Historical Origins of Firm Ownership Structure: The Persistent Effects of the African Slave Trade

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January 31, 2019

This paper extends prior theory linking modern firm ownership structure to institutions and social capital by demonstrating the historical origins of this relationship in traumatic societal shocks. We argue institutions and social capital are not simply predictors of ownership structure, but rather historically persistent mechanisms through which these shocks shape modern businesses. We provide empirical support with one of the most traumatic shocks in human history—the African slave trade. Using data from over 30,000 firms across 41 sub-Saharan countries, we show that firms in areas that suffered high historical slave extraction are today more likely to have concentrated ownership. High slave export countries have more sole proprietorships and majority ownership, with our model implying a difference of 43 percentage points between the lowest and highest export countries. This difference is particularly pronounced in the manufacturing sector where high capital needs require diffuse ownership given weak credit markets. Finally, we present evidence consistent with weakened institutions and social capital are likely mechanisms through which the historical slave trade increases modern ownership concentration. Our paper answers recent calls to bring both Africa and history back into management research by extending management theory into distinct and quantifiable historical events.

Management and finance scholars have established that concentrated firm ownership is overrepresented in countries with weak institutions and low social capital (La Porta, Lopez-de-Silanes, Shleifer, & Vishney, 1998; Peng & Jiang, 2010). Although concentrated ownership serves important roles in both the most- and least-developed markets (Shleifer & Vishney, 1997; Thomsen & Pedersen, 2000), its high prevalence in the latter represents low access to equity-based financing that limits investment and growth. Many firms in these countries remain concentrated

because of key obstacles to diversification—weak property rights and contract enforcement, poor shareholder protection, and low trust and social capital. Although management theory acknowledges the historical origins of the institutional and social capital conditions linked to concentration (Henisz & Williamson, 1999; Peng, Wang, & Jiang, 2008), the sources of cross-national variation are rarely modeled when predicting ownership. Instead, they are treated as fixed effects emerging from the fog of history to shape modern firms.

In this paper we extend prior theory on cross-national differences in ownership structure backward in history, arguing that the institutions and social capital in prior models are not simply predictors, but rather historically-persistent mechanisms that carry the effects of punctuated destructive shocks to the ownership concentration of modern firms. These traumatic shocks, which include disease, conflict, foreign occupation, forced migration, and genocide, are known to permanently change society (Nunn, 2014; Klüppel, Pierce, & Snyder, 2018), but they are rarely linked to modern firms. Why is such an extension important to management theory? First, the exogeneity of many such shocks provides better (but still imperfect) confidence in the causal relationship of institutions and social capital with ownership structure. But most importantly, our theory provides predictions for how ongoing and future traumatic shocks might affect the business environment. Warfare, genocide, and natural disaster continue to shock modern societies, yet their potential impact on the structure of firms is still unmodeled despite recent evidence that they indeed affect business (Grosfeld, Rodnyansky, & Zhuravskaya, 2013; Paruchuri & Ingram, 2012).

We empirically test our theory with one of the worst traumatic shocks in recorded history—the African slave trade. The slave trade, which pre-dated colonialism from the 15th to the 18th century, had depopulated Africa of nearly half its potential population by the advent of colonialism (Manning, 1990). Between twelve and eighteen million Africans were taken in the transatlantic, trans-Saharan, Red Sea, and Indian Ocean trades. The modern economic consequences of the slave

trade are significant; it has been linked to both decreased economic development (Nunn, 2008) and access to credit (Levine, Lin, & Xie, 2018; Pierce & Snyder, 2018).[1]

These and other papers (Nunn & Wantchekon, 2011; Whatley & Gillizeau, 2011) argue that the slave trade fundamentally altered the historical path of Africa through two interrelated mechanisms: weakened institutions and social capital elements such as ethnic fractionalization and mistrust. The established link between these two mechanisms and African conflict and development (Acemoglu, Johnson, & Robinson, 2001; Alesina, Devleeschauwer, Easterly, Kurlat, & Wacziarg, 2003; Easterly & Levine, 1997; Fafchamps, 2006; Michalopoulos & Papaioannou, 2016) makes it likely that the slave trade also altered organizations beyond access to credit. As Klüppel *et al.* (2018) explain, historical shocks such as the slave trade might shape multiple facets of the business environment. Shocks such as conflict, forced occupation, and persecution have been linked to labor market composition (Fernandez, Fogli, & Olivetti, 2004), labor market entry (Siegel, Licht, & Schwartz, 2011, 2013), entrepreneurship (Grosfeld *et al.*, 2013), and industry growth (Brown, Cookson, & Heimer, 2017). None have linked such shocks to ownership structure.

Our analysis is primarily cross-national. We show that firms in countries with high historical slave exports are more likely to be wholly-owned (sole proprietorship) or controlled (majority ownership) by one individual. Furthermore, we posit a cross-industry test. We show that in low slave trade countries manufacturing firms are more likely than other firms to have a diffuse ownership structure. However as the prevalence of the slave trade rises across countries, manufacturing firms become more likely to be sole proprietorships. All results are robust to extensive country- and firm-level controls, including the legal origins explanation in La Porta *et al.* (1998). Instrumental variable models produce identical findings. We also provide evidence that weak institutions and low social capital are likely historically persistent mechanisms explaining

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[1] The slave trade has been linked to other modern societal elements, such as female labor market participation (Teso, 2018), HIV infection (Bertocchi & Dimico, 2017), and polygyny (Dalton & Leung, 2014).

part of this relationship, although we note that the complexity of history is reflected in the imprecision of our estimates.

This paper contributes to four important research streams in management and strategy. First, it answers the call to bring history back into these fields (Greve & Rao, 2012; Ingram, Rao, & Silverman, 2012; Jones & Khanna, 2006; Kipping & Üsdiken, 2014; Klüppel *et al.*, 2018; Madsen, Bednar, & Godfrey, 2014; Morck & Yeung, 2011). Studies that focus on periods before the 20th century are rare in the management and strategy literature (Rowlinson & Hassard, 2013).[2] Our paper contributes by introducing the role of traumatic shocks, and by employing one as an empirically-measurable predictor that can help explain the sources of established links between institutions, social capital, and ownership in modern firms.

Second, it adds to the growing literature on how historical events and conditions continue to shape the modern business environment through culture and institutions (Tabellini, 2008a). Our theoretical model is heavily informed the path dependence literature that examines positive shocks such as technological breakthroughs (David, 1994, 2007; Vergne, 2013). We instead model the emerging concept of traumatic shocks (Klüppel *et al.,* 2018) such as conflict, natural disasters, and forced migration that are particularly important for explaining business history in emerging markets (Austin, Dávila, & Jones, 2017). Only a few papers link such shocks to modern firms.[3]

Third, the paper contributes to important research on the sources and implications of ownership structure in the developing world. Weak institutions and low social capital in developing countries force many firms to eschew key benefits of diffuse ownership due to governance risks from minority ownership. When weak institutions fail to enforce contracts, ownership remains concentrated (La Porta, Lopez-de-Silanes, Shleifer, & Vishney, 2000), hurting

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[2] Recent exceptions include Carmeli and Markman (2011), and Silverman and Ingram (2017).
[3] Exceptions include Cookson (2010), Greve and Rao (2012), Grosfeld *et al.* (2013), Natividad (2019), Rao and Greve (2018), and Pascali (2016).

management practices (Bloom & Van Reenen, 2010) and encouraging resource expropriation (Levine, 2005). There is growing interest in identifying how the resulting concentrated family ownership (Bloom, Genakos, Sadun, & Van Reenen, 2012) and constricted equity investments (Guler & Guillén, 2010; Taussig & Delios, 2015) affect performance in areas such as Africa.

Finally, the paper adds to a nascent literature in management and strategy on Africa. Despite its size and growing economic importance, Africa was until recently ignored by these fields,[4] partly due to the lack of reliable firm-level data. Recent work has sought to remediate this shortfall (Birhanu, Gambardella, & Valentini, 2016; George, Kotha, Parikh, Alnuaimi, & Bahaj, 2016a; Luiz, Stringfellow, & Jefthas, 2017; Michalopoulos & Papaioannou, 2015; Taussig & Delios, 2015; Yenkey, 2015, 2018a, 2018b), but few studies examine cross-national differences. Rivera-Santos, Holt, and Littlewood (2015) and Assenova and Sorenson (2017) are rare exceptions. We answer the call put forth by Zoogah, Peng, and Woldu (2015), Walsh (2015), George, Corbishley, Khayesi, Haas, and Tihanyi (2016b), and Mol, Stadler, and Ariño (2017) to increase attention on African firms and address remaining challenges faced by African managers.

THEORETICAL BACKGROUND

We first present how existing management theory models the cross-national relationship between ownership structure and modern institutions and social capital. We also explain that although many firms might benefit from concentrated ownership even in the absence of weak institutions and social capital, the restrictions on ownership diversification imposed by such weaknesses hurts many other firms by restricting investment and growth. We then provide a theoretical argument for why traumatic shocks from centuries past might predict firm ownership structure, instead presenting institutions and social capital as historically persistent mechanisms connecting these

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[4] See Acquaah (2007) and Julian and Ofori-Dankwa (2013) for exceptions.

shocks to modern firms. Finally, we present two testable hypotheses linking historical traumatic shocks to concentrated ownership structure through institutions and social capital.

Existing Theory: Institutions and Social Capital Explain Ownership Structure

One of the most important dimensions of ownership structure is its concentration. Concentrated ownership comes in many forms, including business groups (Khanna & Rivkin, 2001), family-owned firms (Bertrand & Schoar, 2006; Chua, Chrisman, Steier, & Rau, 2012), limited partnerships (Hitt, Bierman, Shimizu, & Kochhar, 2001), and public firms with large institutional investors (Hoskisson, Hitt, Johnson, & Grossman, 2002). The most highly-concentrated firms have one or a majority owner with controlling interest. In contrast, diffuse firms might be publicly-traded corporations with tens of thousands of individual owners each holding small shares of the firm. Concentrated ownership presents both advantages and disadvantages vis-à-vis diffuse ownership. Concentrated ownership can help incentivize a single or handful of owners to effectively monitor management (Shleifer & Vishny, 1997), thereby avoiding the free riding common with many diffuse minority owners (Berle & Means, 1932; Shleifer & Vishny, 1986).

In contrast, diffuse ownership offers several advantages over concentration that can facilitate investment and firm growth. First, diffuse ownership can reduce the cost of capital by limiting individual exposure to firm-specific risk (Demsetz & Lehn, 1985), allowing smaller investors to pool capital and spread risk across a portfolio of investments. Second, equity-based compensation can attract talented employees (Oyer & Schaefer, 2005) and improve their organizational commitment (Rousseau & Shperling, 2003). Third, diffuse ownership can expand firm networks through the connections of venture capitals or other investors motivated to help young companies acquire resources (Stuart, Hoang, & Hybels, 1999; Stuart & Yim, 2010). These tradeoffs between of ownership structures partially explain why "empirical studies, however, have been unable to reach consensus about the actual relation between managerial ownership and firm

value" (Benson & Davidson, 2009, p.574). Conditional on a given business environment, firms will tend to adopt the best ownership structure available to them, with some performing better with concentration and others under diffuse ownership.

Existing theory establishes that the substantial variation in ownership structure across regions and countries can largely be explained by local institutions and social capital (Peng & Heath, 1996; Peng et al., 2008; Young, Peng, Ahlstrom, Bruton, & Jiang, 2008). Much of this work is based on Douglass North's (1990: 3) institutional economics, where institutions and culture (including social capital) establish "the rules of the game in a society" that define the business environment. Formal institutions are codified rules that include constitutions, laws, property rights and contracts (North, 1990; Peng, 2002). They establish the ease and efficiency of doing business, with weak and corrupt institutions inhibiting foreign investment and business development both historically and in the modern era (Henisz, 2000; Henisz, Zelner, & Guillén, 2005; Henisz & Zelner, 2001; Ingram & Silverman, 2002; Peng, Sun, Pinkham, & Chen, 2009).

Social capital, while defined somewhat differently across fields, represents how embeddedness within groups and networks benefits individual actors (Burt, 2000; Fafchamps, 2006; Putnam, 2000; Sobel, 2002) or facilitates the provision of socially valuable activities through cooperation and individual contribution (Nanncini, Stella, Tabellini, & Troiano, 2013). At the individual level, social capital can manifest as trust within groups, networks, and society more broadly (Glaeser, Laibson, Scheinkman, & Soutter, 2000). At higher levels, it appears as network connectedness and civic engagement that "enable participants to act together more effectively to pursue shared objectives" (Putnam, 1995, 665). In the management literature, Kwon and Adler (2014: 412) similarly define social capital as the "goodwill available to individuals and groups."

Given its costs and benefits, some firms might choose concentrated ownership even in markets with strong institutions and social capital. Indeed, we observe many successful examples

of concentrated ownership in countries with strong institutions and social capital (La Porta, Lopez-de-Silanes, & Shleifer, 1999; Thomsen & Pedersen, 2000). But substantial evidence shows that weak institutions and social capital destroy *the opportunity* to employ diffuse ownership, meaning that many firms who crucially need its benefits are forced into sub-optimal concentration. Why do these ownership restrictions occur?

Weak institutions tend to raise concentration by increasing the cost of equity-based capital as investors fear that contracts and property rights will not be enforced (Besley & Ghatak, 2010; Djankov, La Porta, Lopez-de-Silanes, & Shleifer, 2003) and minority shareholders will not be protected (La Porta, Lopez-de-Silanes, & Shleifer, 1999; Peng & Jiang, 2010). Without these guarantees, ownership remains restricted to individuals and family members (Bertrand & Schoar, 2006) or trusted members of the same group (Cox & Fafchamps, 2008; Fukayama, 1995). Such trusted investors are harder to find in communities where social capital is low due to either ethnic fractionalization or mistrust within groups, which further inhibits diffuse ownership. Low social capital and its associated mistrust also limit diffuse ownership by inhibiting the decentralization of decision rights and contracting within the firm (Bloom, Sadun, & Van Reenen, 2012; George *et al*., 2016b; Gulati, 1998; Mayer, Davis, & Schoorman, 1995; Tsai & Ghoshal, 1998). Mistrust also limits equity investments both within and across countries (Bottazzi, Rin, & Hellmann, 2016).

These obstacles to diffuse ownership from weak institutions and social capital mean that many high-quality entrepreneurs, managers, and ideas in such countries cannot grow because they cannot access equity funding, leaving expansion and growth to wealthy families and business groups (Khanna & Yafeh, 2007). This problem is exacerbated by the fact that such countries also suffer from restricted access to credit (Levine, 1997)—the only other capital source.

An Extended Model of Traumatic Shocks and Ownership Structure

If existing theory partially explains the relationship of ownership structure with institutions and social capital, where does this covariance originate? Existing management theory, represented in Figure 1, does not provide an answer, instead treating institutions and social capital as independent explanatory variables that predict ownership structure after emerging from history through incremental evolution (North, 1991). Institutions and social capital in these models evolve along some equilibrium path to the present day, where they correlate with ownership structure. Henisz and Williamson (1999), for example, explicitly model cross-sectional and longitudinal variation in institutions without explaining historical sources of that variation. Similarly, Peng and Jiang (2010) based their theoretical framework off institutional variation without explicitly modeling its origins. Again, this theoretical tradition does not ignore historical origins, but doesn't explicitly model them. This approach is understandable given the immense challenge of endogenously-changing institutions and social capital, but it fails to provide predictive power for how many future shocks might change how firms organize.

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We extend these prior theories in Figure 2 to specify one set of historical sources as traumatic shocks to societies, thereby making institutions and social capital historically-persistent *mechanisms* in our model of ownership structure. Our model is consistent with the incremental evolution of institutions and culture in North (1991), but we explicitly model distinct traumatic shocks that heterogeneously disrupt existing local institutions and social capital and ultimately shape ownership structure.[5] As Klüppel *et al.* (2018) explain, traumatic shocks are a class of major destructive events such as war (Miguel & Roland, 2011), disease (Nunn & Qian, 2010), famine (Jia, 2014), natural disaster (Fothergill & Peek, 2004), forced migration and slavery (Dell, 2010), persecution (Grosfeld et al., 2013; Pascali, 2016; Voigtländer & Voth, 2012), and foreign

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[5] See Michalopoulos (2012) or Spolaore and Wacziarg (2013) for discussions of biogeographical origins that precede these shocks.

occupation (Burchardi & Hassan, 2013; Dippel, 2014). Similar to disasters (Quarantelli, 2005), traumatic shocks are hard to precisely define, but involve disruptive injuries to society.

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This theoretical extension is informed by the substantial literature on historical persistence in economics and other social sciences that demonstrates how traumatic shocks can destroy or alter institutions and social capital. Acemoglu *et al.* (2001), for example, established the long-run impact of European colonization of Africa in destroying institutions and breeding corruption. Banerjee and Iyer (2005) similarly linked property rights and public goods to idiosyncratic colonial institutions in India. The inefficient provision of public goods also has empirical ties to traumatic shocks such as slavery (Sokoloff & Engerman, 2000), religious proselytism (Nunn, 2014), and foreign occupation and forced labor (Dell, 2010), as does the judicial independence and property rights linked to colonial legal institutions (La Porta et al, 1999; 2008).

Although traumatic shocks can modify culture in a myriad of ways (Klüppel et al., 2018), social capital and its manifestation in trust deteriorate in the wake of traumatic shocks. Both Putnam, Leonardi, and Nanetti (1993) and Guiso, Sapienza, and Zingales (2006) linked mistrust in Italy to historical foreign occupation. Besley and Reynal-Querol (2014) show that historical conflict in Africa predicts lower trust and personal identity that is more ethnically- and less nationally focused (an indicator of low social capital). Similarly, Nunn and Wantchekon (2011) and Levine *et al.* (2018) linked the African slave trade to decreased modern trust in local ethnic groups. These individual-level measures of social capital are supported by macro-level measures as well. Ethnic fractionalization is representative of low social capital in that it defines the cohesiveness of ethnic networks (Easterly, Ritzen, & Woolcock, 2006). It can be an impediment to economic growth in Africa (Easterly & Levine, 1997; Alesina et al., 2003), with roots in both the slave trade (Whatley & Gillezeau, 2011) and colonialism (Michalopoulos & Papaioannou,

2016). The development costs of ethnic fractionalization may depend on a few powerful and competing groups (Posner, 2004; Woolcock, 2001) and may be less important than ethnic inequality (Alesina, Michalopoulos, & Papaioannou, 2016), but it almost certainly reduces social capital by restricting ethnic networks.

For our theoretical explanation to be valid, traumatic shocks cannot simply alter historical institutions and social capital. Those altered historical conditions must also persist across long periods of time in ways that shape modern firms. Evidence from across social science supports such historical persistence. Cultural elements such as social capital persist across generations through family (Inglehart & Baker, 2000; Tabellini, 2008b) and religion (Guiso, Sapienza, & Zingales, 2003). Empirical studies have linked beliefs, traits, and behavior from ancestral paths to modern day populations (Ashraf & Galor, 2013; Putterman & Weil, 2010; Spolaore & Wacziarg, 2009). Nisbett and Cohen (1996), for example, argued that the southern American culture of honor can be traced to ancestral Scotch-Irish culture, a theory supported by Grosjean (2014). Putnam, Leonardi, and Nanetti's (1993) study of Southern Italy also details the deep historical roots of social capital. Within Africa, social capital shaped by ethnic fractionalization from both the slave trade (Whatley & Gillezeau, 2011) and colonialism (Michalopoulos & Papaioannou, 2016) has persisted across centuries.

Similarly, institutions such as investor protection (La Porta *et al.*, 1998) and property rights (Acemoglu *et al.*, 2001) persist because of both societal benefits and irreversible investments (Mahoney & Thelen, 2010; Powell, 1991). Pierson (2000: 54-55) argues that "political arrangements are unusually hard to change. (…) the key features of political life—public policies and (especially) formal institutions—are change-resistant." Although sociologists typically do not represent institutions as deliberately designed, they also emphasize their self-reproductive properties (Mahoney & Thelen, 2010; Powell, 1991). In addition, institutions and cultural elements

such as trust reinforce one another over time, strengthening their persistence (Jones, 2006; Tabellini, 2008a).

Despite the many examples of how traumatic shocks can permanently alter institutions and social capital, even powerful shocks need not permanently reshape a country's institutional and cultural paths across history. The violently destructive and deadly Second World War bombings in Germany, Japan, and Vietnam, for example, appear to have had little effect on long-term industrial productivity or poverty (Brakman et al. 2004; Davis and Weinstein 2008; Miguel and Roland 2011). Under what conditions would we expect traumatic shocks to permanently change institutions and social capital and thereby shape modern firm ownership? First, shocks must be destructive enough to destabilize existing society. Second, shocks with longer duration will be more likely to permanently displace existing social capital and destroy institutions. Third, shocks will be less likely to change stronger and older institutions than weaker and new ones. Voigtländer and Voth (2013), for example explain the greater resilience of China than Europe to the Black Death due to its stronger institutions. Similarly, Michalopoulos and Papaioannou (2013) show how precolonial institutional strength influenced the negative effects of the colonial shock.

TESTABLE HYPOTHESES

As we have argued, traumatic shocks disrupt the historical evolution of institutions and culture, establishing new societal paths that persist to shape the modern business environment. Since traumatic shocks typically weaken formal institutions and destroy social capital, they create a long-term path toward an inhospitable environment that restricts the diffuse ownership option crucial for many firms' productivity and growth. This theoretical argument provides two testable hypotheses on the link between traumatic shocks in history and modern firm ownership structure.

The first empirical prediction is that those traumatic shocks severe enough to disrupt institutions and culture will increase ownership concentration even centuries after the shock. As

we've established, the weakened present-day institutions and social capital that have all been associated with traumatic shocks in the past are well-known to limit firm's access to diffuse ownership. Without this option, some firms that benefit from diffuse ownership are unable to achieve it, forcing them into a suboptimal ownership structure. In order to empirically identify these relationships, however, the effect of a traumatic shock must be heterogeneous across different areas, societies, or populations of people. There's widespread evidence of such heterogeneity in the effect of shocks such as the slave trade (Nunn & Wantchekon, 2011), colonialism (Michalopoulos & Pappaiannou, 2016), genocide (Grosfeld et al., 2013), and forced migration (Cookson, 2010),

We therefore expect a higher rate of concentrated ownership in areas that have suffered more severe historical traumatic shocks.

Hypothesis 1: Higher exposure to traumatic shocks in history will be associated with higher ownership concentration in modern firms.

In addition, we formally hypothesize about the historically-persistent mechanisms that we argued link traumatic shocks with modern firm ownership. We expect weak institutions and low social capital to each partially explain the relationship between the historical traumatic shocks and modern ownership concentration. More specifically, we expect that the effect of the traumatic shock on each of these three mechanisms will predict increased ownership concentration.

Hypothesis 2: The positive relationship between severe traumatic shocks in history and modern ownership concentration is mediated by inhibited institutional development and low social capital.

THE LEGACY OF THE AFRICAN SLAVE TRADE

The impact of the slave trade on institutions and social capital

Our empirical analysis focuses on the African slave trade—one of the most devastating traumatic shocks to human society in history. Between the fifteenth and the eighteenth century, twelve to eighteen million Africans were taken into slavery—reducing the continent's population by as much as 50 percent by 1850 (Lovejoy, 2000). There were four major slave trades: trans-Saharan, Red Sea, Indian Ocean and trans-Atlantic. Most slaves in early periods were prisoners of war or victims of large-scale raids, but later slaves were often sold by friends, family, and co-ethnics to traders. Koelle (1854) documented that 25 percent of a 19th century group of former slaves were captured in war, 40 percent kidnapped, and 20 percent sold by friends and relatives. Betrayals were motivated by payment or rewards (d'Almada, 1984) or in anticipation of betrayal by rivals, generating a culture of distrust within families and groups (Piot, 1996). This culture of mistrust also corrupted institutions, where rivals were condemned to slavery for witchcraft and adultery.

The slave trade had widespread impact on Africa, but its effect on specific ethnic groups varied widely. Nunn (2008) used Murdock's (1967) map of the historical homelands of 970 ethnic groups to link heterogeneous ethnicity-level slave export levels to modern country borders. Although differences across ethnic groups had many reasons, Nunn and others argue that geographic access was crucial in determining slave export levels. Africa is the only place where terrain ruggedness is positively associated with modern GDP (Nunn & Puga, 2012). Peoples in the low-lying fertile areas near demand for the slave trades were most likely to be taken (Nunn, 2008).

The heterogeneous effects on ethnic groups are evident in the psychology and economics of modern Africa. Nunn (2008) demonstrates lower economic growth in the countries with the historical homelands of decimated ethnic groups. He shows that growth was retarded through inhibited institutional development and ethnic fractionalization resulting from the slave trade. The role of ethnic fractionalization was further supported by the empirical work of Whatley and Gillizeau (2011) and Green (2013).

Subsequent work by Nunn and Wantchekin (2011), who use 20,000 modern survey responses from 185 ethnic groups, shows direct evidence of higher mistrust in among high-extraction ethnicities. Similarly, Levine *et al.* (2018) find higher levels of mistrust in financial institutions at the country level. These papers collectively suggest that institutions, social capital, and trust are likely historically persistent mechanisms through which the traumatic shock of the slave trade might shape modern firm ownership.

Why should the slave trade influence modern ownership structure?

Pierce and Snyder (2018) provide the first evidence that the slave trade shaped modern firms by restricting access to credit and capital investment. Yet these constraints likely reflect broader contracting problems with sources in weak institutions and low social capital. Indeed, Pierce and Snyder (2018) find preliminary evidence that the slave trade might shape ownership structure. They show that business groups, which are crucial for capital investment in developing countries (Khanna & Rivkin, 2001; Khanna & Yafeh, 2007; Siegel & Choudhury, 2012), have better credit access in countries in high slave-export countries.

If indeed the slave trade led to weaker institutions and reduced social capital, the prediction for ownership structure is clear—firms in high extraction countries will more likely have concentrated ownership.

DATA AND EMPIRICAL APPROACH

Data

We use two primary datasets for our analysis. The first dataset is at the country-level and details the African slave trade between A.D. 1400 and 1900. For these data, Nunn (2008) estimated the total number of slaves taken from each African country in each of the four major slave routes (Red Sea, Indian Ocean, trans-Saharan, and transatlantic), combining historical slave ethnicity data with shipping data from African ports and regions. The ethnicity data is based on the records of 80,656

slaves of 229 ethnic designations from 54 separate samples.[6] Nunn matched ethnicity-level data to traditional homelands mapped by Murdock (1967), which was then aggregated to produce slave export data for 52 modern countries.

The second dataset is business establishment-level data from the World Bank Enterprise Survey (WES) from 2006-2016, which includes responses from 127,000 firms in 139 countries. The surveys ask managers and owners for opinions and information on firm characteristics, business practices, productivity, and business obstacles. The WES covers 41 countries in Africa for which we have historical slave export data, providing rich self-response data on approximately 30,000 firms. Most of the missing countries are in North Africa, where slave exports were relatively low (see Appendix Figures 1a and 1b). North Africa is both ethnically, religiously, and culturally very different from sub-Saharan Africa, and historically was far more likely to import slaves than to source them locally, so their exclusion is consistent with studying slave extraction where extraction was targeted.

We combine these country- and establishment-level datasets and add country-level data for institutions and social capital as well as important control variables that might also correlate with both the slave trade and ownership structure. Table 1 presents summary statistics for country- and firm-level variables (see Appendix Table 1 for correlations).

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Dependent variables: We use two firm-level dichotomous dependent variables drawn directly from ownership form questions in the WES. The first indicates that the firm is a sole proprietorship (57% of sample). The second indicates that the firm has a majority owner. Since this includes sole proprietorships, it represents 85% of our sample. These high concentration levels are representative of firms in developing countries.

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[6] See Nunn (2008) for details on the development of this database.

We acknowledge that there are many different types of ownership concentration that are unobservable within our data, including institutional ownership (Hoskisson et al., 2002), family ownership (Chua et al., 2012; Miller, Le Breton-Miller, & Lester, 2011), and intercorporate networks (Gedajlovic & Shapiro, 2002). Even within each of these concentrated ownership structures, substantial differences exist (Cannella, Jones, & Withers, 2015). Given that 85% of our sample has a majority owner, we are truly testing extreme concentration versus a mix of both diffuse and still moderately concentrated firms. In our African setting, this comparison makes sense because even mildly diversifying ownership to the point of no majority ownership (such as many of the family firms in Cannella *et al.* (2015)) in many of our sample countries is unusual.

Explanatory variable: Our key independent variable is country-level slave exports, which we measure using the logged number of slaves divided by geographic area in square kilometers. There is wide variation in this measure based on some countries with few recorded enslavements (Rwanda or Botswana) and others with millions (Angola or Ghana).

Historically-persistent mechanisms: We use three country-level measures of institutional strength and social capital. Social capital is measured at the country-level using modern-day ethnic fractionalization data from Alesina *et al.* (2003). Although ethnic fractionalization is not the only or necessarily best measure of social capital in the literature (Woolcock, 2001), it is available as cross-national data in Africa and is linked to both the slave trade (Nunn, 2008; Whatley and Gillezeau, 2011) and development there (Michalopoulos & Papaioannou, 2016).

We alternatively measure social capital at the individual level using modern-day mistrust in financial institutions (Levine *et al.*, 2018), a dummy variable from the World Bank's *Financial Inclusion Data* that indicates that the respondent did not have a bank account because he or she did not trust financial institutions. This measure is imperfect because it also partially measures financial institutions, but is the only trust measure for which we have sufficient country-level (33)

data. Although prior work has used trust questions from Afrobarometer (Nunn & Wantchekon, 2011) and World Values Survey (Guiso et al., 2006), the insufficient country-level overlap of these surveys with our slave data does not provide enough variation to test this mechanism. Nunn and Wantchekon (2011) exploited variation within countries in both respondent and regional ethnicity, but the WES firm respondents are concentrated in a few large and ethnically-diverse cities, with no information on the ethnic composition of the firms. Indeed, the variation in ownership structure in our data is mainly at the country level, not the regional level. In unreported results, we find that country-fixed effects explain twice as much variation in ownership than is explained by region.

We measure institutional strength with precolonial institution measures from Gennaioli and Rainier (2007), who calculate count-level measures of historical government centralization from Murdock's (1967) precolonial (but post-slave trade) measures of ethnicity-level government hierarchy. As Gennaioli and Rainier (2007) argue, these precolonial institutional measures are uncorrupted by the huge effects of colonialism in the late 19th and 20th centuries and thus provide a cleaner link to the slave trade than modern institutional measures. Furthermore, this measure has been linked to modern African economic development (Michalopoulos & Papaioannou, 2013). In contrast, precolonial measures are likely less-tightly linked to modern ownership structure than would be modern ones. This is an inevitable tradeoff in our choice of how to measure institutions in our models.

Country-level controls: The remaining country-level variables represent standard controls for cross-country research in Africa (Besley & Reynal-Querol, 2014; Nunn, 2008) that likely also influence economic outcomes. The first group is European colonizer dummies, which were influential in African development (Acemoglu et al., 2001). We also include environmental and geographic characteristics such as monthly rainfall, longitude, distance from equator, humidity, minimum temperature, coastline length (logged), and an island dummy. Controls for natural

resource wealth include per capita oil, diamonds, and gold. Also included are institutional and cultural factors that include adherence to Islam and dummies for historical communism and French legal origins.

Firm-level controls: Also included are dummies indicating three WES size categories based on employment: small (20 or less), medium (between 21 and 99), and large (100 or more). We also control for 28 industry sectors. The infeasibility of controlling for the prevalence of 28 industries in 41 countries necessitates the firm-level analysis in the paper.

EMPIRICAL ANALYSIS

The total effect of slave extraction on concentrated ownership

We test Hypothesis 1 by examining whether firms in high-slave-export countries are more likely to be sole proprietorships. We use linear probability models, where sole proprietorship is regressed on the logged number of extracted slaves (normalized by geographic area) and our country- and firm-level controls. Our primary models use firm-level data to control for important sector-specific differences in ownership that cannot be included as country-level averages due to the limited degrees of freedom. We cluster standard errors at the country level. The baseline specification is:

$$(1)\ y_{ik} = \beta_0 + \beta_1 \ln(\text{slave exports}_k / area_k) + \boldsymbol{C}_k' \delta + \boldsymbol{X}_k' \gamma + \boldsymbol{Z}_i' \lambda + \varepsilon_{ik},$$

where y_{ik} is a dummy variable indicating that respondent i in country k is a sole proprietorship and $\ln(\text{slave exports}_k / area_k)$ is the natural log of the number of slaves extracted from country k between 1400 and 1900 normalized by land area. $\mathbf{C}_k$ is a vector of dummy variables representing the European colonizer prior to independence; $\mathbf{X}_k$ is a vector of geographic, climate, and cultural control variables; and $\mathbf{Z}_i$ is a vector of 28 industry sector dummies and three firm-size dummies.

Figure 3 presents the raw data representing this approach, showing that sole proprietorship in a country is positively correlated with historical slave exports (see Appendix Figure 2 for majority ownership). We present regression results in Table 2A, with standard errors in

parentheses and p-values in brackets. Column (1) presents estimates without controls, while columns (2)-(4) cumulatively add controls. Column (5) implements a multi-level model with country-level random effects and firm-level controls.[7] Column (6) alternatively uses logistic regression. All models indicate a substantial positive relationship between slave exports and sole proprietorship that supports Hypothesis 1. The baseline results suggest that 67 percent of firms in the above-median slave export countries would have sole proprietorship, while the below-median would have 46 percent. Furthermore, it implies that the difference in the percentage of sole proprietorships between the lowest and the highest slave trade countries is 43 percentage points.

--------- INSERT FIGURE 3 HERE -------------

--------- INSERT TABLES 2A AND 2B HERE -------------

Column (7) implements a country-level instrumental variable model to address concerns of endogeneity in the choice by slave traders of where to capture slaves. The primary concern is that slave traders may have captured people historically living within current national boundaries based on pre-existing culture or institutions, which in turn might correlate with modern ownership structure. Nunn (2008) presents strong evidence dispelling this argument. The slave trade was more prevalent in wealthier and less geographically rugged societies (measured by population density). For robustness, we implement Nunn's (2008) IV model using the distance from each African country to the four demand market locations for the major slave trades.

We use all four instruments in our IV model. Our instruments are weak, with just 41 observations (F-stat is 4.52), so we use Moreira's (2003) conditional likelihood confidence interval correction (Andrews, Moreira, & Stock, 2006), which provides the range of estimates that cannot be rejected with 95 percent confidence. The IV model in column (7) is consistent with the OLS and logit models, finding a positive relationship between slave extraction and sole proprietorship.

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[7] These are frequently referred to as hierarchical linear models in the management literature.

Our IV model does not definitively establish a causal effect from the slave trade to modern ownership concentration, but it raises confidence that our models are not explained be the endogenous historical choice of extraction by slave traders.

Table 2B alternatively uses majority ownership as the dependent variable. Consistent with sole proprietorship, high slave export countries have higher rates of majority ownership, regardless of the set of included control variables. The baseline models suggest that 89 percent of firms in the above-median slave extraction countries have a majority owner, with considerably fewer (80 percent) in the below-median extraction countries. The results are also robust to our IV model. Collectively, Tables 2A and 2B support Hypothesis 1.

As an alternative measure of ownership concentration, we use whether or not the manager reported a corporate ownership structure, which in Africa likely reflects more diffuse ownership structures. These results, presented in Appendix Table 3, are consistent with Hypothesis 1. Firms in high slave trade countries are significantly less likely to have a corporate structure.

Manufacturing sector particularly restricted

We next examine ownership structure in a sector where investment capital is crucial for growth and productivity—manufacturing. Capital investment requirements have grown substantially in manufacturing as technological advances raised the capital equipment to production labor ratio (Berman, Bound, & Griliches, 1994). We repeat our linear probability model in equation (1), but interact slave exports with the dummy for manufacturing sector. Consequently, the coefficient on slave exports can be interpreted as the relationship between ownership structure and the slave trade in all other sectors, while the interaction is any addition effect in the manufacturing sector.

We present model results in Tables 3A and 3B for both sole proprietorship and majority ownership, respectively. Column (1) presents the model without interactions, and confirms that manufacturing firms are less likely to be solely or majority owned on average. Columns (2)-(6)

indicate that the gap between manufacturing and other firms in high slave export countries is much smaller. In the above-median slave export countries, manufacturing firms are one percentage point more likely to be solely owned, while in below-median slave export countries manufacturing firms are 13 percentage points *less* likely to be solely owned. As we noted earlier, given the credit restrictions in high slave export countries, this suggests substantial capital restriction that might limit the investments necessary to reach efficient scale or to adopt modern technology.

--------- INSERT TABLES 3A AND 3B HERE -------------

Evidence on historically persistent mechanisms

We next test for the historically persistent mechanisms of institutions and social capital predicted in Hypothesis 2. As we noted earlier, we will measure low social capital in two ways: at the country level with ethnic fractionalization data on 41 countries from Alesina *et al.* (2003) and at the individual level using mistrust in financial institutions (Levine *et al.,* 2018). We measure institutions using precolonial data on 38 countries from Gennaioli and Rainier (2007).

We test for these mechanisms in two ways that approximate mediation analysis. We first implement two-stage-least squares (2SLS) models in which slave extraction is used to predict the component of each mechanism associated with modern ownership concentration (Shaver, 2005). We introduce each mechanism measure in a separate 2SLS regression. The slave trade explaining the relationship between each mechanism and ownership concentration would be consistent with Hypothesis 2. Our second approach is to use structural equation modeling (SEM) for estimating standard mediation analysis that calculates direct, indirect (as product of coefficients), and total effects for each mechanism (MacKinnon, 2012), with standard errors generated through country-level clustering and boostrapping.[8] We implement both single-mediator models for each mechanism measure and a multiple-mediator model that includes all three..

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[8] We implement this using the sem command in Stata® 15.

We note several major challenges with cleanly identifying institutions and social capital as mechanisms connecting the historical slave trade and modern firm ownership concentration. The first is statistical power. Even though we have nearly 30,000 firms, both our independent variable and mediators are country-level variables, effectively giving us 33-41 observations. Nunn (2008: 164), who enjoyed a larger sample because he did not match with WES data, noted that "with only 52 observations it is not possible to pin down the precise channels and mechanism underlying the relationships with any reasonable degree of certainty." This provides sufficient power for our base regressions in Tables 2 and 3 but is far too low for a structural equation model (Fritz & MacKinnon, 2007; MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002), particularly with multiple correlated mediators. In an unreported exercise, we determined that our cross-country mediation models would require at least 300 countries to estimate our effect size with p-values below 0.05. Second, our mechanisms are heavily correlated with one another (see Appendix Table 1), and are acknowledged to influence one another across history, so a clear causal path is impossible to identify.

Third, our 2SLS models violate the exclusion restriction, given that social capital and institutions cannot be the only paths through which the slave trade has shaped ownership across time. For example, although ethnic fractionalization is one channel through which the slave trade could affect ownership structure, there are many other plausible channels. Our empirical results, which show only partial mediation, accord with this. Finally, measurement error is pervasive. The variables available to us to measure social capital and institutions at the country level are imprecisely measured. So we caution that these models cannot be considered valid instrumental variable models.

Social capital: Tables 4A and 4B present our tests for social capital as a mechanism for both sole proprietorship and majority ownership. For each, column (1) presents the 2SLS estimate

for ethnic fractionalization. There is a strong association between slave extraction and ethnic fractionalization in the first stage, with slave extraction explaining 48 percent of the variation (R^2) in fractionalization.[9] Column (2) of Table 4A shows that the variation in fractionalization explained by the slave trade strongly predicts sole proprietorship. Figures 3A and 3B in the Appendix represent the first and second stage of the 2SLS estimation.

Figure 3C in the Appendix, presents our SEM mediation model, with columns (2)-(4) of Table 4A presenting the key regressions estimates. Columns (2) and (3) show that both slave extraction and fractionalization increase sole proprietorship. Column (4) shows that when both are included as regressors, they continue to positively correlate with sole proprietorship, although the fractionalization estimate becomes significantly smaller and imprecise. Consequently, although directionally consistent with Hypothesis 2, the indirect effect presented in Table 5 is statistically insignificant. Table 4B provides similar results for majority ownership.[10]

Columns (5)-(8) repeat these models (represented in Appendix Figures 4A-4C) using our individual mistrust measure of social capital. Similar to ethnic fractionalization, 2SLS models are consistent with mistrust as a mechanism. Although both mistrust and slave extraction are positively related to sole proprietorship, however, when they are both included in column (8), the coefficient on mistrust effectively becomes zero, as does the indirect effect in Table 5. Evidence on mistrust is mixed.

Collectively, these models are consistent with low social capital as a possible mechanism through which the historical slave trade affects ownership concentration, although the SEM results are imprecise and the models underpowered.

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[9] The Appendix presents Figures 7a through 9b representing the first and second stage of these 2SLS models for all three of our mechanisms. Slave exports is strongly correlated with all three mechanisms, while the predicted value from the first stages are strongly correlated with ownership concentration.

[10] Appendix Table 4 presents instrumental variable models to address the possibility that slave extraction is correlated with pre-existing fractionalization. Results are robust to these models.

--------- INSERT TABLES 4A AND 4B HERE -------------

Institutional inhibition: We implement 2SLS and SEM models (represented in Appendix Figures 5A-5C) on using our precolonial institutions measure in columns (9)-(12) in Tables 4B and 4C. Similar to our social capital models, 2SLS models in column (9) support the slave trade explaining some of the relationship between institutions and ownership structure. The mediation models in columns (10)-(12) are consistent with institutions as a mechanism, although the coefficient on precolonial institutions becomes imprecise in column (12), as is the indirect effect in Table 5. Models predicting majority ownership in Table 4B are similar but less precise. Collectively, these results are consistent with Hypothesis 2, but our mediation models are imprecise.

Multiple mediation models. Finally, we implement a multiple mediation model using the SEM model represented in Appendix Figure 6. Collectively, our three mediators appear to account for approximately 20% of the total effect (see Table 5). We note that although all parameter estimates are consistent with our hypotheses, they are generally imprecisely estimated, more so than in the single mediation models because of the correlation and theoretical interrelation between our three mechanisms. Jointly the mediators are significant with a p-value of approximately 0.14.

DISCUSSION AND CONCLUSION

Our theoretical contribution in this paper is to extend prior management theory by introducing historical traumatic shocks as drivers of the relationship between ownership structure and both institutions and social capital. Our model therefore recasts institutions and social capital as historically persistent mechanisms through which historical shocks can shape modern firms. Our empirical setting with one of the most traumatic shocks in history, the African slave trade, supports our hypotheses, and is consistent with broad contracting problems in slave trade countries that go beyond the credit effects found in prior work. Firms in countries with historical slave exports are

more likely to have ownership concentrated in one individual, which suggests they are unable to access important resources or equity-based capital for investments and growth. Although we recognize that many firms might choose concentrated ownership even under conditions of strong institutions and social capital, the severe restrictions in our settings (with 85% majority ownership) almost certainly represent many firms giving up substantial resource- and capital-based benefits from diffuse ownership.

We note that the many long-term problems associated with the slave trade compound with the costs of concentrated ownership. Equity markets are an important alternative to corporate debt in markets where credit is scarce. Given the results in Pierce and Snyder (2018) and Levine *et al.* (2018) that show constrained access to credit, our results present a grim picture for access to capital. Indeed, we observe manufacturing firms, who are particularly reliant on capital to achieve production efficiency and scale, comparatively more concentrated in high slave-trade countries.

We caution that, like most papers studying shocks from centuries past, we cannot strongly establish causality. Still, the robustness of our slave trade evidence to comprehensive control variables and instrumental variables reduces omitted variable bias and endogenous slave trade concerns. Furthermore, definitively isolating the mechanisms through which the slave trade continued to influence ownership across centuries is impossible. The complexity of history as well as the limitations of cross-national studies are certainly reflected in the imprecision of our mediation estimates. We note that our study demonstrates why achieving precise mediation results is nearly impossible in studies where both explanatory and mediating variables are at the national level, and where standard errors are calculated correctly (in our case with clustering and bootstrapping). For this reason, acquiring more local measures of mechanisms when available is important for future research. In the spirit of Rowlinson, Hassard, and Decker (2014), we must further rely on the substantial historical and empirical evidence corroborating the link between the

two mechanisms of ethnic fractionalization and weak institutions and both the slave trade and contracting problems. And as Klüppel *et al.* (2018) note, they all are likely to influence one another over time, making their historical paths intermingled and impossible to separate. This inseparability is reflected in their correlation with one another as well as in our multiple mediation model.

We also note that although our paper identifies the impact of a traumatic shock from centuries in the past, these shocks continue to emerge in modern society and will undoubtedly shape future firms. Recent work by Paruchuri and Ingram (2012) and Carnahan, Kryscynski, and Olson (2018) show that modern shocks such as the September 11 attacks can have immediate and potentially long-lasting effects on current and future firms. Emerging traumatic shocks such as climate change (Tumen, 2016), conflict (Blumenstock et al., 2017), natural disaster (Dutta, 2017), and epidemic disease (Rao & Greve, 2017) are all likely to reshape institutions and social capital as well as the ownership structure of future firms.

Finally, our paper highlights important efforts to increase research on the role of firms in African development. As our study shows, African managers and business owners face obstacles to growth in equity markets, with many other obstacles to business identified in the WES survey. Despite the enormity of these problems and the high returns to solving them, management and strategy scholars have typically ignored Africa, with most papers published in the last two years. Of these recent papers, only a few exploit data across a broad range of African countries. As George and colleagues (2016b) note, we need more papers studying African firms. Clearly, there is much more to be done, and history can play an important role in this endeavor. As Austin *et al.* (2017) argue, emerging markets such as Africa have unique business histories that are not simply variants of the history of more commonly studied developed economies. Yet the substantial evidence across continents linking traumatic shocks to institutions and culture (Kluppel et al.,

2018), as well as emerging work linking them with firm characteristics (e.g., Cookson, 2010) suggests that our model and results apply beyond Africa.

In our view, the principal constraint for expanding this research is accurate firm-level data. To the best of our knowledge, the WES is the only accessible dataset with wide coverage of African firms, at it lacks many of the rich detailed questions on ethnicity, trust, and networks that would facilitate future research. The Global Database on Events, Location and Tone (GDELT), based on millions of media reports across the globe, provides a promising new opportunity for studying firms in developing countries (Henisz, 2018; Henisz & Mansfield, 2017). We are hopeful that future private or public efforts such as this will gather detailed cross-national data, and believe developing such data will be the primary driver of building our knowledge of doing business in Africa in the future.

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Figure 1: Existing Models of Institutions, Social Capital, and Modern Ownership
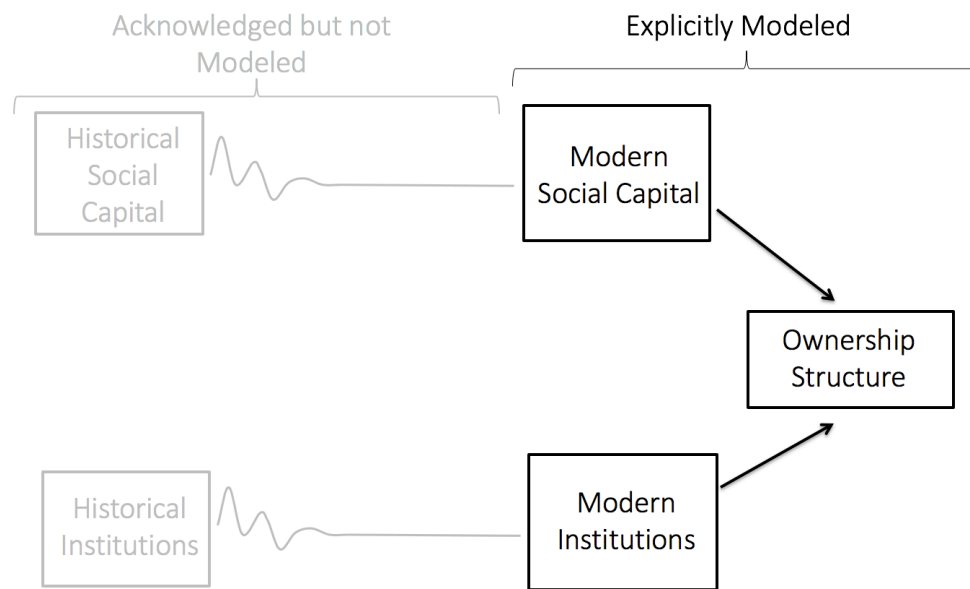

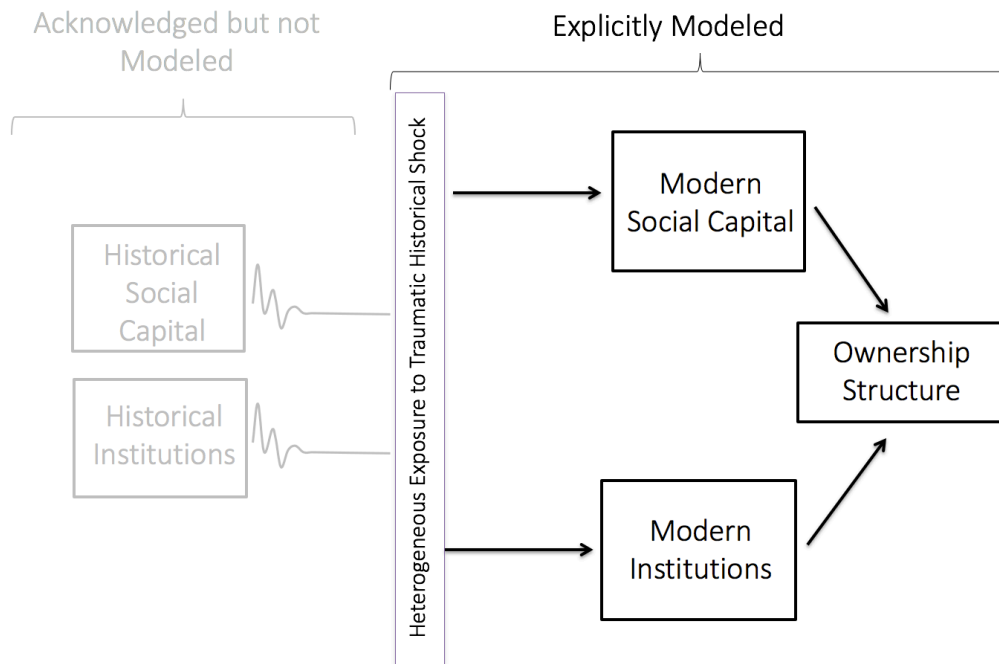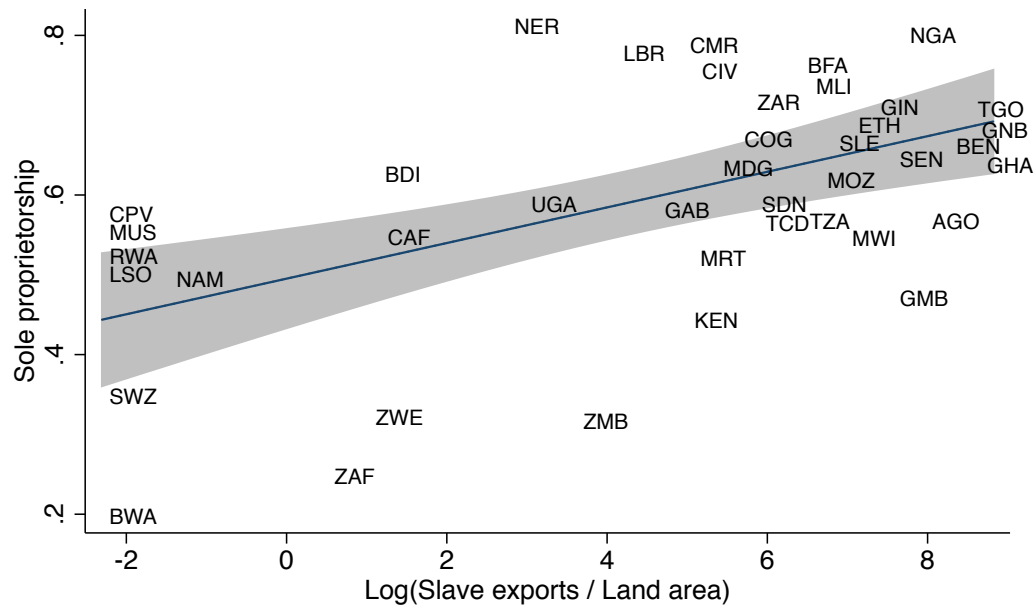## Figure 2: Extended Model of Traumatic Shocks and Modern Ownership

Figure 3
Sole ownership and slave exports

Data comes from Nunn (2008) and the World Enterprise Survey data. Small changes to the positions of the countries were made to prevent the overlapping of the country labels.

Table 1
Summary statistics

	Obs	Mean	SD	Min	Max
Country-Level Variables					
Log(Slave exports / Land area)	41	4.26	3.62	-2.30	8.82
Ethnic fractionalization	41	0.69	0.20	0.06	0.93
Precolonial institutions	38	0.56	0.31	0.00	1.00
Mistrust in financial sector	33	0.10	0.06	0.00	0.25
British colony	41	0.39	0.49	0.00	1.00
French colony	41	0.37	0.49	0.00	1.00
Netherlands colony	41	0.07	0.26	0.00	1.00
Portuguese colony	41	0.10	0.30	0.00	1.00
Log(Coastline / Land area)	41	-0.97	3.05	-4.61	5.48
Log(Population 1400)	41	-1.20	2.05	-8.59	1.74
Absolute latitude	41	12.33	7.89	0.20	30.00
Longitude	41	14.88	19.92	-24.04	57.79
Min of monthly average rainfall (mm)	41	7.68	11.46	0.00	46.00
Max of monthly afternoon avg humidity	41	71.41	11.72	35.00	95.00
Min of avg monthly low temp (C)	41	8.63	7.22	-9.00	19.00
Log(Land area in millions of sq. kms)	41	-1.43	1.74	-6.29	0.92
Indicator variable for small islands	41	0.05	0.22	0.00	1.00
Percent Islamic	41	25.88	31.67	0.00	99.00
Former communist country	41	0.10	0.30	0.00	1.00
Legal origin indicator: French	41	0.59	0.50	0.00	1.00
Log(Diamond production per capita)	41	-5.11	2.57	-6.91	2.19
Log(Oil production per capita)	41	-7.30	3.52	-9.21	2.65
Log(Gold production per capita)	41	-5.99	5.34	-13.82	3.08
Minimum Atlantic distance (000s of kms)	41	6.84	2.95	3.65	15.25
Minimum Indian distance (000s of kms)	41	6.56	3.61	0.03	11.91
Minimum Saharan distance (000s of kms)	41	3.83	1.38	1.77	6.64
Minimum Red Sea distance (000s of kms)	41	3.69	1.39	0.51	6.47
Firm-Level Variables					
Sole proprietorship	30,004	0.57	0.50	0.00	1.00
Small size firm	30,965	0.62	0.49	0.00	1.00
Medium sized firm	30,965	0.27	0.45	0.00	1.00
Large sized firm	30,965	0.11	0.31	0.00	1.00
Majority owner	29,754	0.85	0.36	0.00	1.00
Self-reported: Did not need a loan last year	23,454	0.43	0.49	0.00	1.00

Note: See Nunn (2008) for detailed description of country-level variables and the sources for each variable.

Table 2A and 2B
Slave trade and ownership structure

Table 2A

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Dependent variable: Sole proprietorship						
Log(Slave exports / Land area)	0.039***	0.032***	0.032***	0.016***	0.018***	0.073***	0.043***
	(0.008)	(0.006)	(0.007)	(0.005)	(0.006)	(0.026)	
	[0.00]	[0.00]	[0.00]	[0.01]	[0.01]	[0.00]	
							[.025 , .083]
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	No
Sector and firm size controls	No	Yes	Yes	Yes	Yes	Yes	No
Colonizer controls	No	No	Yes	Yes	No	Yes	No
Geography controls	No	No	No	Yes	No	Yes	No
Specification	OLS	OLS	OLS	OLS	RE	Logit	IV
Unit of Analysis	Firm	Firm	Firm	Firm	Firm	Firm	Country
Clusters	41	41	41	41	41	41	41
Observations	30,004	30,004	30,004	30,004	30,004	30,004	41

Table 2B

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Dependent variable: Majority owner						
Log(Slave exports / Land area)	0.016***	0.013***	0.013***	0.013***	0.011***	0.070**	0.024***
	(0.003)	(0.003)	(0.003)	(0.005)	(0.003)	(0.035)	
	[0.00]	[0.00]	[0.00]	[0.01]	[0.00]	[0.05]	
							[.014 , .051]
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	No
Sector and firm size controls	No	Yes	Yes	Yes	Yes	Yes	No
Colonizer controls	No	No	Yes	Yes	No	Yes	No
Geography controls	No	No	No	Yes	No	Yes	No
Specification	OLS	OLS	OLS	OLS	RE	Logit	IV
Unit of Analysis	Firm	Firm	Firm	Firm	Firm	Firm	Country
Clusters	41	41	41	41	41	41	41
Observations	29,754	29,754	29,754	29,754	29,754	29,754	41

Note: *, **, and *** indicate significance at the 10%, 5%, and 1% confidence levels, respectively. *, **, and *** indicate significance at the 10%, 5%, and 1% confidence levels, respectively. Parentheses contain standard errors clustered at the country level, brackets contain p-values, except in column (7) where they contain confidence intervals. Slave exports / Land area is measured as slaves exported per million square kilometers. Firm controls include sector indicators and size indicators. Colonizer controls include British, French, Portuguese, and Belgium indicators. Geography controls include longitude, absolute latitude, lowest month rainfall, maximum humidity, coastline area, island indicator, diamond production per capita, gold production per capita, and oil production per capita. Instrumental variables regression (7) use distance from slave ports as instruments.

Table 3A and 3B
Slave trade and ownership structure:
Cross-industry differences

Table 3A

	Dependent variable: Sole proprietorship					
	(1)	(2)	(3)	(4)	(5)	(6)
Log(Slave exports / Land area)	0.038***	0.029***	0.029***	0.013**	0.014**	0.033**
	(0.007)	(0.006)	(0.006)	(0.005)	(0.006)	(0.016)
	[0.00]	[0.00]	[0.00]	[0.02]	[0.03]	[0.05]
Manufacturing sector	-0.120***	-0.196***				
	(0.030)	(0.017)	Absorbed	Absorbed	Absorbed	Absorbed
	[0.00]	[0.00]				
Slave exports * Manufacturing sector		0.024***	0.012**	0.009***	0.018***	0.007**
		(0.003)	(0.004)	(0.002)	(0.004)	(0.003)
		[0.00]	[0.01]	[0.00]	[0.00]	[0.02]
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Sector and firm size controls	No	No	Yes	Yes	Yes	Yes
Colonizer controls	No	No	No	Yes	No	No
Geography controls	No	No	No	Yes	No	No
Specification	OLS	OLS	OLS	OLS	RE	OLS
Country fixed effects	No	No	No	No	No	Yes
Clusters	41	41	41	41	41	41
Observations	30,004	30,004	30,004	30,004	30,004	30,004

Table 3B

	Dependent variable: Majority owner					
	(1)	(2)	(3)	(4)	(5)	(6)
Log(Slave exports / Land area)	0.015***	0.012***	0.011***	0.011**	0.010***	0.032***
	(0.003)	(0.003)	(0.003)	(0.005)	(0.003)	(0.008)
	[0.00]	[0.00]	[0.00]	[0.02]	[0.00]	[0.00]
Manufacturing sector	-0.044***	-0.071***				
	(0.015)	(0.011)	Absorbed	Absorbed	Absorbed	Absorbed
	[0.01]	[0.00]				
Slave exports * Manufacturing sector		0.008***	0.007**	0.006***	0.008***	0.005***
		(0.002)	(0.003)	(0.002)	(0.002)	(0.002)
		[0.00]	[0.02]	[0.01]	[0.00]	[0.01]
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Sector and firm size controls	No	No	Yes	Yes	Yes	Yes
Colonizer controls	No	No	No	Yes	No	No
Geography controls	No	No	No	Yes	No	No
Specification	OLS	OLS	OLS	OLS	RE	OLS
Country fixed effects	No	No	No	No	No	Yes
Clusters	41	41	41	41	41	41
Observations	29,754	29,754	29,754	29,754	29,754	29,754

Note: *, **, and *** indicate significance at the 10%, 5%, and 1% confidence levels, respectively. Parentheses contain standard errors clustered at the country level and brackets contain p-values. Slave exports / Land area is measured as slaves exported per million square kilometers. Firm controls include sector indicators and size indicators. Colonizer controls include British, French, Portuguese, and Belgium indicators. Geography controls include longitude, absolute latitude, lowest month rainfall, maximum humidity, coastline area, island indicator, diamond production per capita, gold production per capita, and oil production per capita.

Table 4A
Slave Trade: Mechanisms

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
					Dependent variable: Sole proprietorship							
Log(Slave exports / Land area)		0.032*** (0.006) [0.00]		0.029*** (0.006) [0.00]		0.034*** (0.007) [0.00]		0.035*** (0.008) [0.00]		0.029*** (0.006) [0.00]		0.026*** (0.005) [0.00]
Ethnic fractionalization	1.259*** (0.320) [0.00]		0.480*** (0.132) [0.00]	0.105 (0.118) [0.38]								
Mistrust in financial sector					4.920** (2.137) [0.02]		1.076*** (0.322) [0.00]	-0.158 (0.510) [0.76]				
Precolonial institutions									-1.202*** (0.438) [0.01]		-0.208* (0.116) [0.08]	-0.116 (0.101) [0.26]
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	."Yes"	Yes	Yes	Yes	Yes
Sector and firm size controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Specification	2SLS	OLS	OLS	OLS	2SLS	OLS	OLS	OLS	2SLS	OLS	OLS	OLS
Clusters	41	41	41	41	33	33	33	33	38	38	38	38
Observations	30,004	30,004	30,004	30,004	28,012	28,012	28,012	28,012	28,286	28,286	28,286	28,286

Note: *, **, and *** indicate significance at the 10%, 5%, and 1% confidence levels, respectively. Parentheses contain standard errors clustered at the country level and brackets contain p-values. Slave exports / Land area is measured as slaves exported per million square kilometers. Firm controls include sector indicators and size indicators. Column (6) is run on the set of countries where financial mistrust data exists. Column (10) is run on the set of countries where pre-colonial institutions data exists. Columns (1), (5), and (9) use Log(Slave exports / Land area) as an instrument for the independent variable.

Table 4B
Slave Trade: Mechanisms

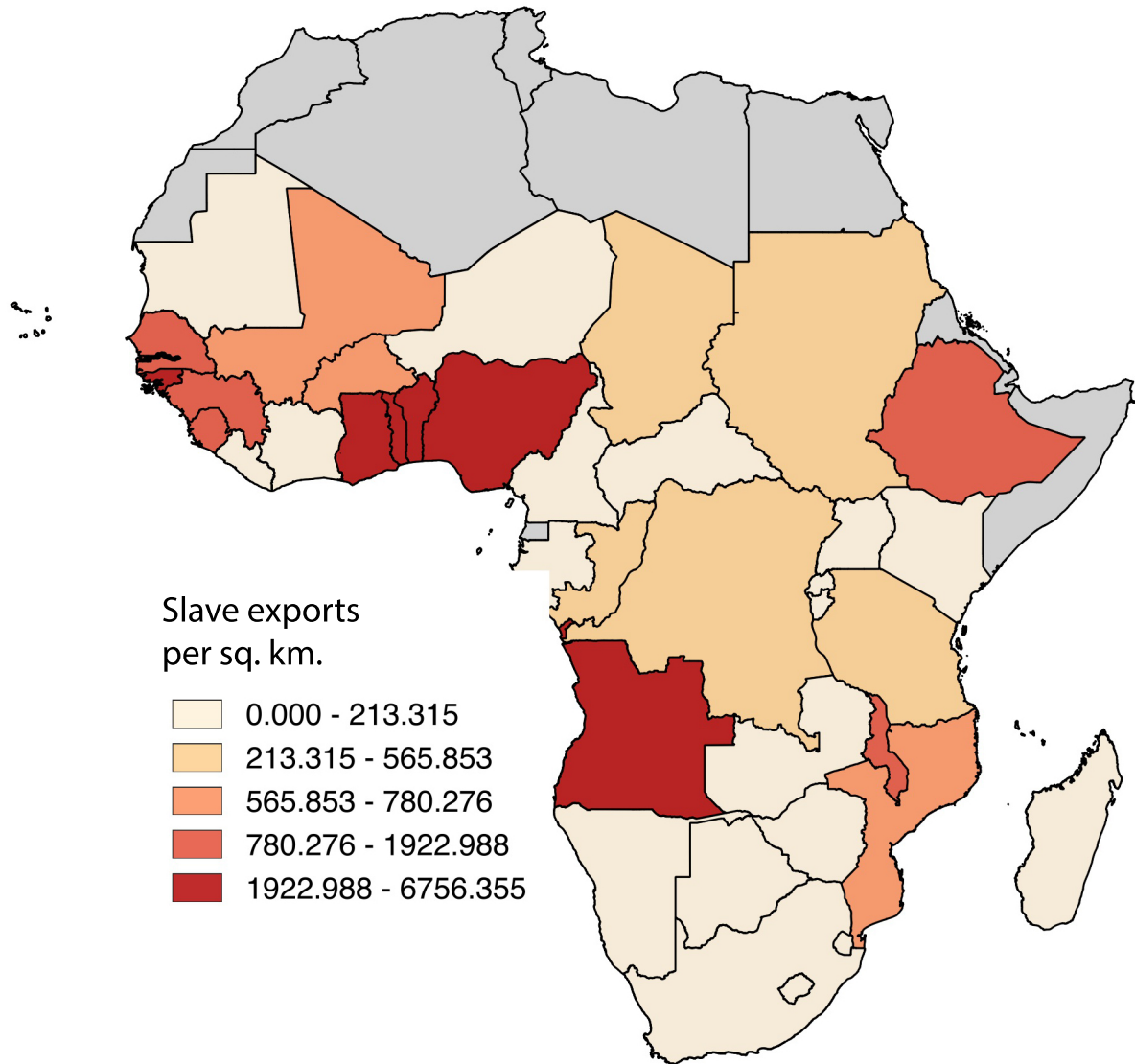|	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
						Dependent variable: Majority owner						
Log(Slave exports / Land area)	0.532*** (0.129) [0.00]	0.013*** (0.003) [0.00]		0.010*** (0.003) [0.00]		0.014*** (0.003) [0.00]		0.014*** (0.004) [0.00]		0.015*** (0.004) [0.00]		0.015*** (0.004) [0.00]
Ethnic fractionalization			0.254*** (0.074) [0.00]	0.121 (0.073) [0.11]								
Mistrust in financial sector					2.054** (0.887) [0.02]		0.435** (0.204) [0.04]	-0.069 (0.273) [0.80]				
Precolonial institutions									-0.631*** (0.226) [0.01]		-0.070 (0.084) [0.41]	-0.019 (0.078) [0.81]
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	."Yes"	Yes	Yes	Yes	Yes
Sector and firm size controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Specification	2SLS	OLS	OLS	OLS	2SLS	OLS	OLS	OLS	2SLS	OLS	OLS	OLS
Clusters	41	41	41	41	33	33	33	33	38	38	38	38
Observations	29,754	29,754	29,754	29,754	27,805	27,805	27,805	27,805	28,286	28,286	28,286	28,286

Note: *, **, and *** indicate significance at the 10%, 5%, and 1% confidence levels, respectively. Parentheses contain standard errors clustered at the country level and brackets contain p-values. Slave exports / Land area is measured as slaves exported per million square kilometers. Firm controls include sector indicators and size indicators. Column (6) is run on the set of countries where financial mistrust data exists. Column (10) is run on the set of countries where pre-colonial institutions data exists. Columns (1), (5), and (9) use Log(Slave exports / Land area) as an instrument for the independent variable.

Table 5
Mediation Analysis: Slave trade channels

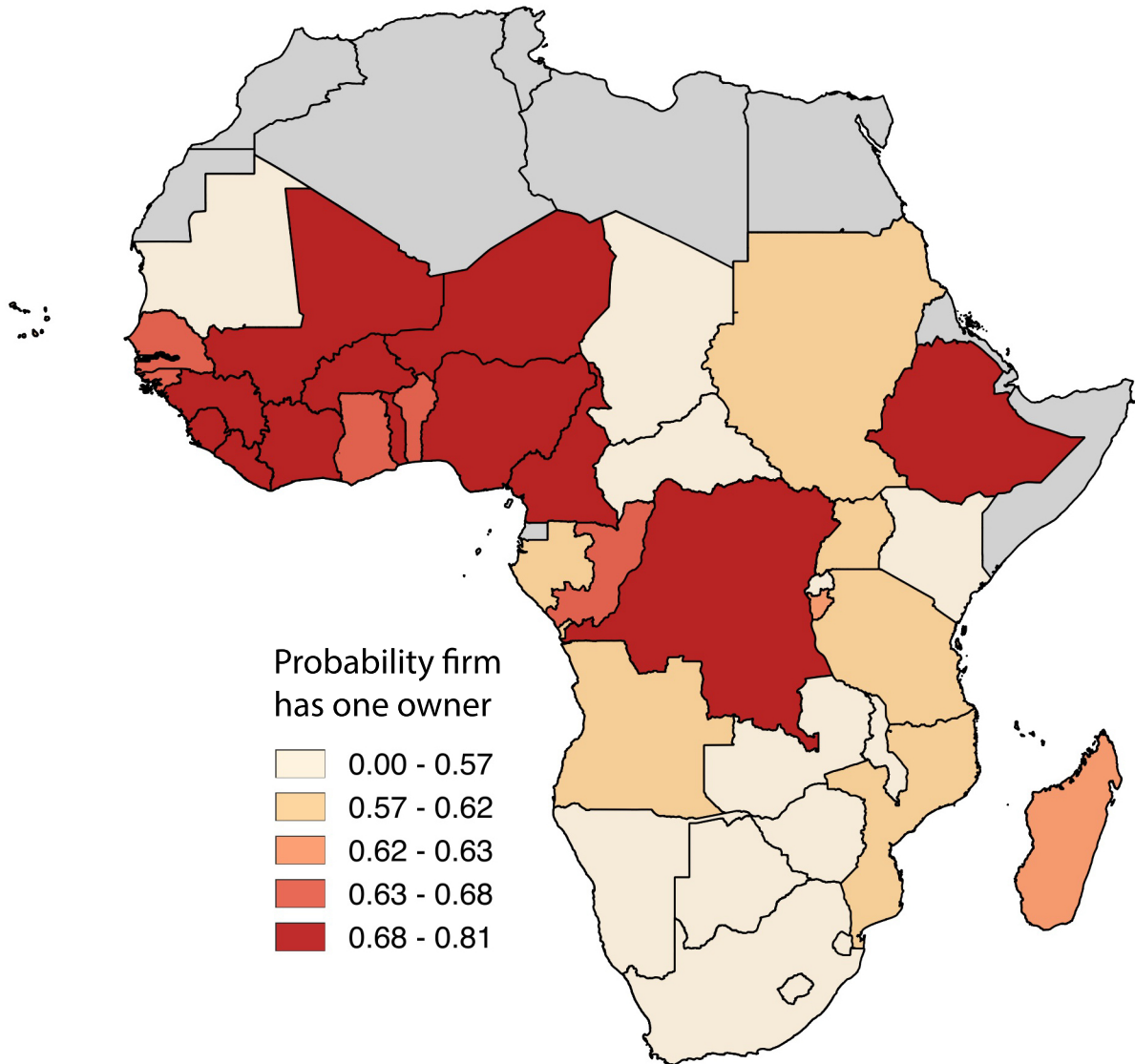| | Dependent variable: Sole proprietorship | | |
	Direct effect	Indirect effect	Total effect
(1) Mediator: Ethnic fractionalization	0.029***	0.002	0.031***
	(0.006)	(0.002)	(0.006)
	[0.00]	[0.41]	[0.00]
(2) Mediator: Mistrust in financial sector	0.035***	-0.001	0.034***
	(0.008)	(0.003)	(0.007)
	[0.00]	[0.743]	[0.00]
(3) Mediator: Precolonial institutions	0.026***	0.003	0.029***
	(0.005)	(0.003)	(0.010)
	[0.00]	[0.346]	[0.00]
(4) Mediators: Ethnic fractionalization,	0.024***	0.006	0.030***
Precolonial institutions,	(0.006)	(0.004)	(0.007)
and Mistrust in financial sector	[0.00]	[0.132]	[0.00]

Note: *, **, and *** indicate significance at the 10%, 5%, and 1% confidence levels, respectively. Parentheses contain standard errors clustered at the country level and brackets contain p-values. Slave exports / Land area is measured as slaves exported per million square kilometers. Firm controls include sector indicators and size indicators in all regressions.

Appendix Figure 1a
Slave exports across Africa

Slave exports
per sq. km.

☐	0.000 - 213.315
☐	213.315 - 565.853
☐	565.853 - 780.276
☐	780.276 - 1922.988
☐	1922.988 - 6756.355

Data comes from Nunn (2008).

Appendix Figure 1b
Sole ownership of firms across Africa

Probability firm has one owner

- 0.00 - 0.57
- 0.57 - 0.62
- 0.62 - 0.63
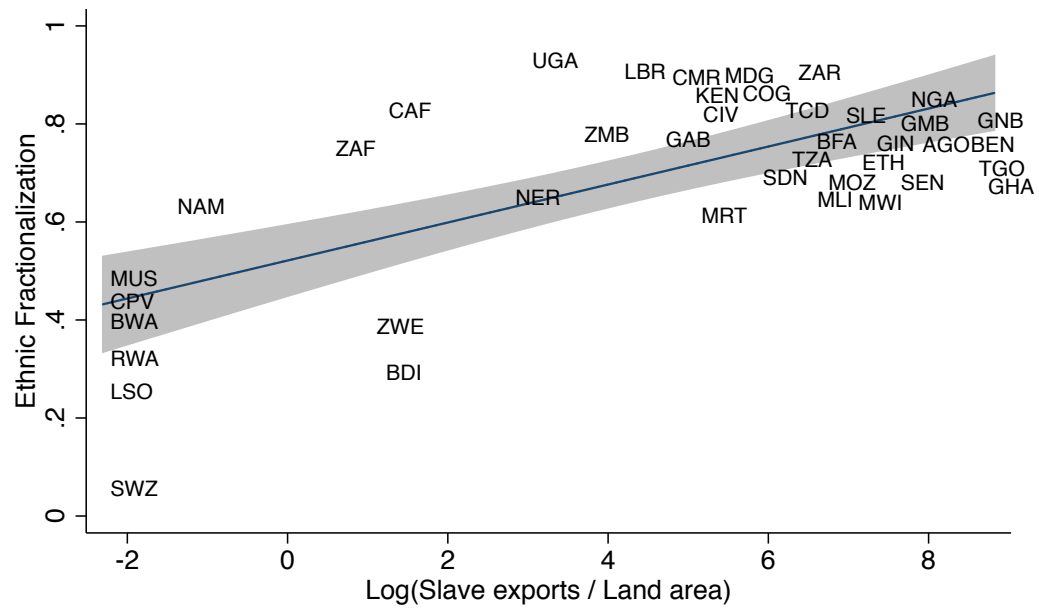- 0.63 - 0.68
- 0.68 - 0.81

Data comes from the World Enterprise Survey data.

Appendix Figure 2
Majority owner and slave exports
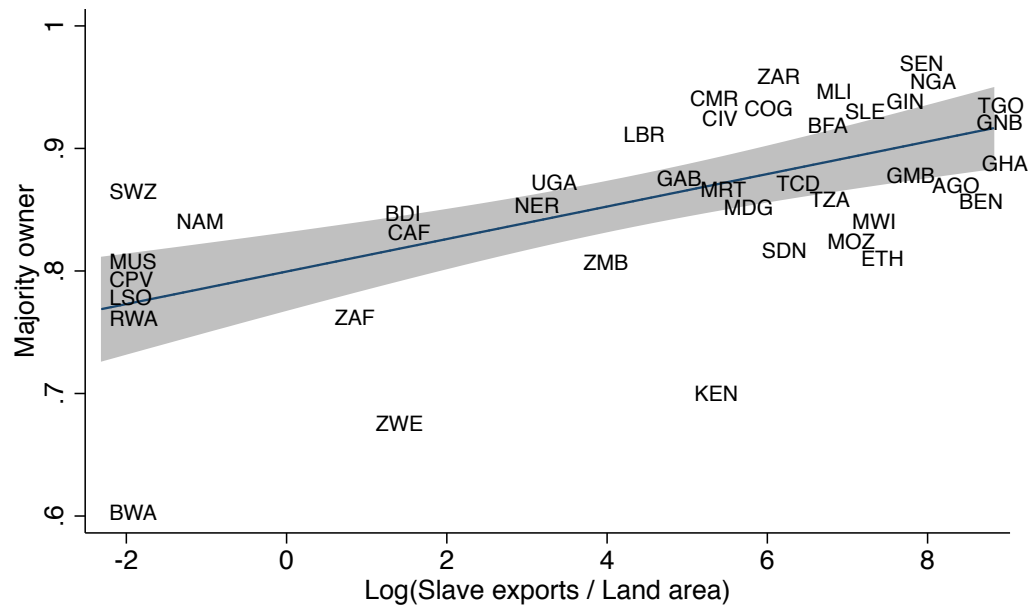
Data comes from Nunn (2008) and the World Enterprise Survey data. Small changes to the positions of the countries were made to prevent the overlapping of the country labels. Regressions are calculated at the country-level with robust standard errors.

Appendix Figure 3a
Ethnic fractionalization and slave exports

Data comes from Nunn (2008) and Alesina et al. (2003). Small changes to the positions of the countries were made to prevent the overlapping of the country labels. Regressions are calculated at the country-level with robust standard errors.

Appendix Figure 3b
Sole owner and predicted values for ethnic fractionalization
(from regression in appendix figure 3a)

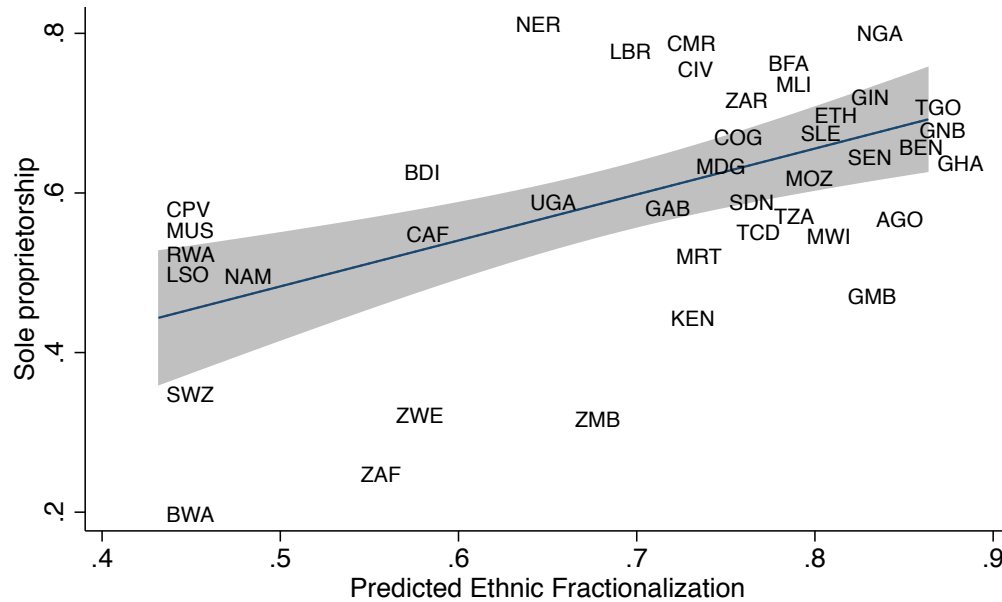Data comes from Nunn (2008), Alesina et al. (2003), and the World Enterprise Survey data. Small changes to the positions of the countries were made to prevent the overlapping of the country labels. Regressions are calculated at the country-level with robust standard errors.

Appendix Figure 3c
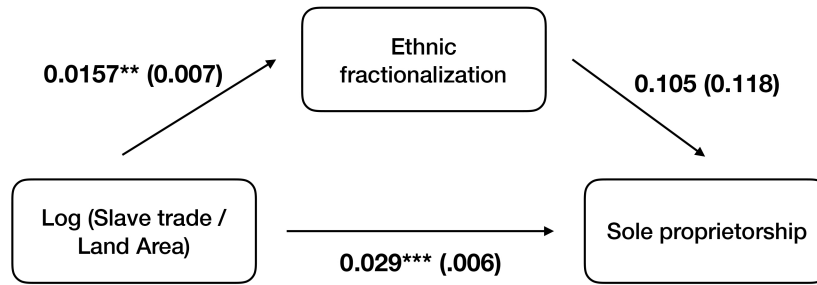## Ethnic fractionalization and slave exports: Mediation analysis

Note: *, **, and *** indicate significance at the 10%, 5%, and 1% confidence levels, respectively. Parentheses contain standard errors clustered at the country level and brackets contain p-values. Slave exports / Land area is measured as slaves exported per million square kilometers. Firm controls include sector indicators and size indicators in all regressions. Nunn (2008) and Alesina et al. (2003). Results correspond to row (1) of table 5.

Appendix Figure 4a
Financial mistrust and slave exports

Data comes from Nunn (2008) and the World Bank's Financial Inclusion Data. Small changes to the positions of the countries were made to prevent the overlapping of the country labels. Regressions are calculated at the country-level with robust standard errors.

Appendix Figure 4b
Sole owner and predicted values for financial mistrust
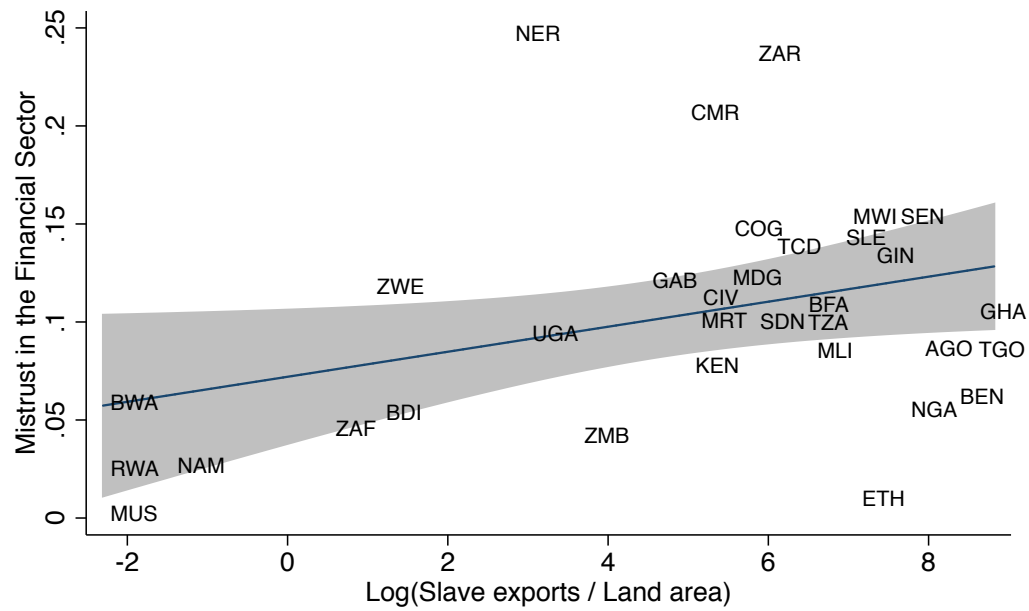## (from regression in appendix figure 4a)

Data comes from Nunn (2008), the World Bank's Financial Inclusion Data, and the World Enterprise Survey. Small changes to the positions of the countries were made to prevent the overlapping of the country labels. Regressions are calculated at the country-level with robust standard errors.

Appendix Figure 4c
Financial mistrust and slave exports: Mediation analysis
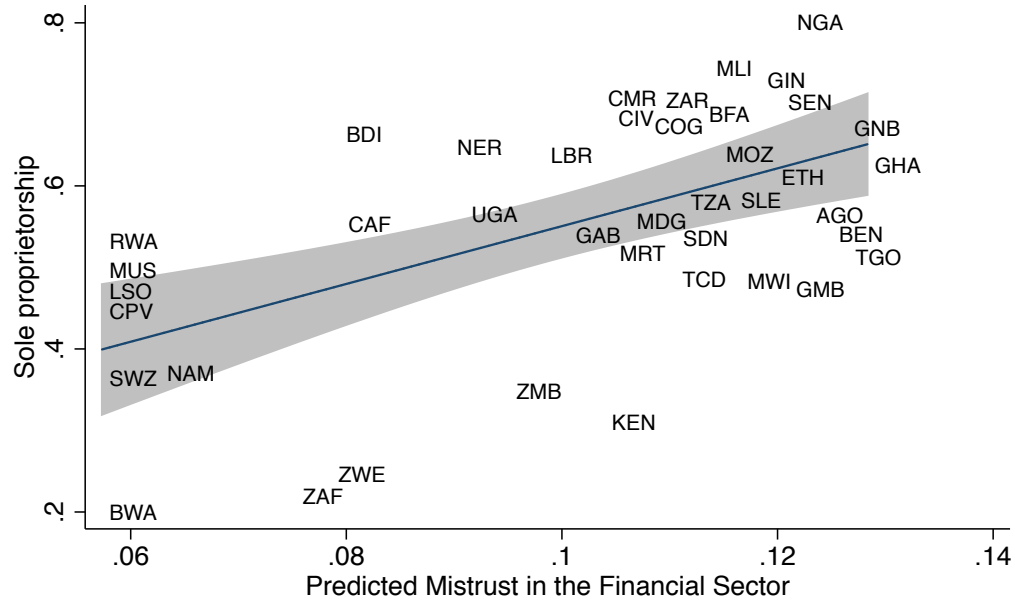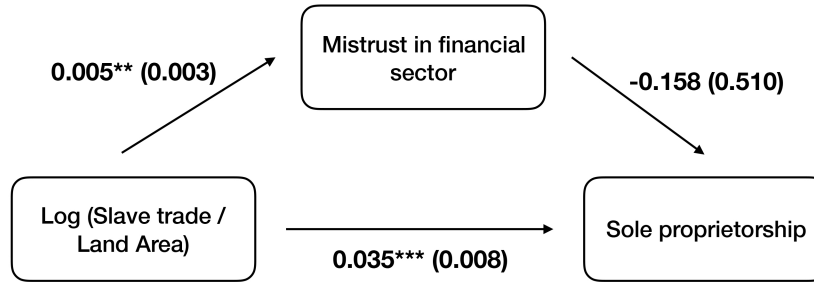

Note: *, **, and *** indicate significance at the 10%, 5%, and 1% confidence levels, respectively. Parentheses contain standard errors clustered at the country level and brackets contain p-values. Slave exports / Land area is measured as slaves exported per million square kilometers. Firm controls include sector indicators and size indicators in all regressions. Data comes from Nunn (2008) and the World Bank's Financial Inclusion Data. Results correspond to row (2) of table 5.

Appendix Figure 5a
Precolonial institutions and slave exports
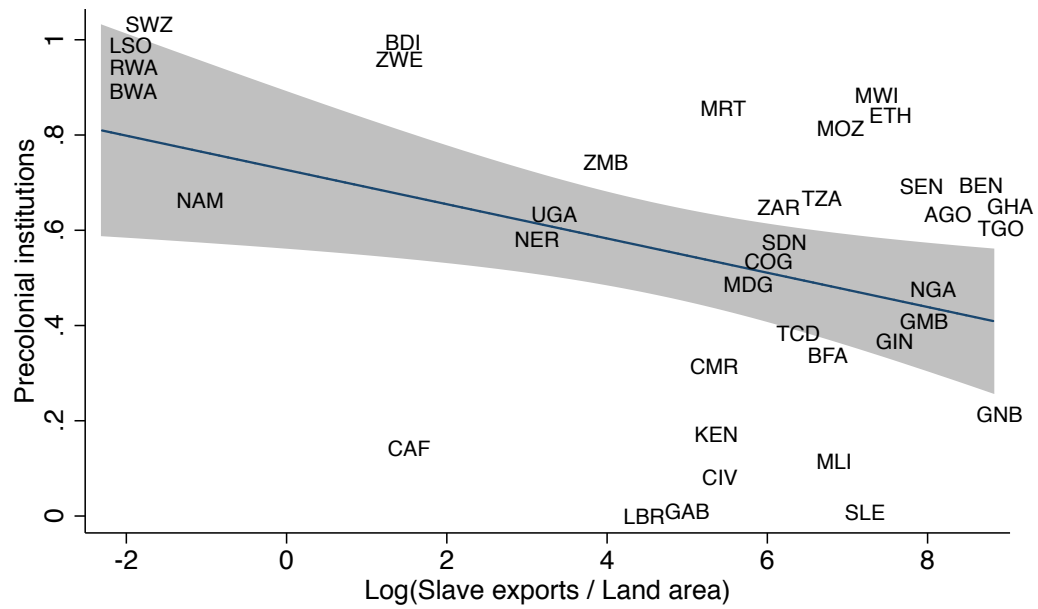
Data comes from Nunn (2008) and Gennaioli and Rainier (2007). Small changes to the positions of the countries were made to prevent the overlapping of the country labels. Regressions are calculated at the country-level with robust standard errors.

Appendix Figure 5b
Sole owner and predicted values for precolonial institutions
(from regression in appendix Figure 5a)

Data comes from Nunn (2008), Gennaioli and Rainier (2007), and the World Enterprise Survey data. Small changes to the positions of the countries were made to prevent the overlapping of the country labels. Regressions are calculated at the country-level with robust standard errors.

Appendix Figure 5c
Precolonial institutions and slave exports: Mediation Analysis
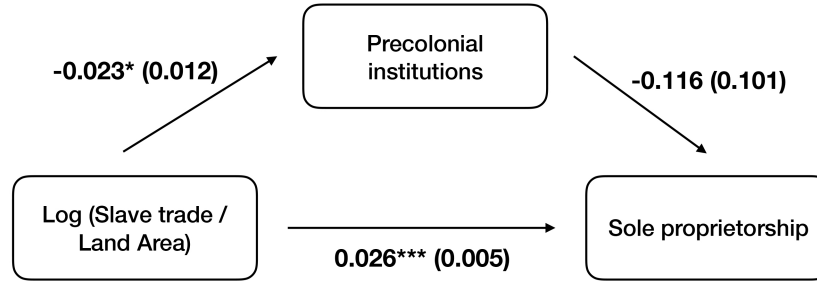
-0.023* (0.012)

Precolonial
institutions

-0.116 (0.101)

Log (Slave trade /
Land Area)

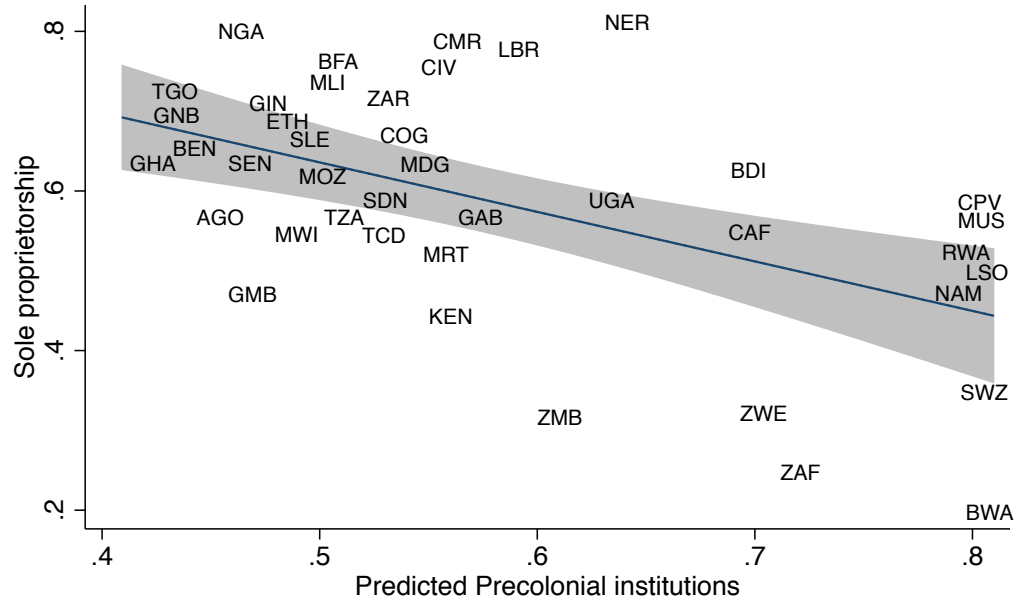**0.026*** (0.005)**

Sole proprietorship

Note: *, **, and *** indicate significance at the 10%, 5%, and 1% confidence levels, respectively. Parentheses contain standard errors clustered at the country level and brackets contain p-values. Slave exports / Land area is measured as slaves exported per million square kilometers. Firm controls include sector indicators and size indicators in all regressions. Data comes from Nunn (2008) and Gennaioli and Rainier (2007). Results correspond to row (3) of table 5.

Appendix Figure 6: Multiple Mediation Analysis: Ethnic fractionalization, Mistrust, and Precolonial institutions
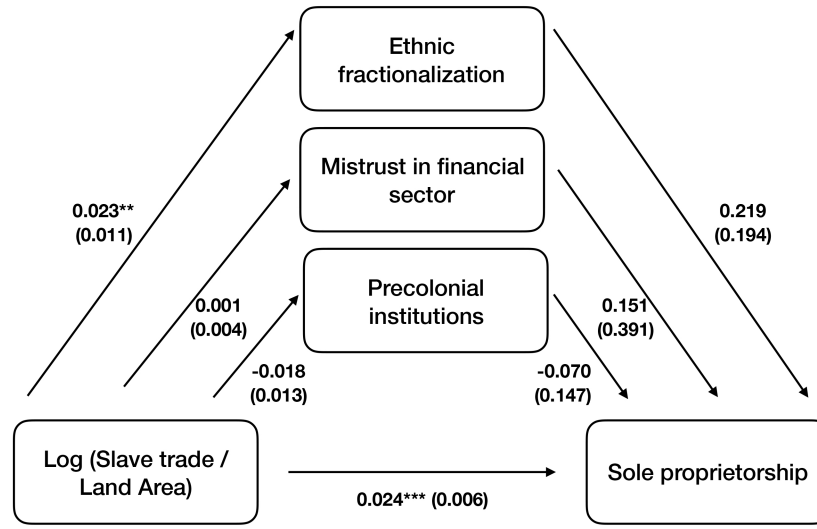
Note: *, **, and *** indicate significance at the 10%, 5%, and 1% confidence levels, respectively. Parentheses contain standard errors clustered at the country level and brackets contain p-values. Slave exports / Land area is measured as slaves exported per million square kilometers. Firm controls include sector indicators and size indicators in all regressions. Data comes from Nunn (2008), Alesina et al. (2003), the World Bank's Financial Inclusion Data, and Gennaioli and Rainier (2007). Results correspond to row (4) of table 5.

Appendix Table 1: Panel 1
Cross-Country Correlations

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
(1) Log(Slave exports / Land area)	1.00													
(2) Ethnic fractionalization	0.70	1.00												
(3) Precolonial institutions	-0.39	-0.68	1.00											
(4) Mistrust in financial sector	0.36	0.37	-0.28	1.00										
(5) British colony	-0.20	-0.21	0.23	-0.25	1.00									
(6) French colony	0.30	0.31	-0.37	0.42	-0.61	1.00								
(7) Netherlands colony	-0.21	-0.27	0.31	0.02	-0.22	-0.21	1.00							
(8) Portuguese colony	0.09	-0.02	0.01	-0.05	-0.26	-0.25	-0.09	1.00						
(9) Log(Coastline / Land area)	0.24	0.26	-0.34	-0.27	-0.13	-0.07	-0.32	0.35	1.00					
(10) Log(Population 1400)	0.59	0.53	-0.15	0.35	-0.12	0.16	0.17	-0.22	-0.30	1.00				
(11) Absolute latitude	-0.47	-0.55	0.54	-0.29	0.26	-0.28	-0.14	0.09	-0.08	-0.40	1.00			
(12) Longitude	-0.36	-0.21	0.50	-0.34	0.34	-0.34	0.18	-0.19	-0.24	0.05	0.22	1.00		
(13) Min of monthly average rainfall (mm)	0.03	0.21	-0.19	-0.03	0.08	-0.02	-0.07	-0.13	0.02	0.18	-0.31	-0.00	1.00	
(14) Max of monthly afternoon avg humidity	0.23	0.15	-0.30	0.06	-0.27	0.19	0.19	0.05	0.15	-0.03	-0.38	-0.36	0.32	1.00
(15) Min of avg monthly low temp (C)	0.47	0.43	-0.51	0.25	-0.41	0.32	0.22	0.14	0.24	0.19	-0.74	-0.48	0.21	0.61
(16) Log(Land area in millions of sq. kms)	0.36	0.50	-0.12	0.32	-0.13	0.22	-0.11	-0.15	-0.24	0.79	-0.10	0.15	-0.03	-0.28
(17) Indicator variable for small islands	-0.42	-0.28	.	-0.31	0.05	-0.17	-0.06	0.31	0.45	-0.78	0.15	0.02	-0.15	0.04
(18) Percent Islamic	0.43	0.18	-0.19	0.31	-0.11	0.37	-0.20	-0.15	0.06	0.21	-0.05	-0.48	-0.24	0.04
(19) Former communist country	0.27	0.16	0.17	0.15	-0.26	-0.08	0.22	0.45	0.03	0.21	-0.06	0.08	-0.01	0.07
(20) Legal origin indicator: French	0.19	0.11	-0.14	0.22	-0.85	0.64	0.24	0.28	0.15	-0.02	-0.25	-0.18	-0.18	0.33
(21) Log(Diamond production per capita)	-0.26	-0.03	-0.12	-0.01	0.12	-0.22	0.03	-0.06	-0.04	-0.02	0.13	-0.04	-0.03	-0.03
(22) Log(Oil production per capita)	0.27	0.34	-0.24	0.19	-0.14	0.19	0.00	0.05	0.15	0.27	-0.39	-0.06	0.17	0.14
(23) Log(Gold production per capita)	-0.05	0.17	-0.16	-0.01	-0.05	0.00	0.17	-0.25	-0.16	0.44	-0.12	0.07	0.05	-0.07
(24) Minimum Atlantic distance (000s of kms)	-0.22	-0.21	0.46	-0.38	0.37	-0.43	0.21	-0.14	-0.13	0.15	0.08	0.83	0.02	-0.39
(25) Minimum Indian distance (000s of kms)	0.41	0.34	-0.57	0.45	-0.45	0.50	-0.18	0.12	0.18	0.04	-0.33	-0.93	-0.03	0.37
(26) Minimum Saharan distance (000s of kms)	-0.56	-0.45	0.44	-0.37	0.38	-0.45	-0.03	0.10	0.00	-0.45	0.66	0.49	-0.06	-0.25
(27) Minimum Red Sea distance (000s of kms)	-0.05	-0.15	-0.20	0.07	-0.07	0.08	-0.28	0.27	0.33	-0.52	0.33	-0.70	-0.08	0.22

Note: See Nunn (2008) for detailed description of country-level variables and the sources for each variable. Blank value exists because there is no data on pre-colonial centralization for islands.

Appendix Table 1: Panel 2
Cross-Country Correlations

Variables	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)	(27)
(1) Log(Slave exports / Land area)													
(2) Ethnic fractionalization													
(3) Precolonial institutions													
(4) Mistrust in financial sector													
(5) British colony													
(6) French colony													
(7) Netherlands colony													
(8) Portuguese colony													
(9) Log(Coastline / Land area)													
(10) Log(Population 1400)													
(11) Absolute latitude													
(12) Longitude													
(13) Min of monthly average rainfall (mm)													
(14) Max of monthly afternoon avg humidity													
(15) Min of avg monthly low temp (C)	1.00												
(16) Log(Land area in millions of sq. kms)	-0.12	1.00											
(17) Indicator variable for small islands	0.09	-0.59	1.00										
(18) Percent Islamic	0.15	0.16	-0.14	1.00									
(19) Former communist country	0.21	0.21	-0.07	-0.20	1.00								
(20) Legal origin indicator: French	0.47	-0.03	0.19	0.15	0.28	1.00							
(21) Log(Diamond production per capita)	-0.12	0.20	-0.16	-0.34	0.14	-0.31	1.00						
(22) Log(Oil production per capita)	0.38	0.27	-0.12	-0.18	0.32	0.17	0.15	1.00					
(23) Log(Gold production per capita)	0.03	0.55	-0.34	-0.06	-0.07	-0.11	0.41	0.12	1.00				
(24) Minimum Atlantic distance (000s of kms)	-0.37	0.09	0.01	-0.26	-0.04	-0.24	-0.28	-0.16	0.10	1.00			
(25) Minimum Indian distance (000s of kms)	0.55	0.02	-0.05	0.51	-0.00	0.32	0.07	0.21	-0.07	-0.87	1.00		
(26) Minimum Saharan distance (000s of kms)	-0.60	-0.24	0.17	-0.61	0.09	-0.36	0.41	-0.11	-0.03	0.20	-0.61	1.00	
(27) Minimum Red Sea distance (000s of kms)	0.06	-0.43	0.24	0.16	-0.06	-0.01	0.25	-0.09	-0.20	-0.76	0.55	0.23	1.00

Note: See Nunn (2008) for detailed description of country-level variables and the sources for each variable.

Appendix Table 2
Firm-Level Correlations

Variables	(1) Sole proprietorship	(2) Small firm	(3) Medium firm	(4) Large firm	(5) Majority owner	(6) No need loan
(1) Sole proprietorship	1.00					
(2) Small firm	0.31	1.00				
(3) Medium firm	-0.18	-0.78	1.00			
(4) Large firm	-0.24	-0.44	-0.21	1.00		
(5) Majority owner	0.50	0.14	-0.08	-0.12	1.00	
(6) No need loan	-0.13	-0.17	0.10	0.14	-0.05	1.00

Note: Firm data from the World Bank Enterprise Survey (2006-2016)

Appendix Table 3
Slave trade and ownership structure:
Corporate organization

	Dependent Variable: Corporation							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Log(Slave exports / Land area)	-0.024***	-0.018***	-0.022***	-0.009*	-0.008*	-0.003	-0.021	-0.019**
	(0.007)	(0.005)	(0.005)	(0.005)	(0.004)	(0.007)	(0.035)	
	[0.00]	[0.00]	[0.00]	[0.08]	[0.05]	[0.70]	[0.55]	
								[-.055 , .001]
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
Sector and firm size controls	No	Yes	Yes	Yes	Yes	Yes	Yes	No
Colonizer controls	No	No	Yes	Yes	No	Yes	Yes	No
Geography controls	No	No	No	Yes	No	Yes	Yes	No
Specification	OLS	OLS	OLS	OLS	RE	RE	Logit	IV
Unit of Analysis	Firm	Firm	Firm	Firm	Firm	Firm	Firm	Country
Clusters	41	41	41	41	41	41	41	41
Observations	30,004	30,004	30,004	30,004	30,004	30,004	30,004	41

Note: *, **, and *** indicate significance at the 10%, 5%, and 1% confidence levels, respectively. Parentheses contain standard errors clustered at the country level and brackets contain p-values. Instrumental variables regressions use Log(Slave exports / Land area) as an instrument. Slave exports / Land area is measured as slaves exported per million square kilometers. Firm controls include sector indicators and size indicators. Colonizer controls include British, French, Portuguese, and Belgium indicators. Geography controls include longitude, absolute latitude, lowest month rainfall, maximum humidity, coastline area, island indicator, diamond production per capita, gold production per capita, and oil production per capita.

Appendix Table 4
Slave trade and Ethnic fractionalization:
Instrumental variables

| | Ethnic fractionalization | |
	(1)	(2)
Log(Slave exports / Land area)	0.039***	0.046***
	(0.007)	
	[0.00]	
		[.021 , .1]
Specification	OLS	2SLS
Unit of Analysis	Country	Country
Observations	41	41

Note: *, **, and *** indicate significance at the 10%, 5%, and 1% confidence levels, respectively. Parentheses contain standard errors clustered at the country level, brackets contain p-values, except in column (7) where they contain confidence intervals. Slave exports / Land area is measured as slaves exported per million square kilometers. Firm controls include sector indicators and size indicators. Colonizer controls include British, French, Portuguese, and Belgium indicators. Geography controls include longitude, absolute latitude, lowest month rainfall, maximum humidity, coastline area, island indicator, diamond production per capita, gold production per capita, and oil production per capita. Instrumental variables regression (7) use distance from slave ports as instruments.

Appendix Table 5
Slave trade and other organizational variables

| | Larger Entity | | Pct. Foreign Owner | | Log(Employees) | |
	(1)	(2)	(3)	(4)	(5)	(6)
Log(Slave exports / Land area)	-0.012***	-0.012**	-0.487*	-0.760***	-0.029**	-0.035***
	(0.004)	(0.005)	(0.242)	(0.241)	(0.012)	(0.012)
	[0.01]	[0.02]	[0.05]	[0.00]	[0.02]	[0.01]
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Colonizer controls	No	Yes	No	Yes	No	Yes
Specification	OLS	OLS	OLS	OLS	OLS	OLS
Unit of Analysis	Firm	Firm	Firm	Firm	Firm	Firm
Clusters	41	41	41	41	41	41
Observations	30,961	30,961	30,334	30,334	30,540	30,540

Note: *, **, and *** indicate significance at the 10%, 5%, and 1% confidence levels, respectively. Parentheses contain standard errors clustered at the country level, brackets contain p-values, except in column (7) where they contain confidence intervals. Slave exports / Land area is measured as slaves exported per million square kilometers.