty on both free and enslaved persons. In cases of maltreatment, owners could be punished in accordance with local legal custom (e.g. fined, as in the Asante state). There were also avenues for upward social and political mobility for slaves (Miers and Koptykoff 1977:134-170). For instance, in the Hausa-Fulani Emirates, slaves could be appointed village heads. Slaves among the Mende of Sierra Leone could obtain the political positions of chiefs. Asante slaves were granted occupation of stools, the traditional symbols of authority (Perbi 2001:11).

But there always remained a social relationship that was based on subordination with typically strict rules about behaviour, clothing and diet (Klein

1998: 7). Especially captured (as opposed to born) slaves were treated harshly and had few rights, especially when the risk of escape was large. Slaves had no familial rights, did not control their children and could not make bequest decisions: if a slave died, his or her property fell to the master (Klein 1978:602). All slaves could be sold (Klein 1998: 6). They could be used as sacrifice or to pay off debts; were expected to work harder and dress simply; could not freely mix with free men and women; needed the owner's permission to embark on any enterprise; and received only the simplest burials (Perbi 2001:1). People always entered into slavery by an act of violence which stripped them of their social identity in their own kinship system, to be only marginally integrated into an alien kinship system. Precisely the danger that a slave might escape in the area where (s)he had social linkages was an important reason why slaves were transported and traded across societies (Klein 1978: 601; 1998: 2; Manning 1983: 2). Slaves were exploited one way or another, though more intensively so in the 'high-density' slave systems.

Klein (1978: 602) recounts that after slavery was abolished in French Africa, 'hundreds of thousands of slaves left their masters and went home.' Those who stayed often did so because they had no other place to go or because the costs of building up a new life were too large; or they formed separate communities locally. These ex-slaves often remained in relations of dependence and exploitation, as in the western Sudan were released slaves farming for themselves generally paid their former masters the amount of grain necessary to feed a person for one year. It is also noteworthy that most observations on indigenous slavery were made in the period of colonial rule, which, as Klein (1978:601) stresses, 'deprived ruling [indigenous] elites of their capacity to coerce'. Thus historically, observed indigenous slavery may have been the milder form.

In sum, in this and the preceding two sections we discussed how slavery was part of Africa's indigenous economic systems and cultures; how it was interwoven with trade patterns, political relations between states and political structures within states; and how slavery marginalized large sections of society. Each of these features will be relevant in understanding indigenous slavery's long-term impact on statehood and on economic development.

V. Observing Indigenous Slavery: Our Data

We do this based on data taken from an 'Ethnographic Atlas' compiled by Murdock (1967)[7], in turn based on data previously published in the journal *Ethnology*. For sub-Saharan Africa, Murdock included 485 societies, with a wealth of ethnographic data. One of these is whether a society historically had the institution of (indigenous) slavery, combined with an indication whether slavery was hereditary or not. The actual time periods to which this data refer is dependent on the earliest period for which Murdock could find reliable data, which is from 1850 onward but not later than 1950, and varying over societies. Following Bolt (2012), we combine this data with population data from the *Atlas Narodov Mira* (1964) to assign indigenous societies to present-day countries. We so calculate the share of the population within modern-day national borders that historically had the institution of indigenous slavery[8]. Thus, it is not a measure for actual slaves scaled by population (a quantity which, according to Klein, we will never know with precision (Klein 1998: 252)[9], but for population

[7] We use the revised version of the Ethnographic Atlas: Gray, J. P. (1999). "A Corrected Ethnographic Atlas", *World Cultures* 10(1):24-85, accessed at: http://eclectic.ss.uci.edu/~drwhite/worldcul/SCCSarticles.htm

[8] For instance, let us assume that only the Mende and Temne peoples - who lived in lands now part of Sierra Leone - historically had the institution of indigenous slavery, and no other ethnicities in present-day Sierra Leone did. If the Mende make up 17 % of the population of present-day Sierra Leone and the Temne 8 %, then our measure for indigenous slavery in Sierra Leone is 25 %.

[9] Klein (1998: 254-55) presents an rough estimate of slaves in West African Territories: in the Haut-Sénégal-Niger region, the percentage of slaves in the total population was around 21%, in the Guinea the percentage was as high as 51% and in Senegal, on average 31% of the population was slave.

fractions historically practicing the institution of indigenous slavery. An important distinction with measures of export slavery (such as Nunn's) is that our measure is about the country that *practised* indigenous slavery, not countries that *lost* their people to countries that practised export slavery (Table 1).

Table 1: Population Fraction in Today's Borders That Historically Had Indigenous Slavery

Lesotho	0	Malawi	0.81
Swaziland	0	Burkina Faso	0.84
South Africa	0.02	Central African Republic	0.86
Equatorial Guinea	0.08	Gambia, The	0.88
Kenya	0.1	Congo, Dem. Rep.	0.89
Botswana	0.13	Ethiopia	0.9
Gabon	0.15	Uganda	0.9
Mozambique	0.22	Guinea	0.92
Sudan	0.27	Togo	0.92
Guinea-Bissau	0.34	Senegal	0.93
Chad	0.36	Nigeria	0.94
Cape Verde	0.38	Sierra Leone	0.94
Cameroon	0.4	Zambia	0.94
Liberia	0.45	Rwanda	0.98
Angola	0.53	Somalia	0.98
Congo, Rep.	0.66	Burundi	0.99
Tanzania	0.67	Ghana	0.99
Benin	0.7	Madagascar	0.99
Cote d'Ivoire	0.7	Mali	0.99
Namibia	0.72	Mauritania	0.99
Djibouti	0.76	Niger	0.99
Zimbabwe	0.77		

Source: Authors' compilation based on Atlas Narodov Mira (1964) and the Ethnographic Atlas (1967/1999)

Table 1 ranks the sample countries by increasing values of an 'indigenous slavery' variable. It shows that indigenous slavery was prevalent among the peoples of most of today's African countries. On average, it was an indigenous institution in 65 % of the population; and in 21 of the 43 countries in our sample, it occurred among over 80 % of the population. It is also noteworthy that the majority if these very high values are

West or West-Central African countries north of the equator. This is where both the institution of indigenous slavery and the slave markets for the Atlantic slave trade were concentrated.

In order to validate the information on slavery in the *Ethnographic Atlas*, we compared the coding for 83 random groups with information on slavery found in historical literature. In a majority of the cases, there is agreement between our measure and the literature on whether some form of slavery existed in a particular society. For example, a number of societies that feature prominent in the literature as intensive users of slaves are indeed classified by the *Ethnographic Atlas* (and thus in our data) as societies with (hereditary) slavery [10]. There is less agreement on the specific form of slavery (hereditary/high-status versus nonhereditary/low status). For example Austin (2005: 106) describes the Asante as intense and widespread users of slaves where '[..] over successive generations their descendants were treated increasingly as junior kin' (see also Perbi 2004). The *Ethnographic Atlas* classifies slavery in Asante in contrast as 'Incipient or nonhereditary slavery' (2). The Babwa of Congo are described to have a significant concentration of slaves, where slavery was not hereditary but where the children of slaves retained an inferior social status (Northrup 1988). The *Ethnographic Atlas* codes slavery among the Babwa as 'Slavery reported, but not identified as hereditary or nonhereditary' (3). Therefore our data are binary: they record the incidence of slavery, but not its nature, reflecting both the agreement in the literature on the existence of slavery and the disagreement on how to classify slavery systems.

[10] The Songhai of Western Africa (Klein 1998), the Tuareg of the Sahara (Klein 1998), The Fulbe of Western Africa (Fage, 1980; Klein 1998), Fon (Dahomey) (Walker Kilkenny 1981) and Ganda of Uganda (Twaddle 1988). The servile population among the Songhai has been estimated at around 66% to 75% of the total population, where the ratio of the servile population to free persons was up to 8 or 9 to 1 for the Tuareg in the southern parts of the Sahel (Klein 1998: 252). But also the Lozi of Zambia, the Merina of Madagascar feature as prominent slave users (Robertson and Klein 1997; Clarence-Smith, (1979). The Ibo are often described as the largest stateless slave holding society in pre-colonial Africa of Nigeria. According to Basden (1966: 243) slavery was widespread among the Ibo until the advent of the British, both for trading purposes and for use within their own society (Horton, 1954: 312).

Is it possible to empirically distinguish between indigenous slavery and export slavery, or do these measures really capture the same thing? We compare our indigenous slavery variable introduced in Table 1 to export slavery, which is measured by the total number of slaves taken from each country during various slave trades between 1400 and 1900, scaled by populations. This is a variable constructed by Nunn (2008), to which we refer for further detail on the underlying data. In Figure 1 we plot country-level observations of the prevalence of indigenous slavery against the logarithm of slave exports per population. The correlation between these two measures in our sample is substantial (as the positively sloped trend line demonstrates) but far from complete: the bivariate correlation coefficient is 0.36 (n = 43). This is in line with scholarly work suggesting that although both slave systems existed in close connection, they were certainly not identical (Perbi 2004; Thornton 1998; Ewald 1992; Lovejoy 1983).

Figure 1: Scatter Plot of the Prevalence of Indigenous Slavery and Slave Exports

Sources: Atlas Narodov Mira (1964), The ethnographic atlas (1967/1999), Nunn (2008)

Indigenous slavery lasted longer than export slavery. In 1807 Britain passed a law abolishing the Atlantic slave trade, but the African colonies had laws against indigenous slavery passed by their colonizers much later and at different dates: in 1874 in the Gold Coast Colony (the southernmost part of Ghana), but not until 1908 in the Asante and Northern Territories of Ghana (Perbi 2001:12). Only after 1914 was enslavement prohibited in all colonies (Manning 1990:12). Even then, indigenous slavery often continued in practice. The abolition of slavery brought about a labour shortage as the demand for controllable cheap labour did not end. This induced an increase in pawning and other forms of low cost labour, to which former slaves and their descendants - often in the most vulnerable strata of society – were the natural victims (Perbi 2004; Austin 2005). 'Laws against slave trading were more strictly enforced than legislation on slavery, which was often a dead letter'… 'Servile labour remained important in many areas well into the interwar period; and in a few economic backwaters it persisted even longer, generally with the knowing complicity of colonial regimes' (Klein 1978: 599, 608; 1998). Within the Ibo societies, the slaves and their descendants remained a clearly defined element in society well into the second half of the 20th century, and their general position did not change even though the government in the 1950's prohibited their use as a labour force (Horton 1954). In sum, indigenous slavery and its observable effects were both pervasive and fairly recent in Africa. Chattel slavery was officially abolished only in 1980 in Mauritania[11], and traditional forms of servitude survived in various parts of the Sahara until today (McDougall 1988). This provides the background for investigating its relation to statehood and its impact on long-term economic development.

[11] See Miers and Klein 1999 (p. 10 -11) and the various contributions in this volume for evidence on the long lasting effect of the institution of slavery, for example in the Ewe and Igbo societies in West Africa (Ohadike: 189; in Eastern Senegal (Clark: 91), and in Sudan (Hargey: 266).

VI. Indigenous Slavery and Long-Term Income Development

Nunn (2008) showed statistically that export slavery had a negative impact on Africa's long-term development, as measured by GDP per capita (income) levels in the year 2000. In this section we investigate whether this long-run effect is also observable for indigenous slavery.

To begin with, we plot the percentage of the population within today's borders of an African country that historically had the institution of indigenous slavery, against the logarithm of its per capita income in 2000, for 43 countries (Figure 2). The negative relation (with bivariate correlation coefficient of -0.55) is already clear from visual inspection. This is confirmed by computation of an OLS trend line with a highly significant and negative coefficient of -1.27 (with t-value - 4.79) and an R-squared of 0.35. Thus, a third of the variation in Sub-Saharan Africa's current income levels is statistically associated with the variation in the measure for past indigenous slavery.

Figure 2: Indigenous Slavery and Income levels in 2000 in 43 African Countries

Sources: Atlas Narodov Mira (1964), The Ethnographic Atlas (1967/1999), Maddison (2003)

A baseline OLS equations to test this relation more rigorously follows the specifications in Nunn (2008):

$$\ln(\text{income2000})_i = C + ß_{ij}X_{ij} + e_{ij} \qquad \text{with} \quad i = 1,2,\ldots,43 \quad \text{and } j = 1,2,\ldots,11$$ [12]

Where $\ln(\text{income2000})_i$ is the natural logarithm of average per capita GDP in the year 2000 in country i, C is a constant, $ß_{ij}$ is the coefficient reflecting the impact of condition X_j in country i on year-2000 per capita income levels and e_{ij} is a white-noise error term. In Table 2 we show estimation results. Definitions and descriptive statistics of all variables are in the Appendix. Model (2.1) is the univariate equation (j=1) with only the indigenous slavery variable. Model (2.2) additionally includes Nunn's (2008) export slavery variable[13] plus additional control variables for income capturing geography, climate, primary resources and disease. Model (2.3) adds to this point resources (oil, diamonds and gold). Legal origin and nationality of the colonizer are additionally included in model (2.4). Finally, model (2.5) is our preferred specification, where we omit from the complete model specification (2.4) stepwise those variables that are statistically insignificant (p= 25 %). This yields a parsimonious model that explains 79 % of observed variation in the dependent.

[12] We estimate the same equations for the average growth of pc income between 1950 and 2000.
[13] Compared to the Nunn (2008) specification, this model does not include a dummy for North Africa, as we have no North African countries in the sample.

Table 2: Indigenous Slavery and 2000 Income levels: OLS

	model 2.1	model 2.2	model 2.3	model 2.4	model 2.5
Slavery	-1.267***	-0.995***	-0.675*	-0.757**	-0.753**
	(0.279)	(0.326)	(0.337)	(0.344)	(0.313)
Export Slavery		-0.070**	-0.092***	-0.081***	-0.081***
		(0.028)	(0.027)	(0.026)	(0.024)
Longitude		-0.007	-0.007	-0.005	-0.004
		(0.004)	(0.004)	(0.004)	(0.004)
Latitude		0.005	0.025***	0.020**	0.021**
		(0.013)	(0.009)	(0.010)	(0.008)
Rainfall		0.002	0.003	-0.003	
		(0.007)	(0.006)	(0.006)	
Humidity		0.001	0.001	0.019**	0.018**
		(0.011)	(0.010)	(0.009)	(0.007)
Malaria		-0.000	0.000	-0.000	
		(0.000)	(0.000)	(0.000)	
Gold			0.004	0.020	0.019
			(0.015)	(0.015)	(0.014)
Oil			0.093***	0.075***	0.075***
			(0.024)	(0.024)	(0.023)
Diamonds			-0.017	-0.056	-0.050
			(0.055)	(0.045)	(0.041)
Islam			0.001	-0.001	
			(0.002)	(0.002)	
Legal Origin UK				-0.505	-0.549
				(0.329)	(0.328)
Constant	7.789***	7.902***	8.072***	8.819***	8.874***
	(0.229)	(0.841)	(0.884)	(0.537)	(0.497)
Colonial origin dummies	no	No	no	yes	yes
R2	0.359	0.484	0.621	0.792	0.791
N	43	43	43	43	43

Sources: see Appendix. Robust standard errors are in parentheses. Asterisks ***, **, and * denote statistical significance at probability levels below 1 %, 5 % and 10 %, respectively. We use Maddison's income data, as in Nunn (2008). Using other sources such as World Development Indicator income data gives similar results.

Indigenous slavery is significantly and negatively correlated with current income in all three models. As in Nunn's (2008) study, export slavery enters robustly and

significantly. The indigenous slavery effect is appreciably smaller when export slavery is also included. But the preferred model suggests that indigenous slavery does have a long-term growth effect apart from the effect of export slavery already identified by Nunn (2008). The presence of oil and a country's location (in degrees of longitude) are also robustly part of the preferred model, with expected coefficient signs.

A consequence of such a long term analysis relating observations from pre-colonial societies to present day income levels is that significant historical changes might be overlooked (Hopkins 2009). Moreover, the relation between the two variables might not be stable over time (Austin 2008). To accommodate for this 'compression of history' critique, we estimated the same models as presented above, but changed the dependent variable to growth rates of income per capita for the longest possible period. For nearly all African countries, income estimates are available since 1950 (Maddison 2003). Results show that slavery is also significantly and negatively related to per capita income growth between 1950 and 2000 in Africa[14].

While this is *prima facie* evidence that indigenous slavery depressed economic development in the long run, it is important to note that there may be a selection problem, where countries destined by climate or location to remain relatively poor also selected into the practice of indigenous slavery. One plausible selection mechanism would run via technology. Hopkins (1973:25) attributed indigenous slavery institutions to scarcity of labour especially in West Africa, where under conditions of simple agricultural technologies (which restrain income growth), 'the costs of acquiring and maintaining slaves were less than the cost of hiring labour'. Similarly, Fielding and Torres (2008) explain that particular combinations of

[14] The coefficient for indigenous slavery always enters the equation with at least 5% significance. Results are available upon request.

endowments and climates - prevalent especially in West and Central Africa - stimulated the development of plantation and mining economies with their attendant 'extractive institutions' (Acemoglu et al, 2001) inhibiting long-term development. This is another possible selection mechanism, as slaves were used intensively in plantation and mining. In such and similar scenarios, we observe a negative correlation of indigenous slavery with today's income levels, but this is no conclusive evidence of causation. Conducting a simple OLS regression as reported in Table 2 would then lead to biased estimates.

In order to assess how serious this selection problem is, we want to know if countries with endogenous slavery were already poor at the time of observation of indigenous slavery in our data set. Historically, as shown by (among others) Acemoglu et al. (2001), population density is a good indicator for prosperity. We explored this relation for the 27 countries for which we have data on both historical population density (in the 15th century) and indigenous slavery[15]. With a correlation coefficient of 0.35, it appears that if anything, there is a *positive* association between the two. This is also reported by Nunn (2008) on export slavery; he finds that it were the richer, not the poorer countries that selected into the slave trades. If that is the case, then correcting for omitted variable bias would strengthen, not undermine our OLS results.

But we cannot be certain that our OLS estimates do not suffer from endogeneity problems in some other way. We address this possible problem in two ways. We apply an instrumental-variable approach to estimating the slavery-income relation. The instrumental-variable approach also controls for the fact that our

[15] Data are taken from Nunn (2008). We are aware that dependable pre-colonial population figures are scarce. Estimates are mostly backward projections from colonial population counts, which are generally considered to have substantially understated the actual population (Hopkins 2009; Austin 2008). Nonetheless, we use these figures as to our knowledge they are the only cross country figures available.

indigenous slavery variable is a constructed variable, which may render OLS estimates biased. On the other hand, we note that 2SLS regressions have bad small sample properties. We therefore present them as just an additional robustness check of the OLS regression. Estimations results are relegated to Appendix C. The reported model coefficients for instrumented indigenous slavery are positive across a range of model specifications and actually larger than OLS estimates. We conclude that the instrumental-variable approach is in line with the above empirical findings.

Second, we apply a method suggested by Altonji et al. (2005), which gauges how much the coefficient for the independent variable will be reduced if unobserved variables were added to the model[16]. They exploit the assumption that the ratio of selection on unobservables relative to selection of observables is likely to be less than 1. Their procedure is to compare the value of the coefficient of interest in a constrained univariate model to the value of that coefficient in an unconstrained model (i.e. with observables added). The difference between coefficient values in the constrained and the unconstrained models shows how much the adding of observed variables reduces the coefficient for the independent variable (if at all). Then Altonji et al. (2005) calculate how many times stronger the effect of unobservables would have to be in order to render the independent variable's effect zero – that is, to explain away the observed effect by attributing it completely to unobserved-variable bias. If this multiple is larger than 1, then this clashes with the assumption that the ratio of selection on unobservables relative to selection of observables is likely to be less than 1. The conclusion is then that at least part of the observed effect is probably real. For computational details of this approach we refer to Altonji et al. (2005).

[16] Another standard way to address possible endogeneity is to apply an instrumental variable approach. Because instrumental variable regressions have bad small sample properties, and the choice for a truly exogenous theoretically sound instrument proved difficult, we decided to not pursue the IV path.

In our case, adding seven observed variables in the unconstrained model (2.5) reduces the coefficient from -1.27 found in the constrained model (2.1) to -.75. This is a reduction of the effect by 0.52, or just 40 % of the original effect in model (2.1). It follows that for unobservables to render the effect zero, their impact would have to be more than twice as strong (1.27/0.52 = 2.44 times as strong, to be precise) as is the effect of adding observables. Since this is larger than 1, the conclusion is that it is likely that at least part of the observed effect of indigenous slavery on income levels in 2000 is real, even if there is some unknown endogeneity bias.

We may also ask what the substantial impact of indigenous slavery on long-term development of African income levels was. How much income development did it cost the continent? If we take the typical variation in the indigenous slavery variable (the standard variation of 0.35 around the sample average of 0.63) and apply the OLS coefficient[17], this translates into a decline of 26 % in year 2000 per capita GDP, compared to the actual level. For a one standard deviation increase in export slavery, the income decline is 39 %. To put this into context, total average growth in per capita income achieved during 1950-2000 in the same sample was 0.93 % annually. The growth loss due to a one standard variation change in the measure for indigenous slavery is thus equivalent to 24 years of contemporary growth. For export slavery this was 38 years.

In sum, our findings suggest that indigenous slavery had a statistically robust negative long-term effect on economic development. The effect is significant in terms of the growth loss it represents in contemporary terms. It exists independently from the growth-depressing effect of export slavery, which is considerably larger.

[17] Since the dependent variable is in logarithmic terms but the independent is not, the coefficient is a semi-elasticity: it tells us the percentage change in 2000 per capita incomes resulting from a one unit change in the slavery variable.

VII. A Theory of Indigenous Slavery and 'Limited Access' States

In view of these findings, the natural question to ask is *how* indigenous slavery influenced long-term development negatively. For export slavery, Nunn (2008: 23-25) has suggested an ethnic fractionalisation channel and an early state development channel. Export slavery may have "impeded the formation of larger communities and broader ethnic identities" and therefore is "an important factor in explaining Africa's high level of ethnic fractionalisation today" (Nunn, 2008:142), which in turn is negatively related to economic development. On the other hand, Kusimba (2004:67) suggests that "[i]n some cases, smaller ethnically related communities were compelled to aggregate into large groups strong enough to construct large fortified settlements". The slave trades might have increased ethnic tensions, but it is less clear how it influenced fractionalisation itself. Likewise, indigenous slavery may - as we elaborate below - have perpetuated social exclusion along ethnic lines, but probably did not cause ethnic fractionalization itself. Indeed, we find no significant correlation between measures for ethnic fractionalisation and our measure for indigenous slavery[18].

Alternatively, the political development argument is that export slavery was a major motivation in inter-African wars, intertwined commerce with warfare and decimated populations unevenly, so hindering the development of political stability and economic confederations in traditional African states and societies (Nunn 2008: 144). In turn, early and continuing state development matters to economic development (Bockstette et al. 2002; Chanda and Putterman 2005; Bardhan 2005). Conversely, Austin (2008) argues that political centralisation in pre-colonial Africa was low and that 'there is no evidence that the average size of states in West and

[18] The correlation coefficient between our indigenous slavery measure and the Alesina et al. (2003) ethnic fractionalisation measure is an insignificant 0.22 ($p = 0.16$). This fractionalisation measure reflects "the probability that two randomly selected individuals from a population belonged to different groups" (Alesina et al. 2003: 5).

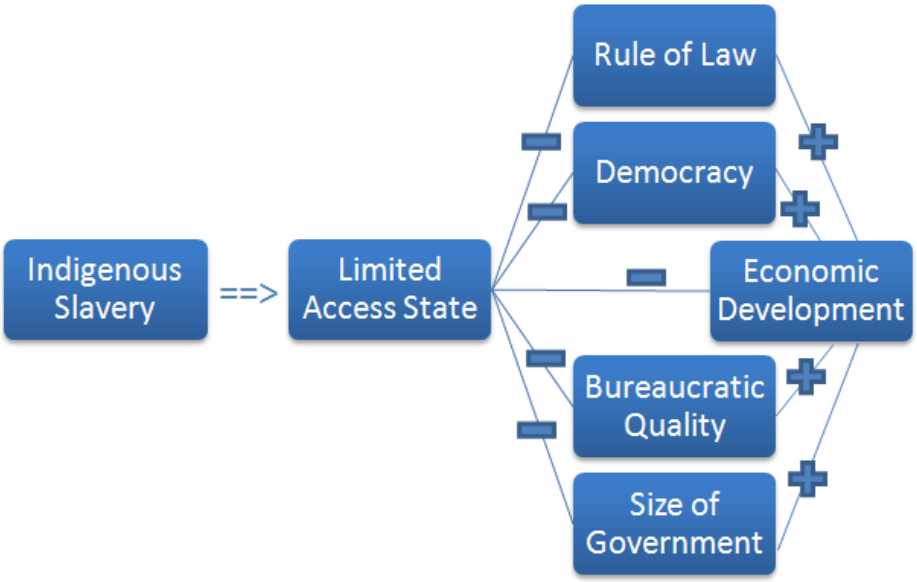
West-central Africa decreased (or increased) during the more than four centuries of the Atlantic slave trade.' (Austin 2008: 1005).

This explanation also does not fit particularly well when we turn to *indigenous* slavery. Indigenous slavery was an ingrained feature of many traditional societies rather than externally imposed, in contexts both with and without major state structures. It supported rather than hindered state development in many cases. Often (as in the Ashanti empire), slavery was one of the foundations of state structures through the tribute system and slaves' economic and administrative contributions to statehood (Perbi 2001; 2004, Fenske 2012). But also decentralised societies often had the institution of slavery (Klein 1998: 4). This is reflected by the low and insignificant correlations between measures of early state development and indigenous slavery[19].

Instead, we now develop a theory where indigenous slavery may have impeded the development not so much of statehood itself, but rather the transition from a 'Limited Access State' (where social interaction is based on personal relationships and where access to public and private organisations is limited) to an 'Open Access State' where social interaction is mainly governed by clear, well defined rules and access to public and private organisations is open to most. This theory is based on a framework developed by North et al. (2009). Figure 3 illustrates the relations between key concepts and measures in this theory.

[19] The correlation coefficient between our measure for indigenous slavery and pre-colonial state development, taken from Gennaioli and Rainer (2007) is low and insignificant: r = 0.03 (p = 0.84).

Figure 3: Indigenous Slavery, Statehood and Economic Development



The framework proposed by North et al. (2009) distinguishes two broad social orders: 'limited access' and 'open access' orders. In limited access orders, personal relationships form the basis for social organisation and constitute the arena for individual interaction. Access to valuable resources (such as land, labour and capital) and access to and control over valuable activities (such as education and political power) are both in the hands of a small elite protecting its privileges. The ability of individuals to form organisations is limited.

In contrast, open access orders allow, and are geared towards, participation of society at large. Social interaction is broadly governed by clear and well-defined rules. Citizens have to ability to form organisations. They can use the state bureaucracy to access public goods and services. There is open access to public and private organisations. There are widespread impersonal relationships within the context of a capable bureaucracy and rule of law. There is a vibrant civil society; a bigger, more decentralised government; and on average stable and positive economic growth. In contrast, limited access states are characterised by slow growing, volatile economies exposed to shocks, polities without broad-based legitimacy, few private organisations,

smaller and more centralised governments, and social relations governed by personal relationships, privileges and weak institutions and rule of law.

How is this relevant to explaining the impact of indigenous slavery on long-term development, via the development of statehood? Africa's pervasive slavery practices implied discrimination and social exclusion of large population groups. Even in the most benign view, indigenous slaves were still marginalized members of society with few social linkages to free men and women (Perbi 2001). This was often perpetuated as after the abolition of slavery, ex-slaves often remained in relations of dependence and exploitation. They typically kept their inferior status, even over several generations (Miescher 2004; Manning 1990) - former slaves in Ibo society could for example not take part in councils (Forde and Jones 1950). We know for the New World that the exclusion of people intrinsic to the institution of slavery led to inequality in wealth which in turn contributed to the development of restrictive institutions, which protected the privileges of elites and restricted opportunities for the masses, even after the abolition of slavery (Sokoloff and Engerman 2000: 227).

In sum, long-standing and pervasive indigenous slavery and the social exclusion it implied also after it was abolished, may have undermined the development of open access states characterised by broad-based legitimacy, effective bureaucracies, stronger institutions and bigger and more decentralised governments.

Importantly, this explanation connects to what we know from the field of development studies about the importance of capable and accountable states. The 'developmental state' literature (Evans 1995; Granovetter 1985) argues that such states are vital to processes of sustainable economic development. Ndulu and van de Walle (1996), Sindzingre (2004) and Kohli (2004), among others, explain how economic development in poor countries requires that nation states are supported by large sections of society and have the administrative and bureaucratic capacity to

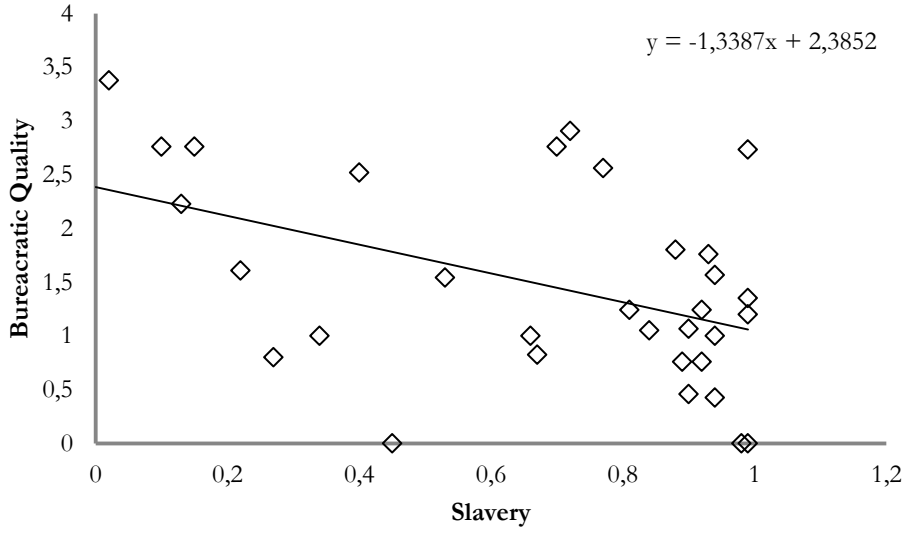
uphold key market institutions and to effectively implement policies . The contrast to this 'developmental state' scenario is the capture of African states by elites as identified by Bates (2008). And Englebert (2000a) explicitly connects the weak capability of African states to their limited legitimacy. In turn, lack of legitimacy may be linked to the indigenous slavery heritage of large-scale social exclusion. In societies where large population groups continue to be excluded from opportunities for higher education and state employment, bureaucracies cannot tap into much of the population's human capital. Also, social exclusion undermines broad-based state legitimacy, and thereby the state's capacity to formulate and implement effective development policies. A large body of development studies literature so places the weak state capacity at the core of Africa's dismal growth performance in the post-colonial era. As we suggested above, widespread indigenous slavery in (recent) history may help understand this state of affairs, which can be understood in terms of 'limited access' versus 'open access' orders as proposed by North et al (2009).

How well does this explanation fit the facts? Below we empirically explore this channel from indigenous slavery to the prevalent form of statehood by relating our indigenous slavery measure to various characteristics of open access societies as identified by North et al. (2009: 12). We capture these characteristics in index measures for 'democracy', 'bureaucratic quality' and 'rule of law'. We also measure the size of government, by total government expenditure per GDP. The scatterplots below show a consistently negative relationship between each of the first three measures and indigenous slavery, in line with the theory developed in this section.

Figure 4: Indigenous Slavery and Democracy

Source: Kaufmann and Kraay (2007). R= -0.27, p= 0.08, n =42.

Figure 5: Indigenous Slavery and Bureaucratic Quality



Sources: ICRG database. R= -0.45, p = 0.009, n = 32

Figure 6: Indigenous Slavery and Rule of Law

Source: Kaufmann and Kraay (2007). R= -0.29: r = -0.27, p= 0.09, n =42

We also explore whether, as in the theory, limited access states typically have smaller and more centralised governments, linked to the lower level public goods supply such as infrastructure, education and health (North et al. 2009). Since information on government expenditure is relatively scarce for African countries, the analysis of the relationship between slavery and the size of the government is based on a much smaller sample[20] [21]. To gauge the relationship between indigenous slavery and the size of the government we divide our sample into two about equally-sized sub samples, based on whether less/more than 70 percent of the population historically had the institution of indigenous slavery. We have fairly good data for three points in time

[20] There is little information on local level expenditure, so we focus on the size of the national government. For 1990 and 1996 we have data for 4 countries, for 2000 we can include 6 countries; see the appendix (marked by *). From 2000 onwards the number of countries with information on government expenditure increases significantly and the pattern described here remains unchanged.
[21] Information on local expenditure is very limited, we only take into account the total size of the government.

over the 1990s. Table 3 shows that countries with prevalent indigenous slavery have a consistently smaller government in terms of total expenditure per GDP.

Table 3: Size of the Government

	All Government Expenditure % of GDP 1990	All Government Expenditure % of GDP 1996[a]	All Government Expenditure % of GDP 2000
Countries with Indigenous Slavery < 70%	28	28	24
Countries with Indigenous Slavery > 70%	21	20	19

[a] We use 1996 and not 1995 because for the countries with more than 70% slavery, there is no expenditure information in 1995

As to the right left hand side of flow chart (figure 3) which shows the relationship between the institutional measures and economic development, we also computed the correlations between their with GDP per capita levels in 2000. These are all large, positive and significant: for democracy $r = 0.44$, $p < 0.01$; for bureaucratic quality $r = 0.67$, $p < 0.01$; and for rule of law $r = 0.31$, $p = 0.03$. This is in line with research indicating that political development is an important determinant of economic development (Lipset 1959; Englebert 2000a; Kohli 2004; Evans 1995; and of course North et al. 2009). Also, we find that the countries included in table 3 above with less than 70 percent slavery have a higher per capita GDP level, on average, than countries with more than 70 % slavery (although the difference is larger in 1990 than in 2000 [22]).

[22] For 2000: 1,715 versus 1,063 international dollars per capita.

In short, we find that on all these characteristics of limited access states, countries with a higher prevalence of indigenous slavery perform different from countries with less slavery, with the differences being what one would expect based on the theory. Taken together with the analysis in the preceding section, all this suggests that the institution of indigenous slavery had effects on both political and economic development which linger until today.

VIII. Summary, Discussion and Conclusion

In this paper we conducted the first systematic quantitative assessment of the long-term impact of Africa's indigenous slavery on its economic and political development. We provide an analytical survey of the literature in order to place indigenous slavery in its historical and cultural context. This suggests that the conditions of indigenous slavery varied greatly depending, among others, on technologies and labour needs, and on the intensity of slavery systems. Indigenous slaves were at the very least marginalised members of society, with chattel slavery at the other end of the spectrum. Indigenous slavery was a pervasive institution across traditional African societies and lasted well into the 20th century, much longer than export slavery. This suggests that it was arguably a strong and pervasive impediment to political and economic development and in turn, that the institution of indigenous slavery had a perceptible impact on the continent's development over time. This consideration of the qualitative literature motivates a quantitative assessment.

We construct a novel measure of indigenous slavery using historical data for a sample of 43 Sub-Saharan African countries. This novel measure is the percentage of the population within today's borders of an African country that historically had the institution of indigenous slavery. We test its causal relation to long-term economic development in an OLS regression, where economic development is measured by

year-2000 income levels. We add in the robustness analysis the 1950-2000 average income growth rates, with similar results. As a further robustness test we also apply the Altonji et al (2005) method and 2SLS regression to assess any bias due to unobserved variables.

We conclude that indigenous slavery was clearly harmful to long-term economic development. The effect is statistically significant and substantial in economic terms, and it can be interpreted in causal terms. It exists independently of the growth-depressing effect of export slavery. We estimate that the continuing impact of Africa's indigenous slavery is equal to 24 years of contemporary income growth.

A further contribution of our paper is to present a theory about the mechanism by which this happened. Indigenous slavery may have impeded the development not so much of statehood itself – as is often argued for the slave trades - but rather the transition from a 'Limited Access State' (where social interaction is based on personal relationships and where access to public and private organisations is limited) to an 'Open Access State' where social interaction is mainly governed by clear, well defined rules and access to public and private organisations is open to most. This is in line with developmental studies literature suggesting that slavery and the social exclusion it entailed may have inhibited the development of politically accountable states with capable bureaucracies, in turn leading to lower income levels of economic development. We identify various measures that capture the difference between 'limited access' and 'open access' states, and analyse their values over levels of indigenous slavery prevalence. We capture these in index measures for 'democracy', 'bureaucratic quality' and 'rule of law'. We find that the historical prevalence of indigenous slavery is negatively related to democratic accountability, bureaucratic capacity, rule of law and government size, in line with the theory.

We also note several limitations. Our measure does not distinguish between the gender of slaves, which was arguably important as in certain societies female slaves were preferred. Export slavery also changed the gender ratio, in different ways: more males were transported in the Atlantic slave trade, more females in the Arabic slave trades. Further, our measure only distinguishes between slavery and no slavery, even though the impact of hereditary slavery might have been larger (and in any case very different in terms of marginalization) than non-hereditary slavery. In part this limitation is dictated by the literature. With little agreement on the nature of slavery among scholars, there is no solid foundation to build a more discerning measure on. We also note that our observation of the incidence of indigenous slavery is mostly early 20th century. It is unclear that this is an accurate reflection of indigenous slavery prevalence in earlier times. On the other hand, as we have argued, the colonial presence which limited the power of indigenous chiefs probably leads to underestimating any negative effects of indigenous slavery, rather than invalidating the results of this study. If there is a bias, it is towards a conservative estimate of the effects of indigenous slavery.

In conclusion, the present study breaks new ground and presents new results; but it also needs validation and extension by further work that links indigenous social institutions with political development, state formation and economic development in former colonies in Africa and elsewhere.

Appendix A: Descriptive Statistics

Variable	*Obs*	*Mean*	*Std. Dev.*	*Min*	*Max*
Indigenous slavery	43	0.6277	0.3498	0	0.99
Ln(income2000)	52	7.1335	0.8253	5.3845	9.2735
Export slavery	52	3.2596	3.8948	-2.3026	8.8183
British colony	52	0.3462	0.4804	0	1
French colony	52	0.4038	0.4955	0	1
Portuguese colony	52	0.0962	0.2977	0	1
Belgian colony	52	0.0577	0.2354	0	1
Spanish colony	52	0.0192	0.1387	0	1
Legal origin UK	52	0.346154	0.480384	0	1
Latitude	52	13.5500	9.8586	0	36
Longitude	52	16.6988	20.2144	-24.0443	57.7939
Rainfall	52	8.8654	16.0551	0	69
Humidity	52	71.6731	11.9471	35	95
Malaria 1998	45	97.77333	152.2661	0	915.1
Islam	52	35.3192	39.0848	0	100
Gold	52	-7.4840	5.6642	-13.8155	3.0843
Oil	52	-6.7148	4.0309	-9.2103	3.2359
Diamonds	52	-5.4901	2.3963	-6.9078	2.1868
Population Density 15^{th} century	52	0.1107	1.3340	-2.3026	3.0369
Early state development	47	0.5804	0.3291	0	1
Voice and Accountability (96-98)	48	-0.5591	0.698466	-1.6404	0.907132
Bureaucratic Quality	32	2.6393	0.9751	0.4917	4.4333
Rule of Law (96-98)	48	-0.5393	0.656198	-1.9149	0.8168

Appendix B: Definitions and Sources

log of GDP pc in 2000	Maddison (2003)	Real per capita GDP in 2000
British colony	Nunn (2008)	British Colony
French colony	Nunn (2008)	French Colony
Portuguese colony	Nunn (2008)	Portuguese Colony
Belgian colony	Nunn (2008)	Belgian Colony
Spanish colony	Nunn (2008)	Spain (Equatorial Guinea)
Legal Origin UK	La Porta et. al (1999)	Dummy indicating whether the legal system originates in the Origin of the legal system, based on the legal system in the UK
Longitude	Nunn (2008)	The longitude of each countries centroid, measured in degrees. The centroid of each country is calculated using the Centroid Utility in ArcGIS. For the countries where the centroid is located outside the land borders of the country (Cape Verde, Gambia, Mauritius, Seychelles and Somalia), a point within the country closest to the centroid is used. The location on the coast that is closest to each country's centroid is identified using the Proximity Utility in ArcGIS
Latitude	Nunn (2008)	The absolute value of latitude of each country's centroid measured in degrees
Early state development	Gennaioli and Rainer (2007)	For each country the share of non-European population that belongs to indigenously 'centralised' ethnic groups
Islam		The percent Islamic variable is the percent of a country's population that is Islamic.
Slave export per area	Nunn (2008)	Log of total number of slaves taken from each country during various slave trades between 1400 and 1900, normalised by country size (measured by land area -millions of squared kilometres)
Rainfall	Nunn (2008)	The average total rainfall, in the driest month of the year, measured in millimetres.
Humidity	Nunn (2008)	The average of the maximum afternoon humidity, measured in percent, during the hottest month of the year
Gold	Nunn (2008)	Natural log of the average annual gold production per thousand inhabitants from 1970 to 2000 measured in kilograms
Oil	Nunn (2008)	Natural log of the average annual crude petroleum production per thousand inhabitants from 1970 to 2000 measured in thousands of tonnes
Diamonds	Nunn (2008)	Natural log of the average annual gemstones and industrial diamond production per thousand inhabitants from 1970 to 2000 measured in thousands of carats
Population density 15 century	Nunn (2008)	Log of thousands of population per million of squared kilometer
Voice and Accountability	Kaufmann et. al (2007)	Extend to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and a free media.
Bureaucratic quality	ICRG	Reflect the risk of drastic changes in policy or interruptions in government services after a change in government
Rule of Law	Kaufmann et. al (2007)	measuring the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, the police, and the courts, as well as the likelihood of crime and violence

Appendix C: 2SLS estimations

We need an instrument that is correlated with indigenous slavery, but not with the error term in the equation explaining present-day income. We instrument indigenous slavery with latitude, state development and prevalence of Islam[23]. Also, since we are interested in unbiased estimates of the effects of both indigenous and export slavery, we take account of the fact that export slavery may be an endogenous variable. As in Nunn (2008), we instrument export slavery with a country's distance to African coasts where important export slave trade ports were located: the Red Sea coast, the Atlantic Ocean coast, the Mediterranean coast and the Indian Ocean coast.

Estimations results are reported in tables C1 and C2, where we report second and first stages, respectively, of 2SLS regressions of two models. In both models, the coefficient for instrumented indigenous slavery takes a negative value which is significant statistically. We conclude from this that indigenous slavery was a robust long-term influence on African development, even taking account of any endogeneity problems and controlling for the presence of export slavery.

To justify our use of the instrument variables (IV), we conduct several tests. A test of the exogeneity of the regressor (endogeneity test) indicates whether the IV method is required. It tests the null hypothesis that the variable is exogenous (hence, high p-values indicate exogeneity). Second, we use a weak identification test, with the Kleibergen-Paap F-statistic, to examine the relevance of our instruments. This confirms they correlate with our independent variables. A weak identification indicates the weak explanatory power that causes an increased bias in the estimated IV coefficients (Hahn and Hausman, 2002). We provide Stock-Yogo critical values. Test statistics below the critical value indicates weak instruments (which is the case for our second estimate). Third, we use a test of over-identifying restrictions using the Hansen J statistic to test the validity of our instruments (i.e., if the instruments are orthogonal to the error distribution of the dependent). For this test statistic, the null tests validity of instruments, which is indicated by high P-values.

[23] Instrumenting only with latitude produces qualitatively identical results. This might be viewed as more valid since indigenous state development and prevalence of Islam are plausibly endogenous themselves and therefore, it could be argued, not suited as an instrument. Either choice does not affect the outcome.

Table C1: 2SLS estimations second stages

	1 pc income 2000	2 pc income 2000
Export slavery		-0.160*** (0.0559)
Slavery	-1.297** (0.574)	-0.581* (0.290)
Longitude	-0.00535 (0.00559)	-0.0137** (0.0057)
Oil	0.0418 (0.0320)	0.0767*** (0.023)
Constant	8.144*** (0.389)	8.760*** (0.427)
adj. R^2	0.249	0.453
N	41	41
Kleibergen-Paap rk Wald F statistic / partial F statistic	7.439	2.278
Stock-Yogo critical values	6.46	6.16
Hansen J statistic (p-value)	0.14	0.61
Endogeneity test (p-value)	0.73	0.5

Robust Standard errors in parentheses, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. 2sls is estimated using small sample properties.
The Hansen J statistic tests for joint instrument validity, where null hypothesis is that the instruments are valid, i.e., uncorrelated with the error term, and that the excluded instruments are correctly excluded from the second stage equation. The Kleibergen-Paap Wald rk F statistic for weak instruments is an adaption of Gragg Donald F statistic as errors are assumed to be the non i.i.d. and robust to HAC. The degrees-of-freedom for the rk statistic is ((N-L)/L1)*((N- 1)/N)*(N_clust-1)/N_clust), where N is the number of observations, L is the number of instruments and L1 is the number of excluded instruments. Kleibergen-Paap F closely approximates partial F statistic and is reported jointly. Stock -Yogo (2005) critical values are for 20% maximal LIML size.

Table C2: 2SLS estimations, first stages

	1 Slavery	2 Export Slavery	3 Slavery
Longitude	-0.005** (0.002)	0.153 (0.154)	-0.059*** (0.019)
Oil	-0.027* (0.014)	0.235 (0.165)	-0.016 (0.016)
Latitude	-0.028*** (0.007)	-0.101 (0.156)	-0.011 (0.01)
Islam	0.004** (0.001)	0.005 (0.02)	0.006*** (0.002)
Early state dev.	0.538*** (0.152)	0.62 (2.495)	0.495*** (0.152)
Atlantic dist.		-0.612 (0.713)	-0.196*** (0.06)
Indian dist.		-1.167 (0.878)	-0.212** (0.088)
Saharan dist.		-4.299** (1.624)	0.231 (0.167)
Red Sea dist.		3.737* (1.905)	-0.670*** (0.217)
(constant)	0.443*** (0.105)	19.17 (15.458)	5.360*** (1.563)
adj. R^2	0.38	0.21	0.53
N	41	41	41
F	8.70***	3.59***	8.25***

Standard errors in parentheses, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

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