THE AFRICAN SLAVE TRADE AND MODERN HOUSEHOLD FINANCE

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Abstract

We evaluate the impact of the African slave trade between 1400 and 1900 on modern household finance. Exploiting cross-country and cross-ethnic group differences in the intensity with which people were enslaved and exported from Africa, we find that slave exports during the 1400-1900 period are negatively associated with current measures of household (a) access to financial services, (b) access to credit, (c) use of mobile finance, and (d) trust in financial institutions, suggesting that the slave trade has had an enduring, deleterious effect on household finance.

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1. INTRODUCTION

Given the importance of finance for aggregate economic growth and the distribution of household income, an active body of research examines the historical determinants of financial development.[1] This work explores how historical differences in legal origins, institutional development, religion prejudices, and other factors shape the operation of modern financial systems.[2] In a recent contribution, Pierce and Snyder (2017) demonstrate that firms in countries heavily exposed to the historical African slave trade face greater financial constraints today than firms in lower-slave-extraction countries.

In this paper, we provide the first evaluation of the impact of the African slave trade between 1400 and 1900 on household finance today. Two lines of research suggest how the intensity with which people were captured, enslaved, and exported from Africa could influence modern household finance. First, Nunn and Wantchekon (2011) explain that enslavement often occurred through inter-African village raids that damaged social cohesion, with enduring ramifications on distrust. Distrust, in turn, impedes the willingness of potential lenders to supply credit and the inclination of households to save and use financial institutions or markets (e.g., Guiso, Sapienza, and Zingales, 2004). Second, the distrust between villages generated by the slave trades restricted economic and social interactions, which in turn helped solidify and perpetuate narrow ethnic identifies. The resulting fragmentation hindered the formation of growth-enhancing institutions, including financial markets and intermediaries (e.g., Easterly and Levine, 1997; Nunn, 2008; Karlan et al., 2009). In light of this research, we explore the connections between slave exports and household finance.

We focus on household finance because financial systems influence economic welfare by providing services to households, not just by allocating credit to firms (e.g., Campbell, 2006;

[1] See, for example, King and Levine (1993), Jayaratne and Strahan (1996), Levine and Zervos (1998), Rajan and Zingales (1998), and Beck, Levine, and Levkov (2010).

[2] See, for example, La Porta et al., (1998) on legal origins, Engerman and Sokoloff (1997), Acemoglu, Johnson, and Robinson (2001), and Beck, Demirgüç-Kunt, and Levine (2003) on institutions, and Pascali (2016), Voigtländer and Voth (2012), and D'Acunto, Prokopczuk, and Weber (2018) on how the historical treatment of Jews shapes modern financial development. D'Acunto (2017) reviews the history and finance literature.

Tufano, 2009; and Guiso and Sodini, 2013). Household finance can mitigate the repercussions of adverse shocks to family income on the schooling of children (e.g., Jacoby, 1994; Jacoby and Skoufias, 1997) and allow households to purchase homes and accumulated home equity, which can then be used as collateral for new businesses. Household access to banks can increase savings—and the security of those savings, which can improve households' resilience to shocks, enhance consumption smoothing, create opportunities for large, welfare-enhancing purchases, and reduce risk. Furthermore, households benefit from the payments services provided by financial institutions by reducing transactions costs and expanding economic interactions beyond a few, well-known individuals.

To conduct our study, we use two sources of data on the intensity with which people were captured and exported as slaves from each African country. Nunn (2008) provides data on the intensity with which people were enslaved and exported from each country: *Slave exports* equals the natural logarithm of the total number of slaves taken from each country during the period from 1400 through 1900 divided by the size of the country in millions of square kilometers. Furthermore, Nunn and Wantchekon (2011) provide information on the intensity with which people from particular ethnic groups were enslaved and exported from Africa: *Ethnicity based slave exports* equals the natural logarithm of one plus the total number of slaves taken from each ethnic group during the 1400-1900 period, divided by the area of land inhabited by the ethnic group measured in square kilometers. This ethnicity-level measure of slave exports, when combined with ethnicity-level measures of current household financing constraints, provides a unique vehicle for better identifying the impact of the slave trades on household finance, as we discuss in greater detail below. We use both the country-level and ethnicity-level measures to evaluate the impact of the historic slave trades on household finance today.

To measure household finance, we use three broad categories of indicators: (1) access to and use of financial services provided by financial institutions, (2) access to credit, and (3) use of mobile financial services. First, we measure the extent to which individuals have access to and use financial services using seven individual-level measures of whether an individual (a) has an

account at a bank or another type of financial institution, (b) deposited money into his/her personal account(s), (c) withdrew money from his/her personal account(s), (d) owns a debit card connected to a bank account, (e) used a debit card to make a purchase, (f) saved at a formal financial institution, or (g) saved via an informal savings club. Second, we measure household access to credit using six individual measures of whether an individual (a) borrowed from a bank or another type of formal financial institution, (b) borrowed from a store, (c) borrowed from family or friends, (d) owns a credit card, (e) used a credit card, and (f) has a mortgage from a bank or another type of formal financial institution. The third broad category of household finance indicators focuses on mobile financial services. Specifically, we measure (a) whether an individual has a mobile money account, (b) whether the person used a mobile phone to make payments, buy things, or send or receive money, (c) whether the person made payments on bills or bought things online using the internet, and (d) whether the person sent or received money to or from others living in a different area inside a country through a mobile phone.

We use several strategies to identify the impact of the historic slave trade on modern household finance in Africa. We begin by using ordinary least squares and a control function approach to limit the possibility that omitted variables bias our evaluations. We control for (a) an array of country-specific factors, including legal origin, religious composition, the latitude and longitude of the country, the amount of rainfall and humidity in the country, how long the country has been independent, and the European colonizer, and (b) person-specific factors, including education, income, gender, and age. Second, to test one potential channel linking the historic slave trade to modern household finance—and therefore to reduce identification concerns, we examine the impact of slave exports on the degree to which households distrust formal financial institutions today. Third, to address any remaining concerns that omitted country characteristics bias the findings, we differentiate by ethnic groups within countries, which allows us to include country fixed-effects. Although we have more limited information on household finance at the ethnicity-level, these ethnicity-household-level analyses materially augment our study. Finally, in extensions of these ethnicity-level analyses, we (a) further evaluate the trust

channel by testing whether the negative relationship between ethnic enslavement and household finance is stronger in countries with greater mistrust of financial institutions and (b) test whether pre-1400 ethnic group oppression accounts for our findings by controlling for the extent to which ethnic groups were geographically confined—and hence oppressed—in the distant past. As we show, these extensions further reduce concerns with our identification strategy.

We discover that the intensity of slave exports during the 1400-1900 period is strongly, negatively associated with measures of modern household finance, including access to financial services, access to credit, and use of mobile finance. More specifically, the intensity of a country's historical exposure to the slave trade is negatively associated with households (a) owning or using an account or a debit card at a bank or other formal financial institutions, (b) saving at formal financial institutions, (c) obtaining credit, in the form of short-term loans, credit cards, or mortgages from banks, and (d) using the internet or mobile phones to make financial transactions. The sizes of the estimated coefficients suggest an economically large impact of the slave trade on household finance. For example, if a country were to move from the 75th percentile of the cross-country distribution of *Slave exports* to the 25th percentile, our household-level estimates imply that the probability of an average person in that country would have (a) saved at a bank would increase by 9 percentage points, (b) received a loan from a bank would rise by almost 5 percentage points, and (c) made a transaction with a mobile money account would jump by about 6 percentage points, all equivalent to more than 50% of their corresponding sample average value.[3]

We also provide evidence suggesting that the slave trade influences modern household finance through its effects on trust between individuals and formal financial institutions. We discover a strong, positive relation between our key explanatory variable, *Slave exports*, and the extent to which households distrust banks or other types of formal financial institutions. This

[3] We also show that a significant extent of cross-country heterogeneity in household finance can be explained by historical intensity of the slave trade in each country. In the country-level analyses where the dependent variable is a country-specific measure of the extent to which individuals in that country have access to financial services, credit, or mobile finance, or trust formal financial institutions, we find that a country's historical exposure to the slave trade can explain between 13 and 22 percent of the variation in household finance across Africa.

finding is consistent with the view that the historical slave trade had an enduring, deleterious effect on social cohesion that in turn manifests as distrust in financial institutions.

Furthermore, the relationship between the slave trade and household distrust of financial institutions does not simply operate through income or education. In particular, we were concerned that the relation between the intensity of slave exports and trust in financial institutions today could simply reflect demand-side factors associated with income or education. We mitigate this concern by showing that the results hold when (a) controlling for each individual's education, income group, and other characteristics, and (b) splitting the sample of individuals by income and education. The association between slave exports and mistrust in financial institutions is significant in both the high- and low-income subsamples and in both the high- and low-education groups, suggesting that the results are not driven solely by demand-side factors associated with income or education.

We next discover that the results from the analyses exploiting the ethnicity-level slave trade measure are fully consistent with those using the country-level slave trade measure. We find that the intensity with which people from particular ethnic groups were enslaved and exported from Africa is positively linked with how households from those same ethnic groups perceive the severity of credit constraints today. These results hold when controlling for country fixed effects, providing evidence of a strong positive connection between slave exports and household liquidity constraints. Using these ethnicity-level slave trade data, we also reexamine whether the slave trade influences modern household finance through its effects on trust. Consistent with the findings using country-level slave trade measures, we find that the positive relation between ethnicity-specific enslavement and household financial constraints today is stronger in places with greater mistrust in the financial sector. Finally, we extend these ethnicity-based analyses to address a concern that the results reflect pre-slave trade ethnic conflicts that shaped both cross-ethnicity differences in slave exports and household financial constraints today, rather than the impact of the slave trade on modern household finance. As discussed in detail below, we find that the negative association between slave exports and present-day

household finance is accounted for by the measures of slave extraction per se, and not by measures of the intensity with which ethnicities were discriminated against during the pre-1400 period. These ethnicity-based findings constitute additional evidence for the view that the slave trade damaged trust, which had enduring effects on household finance.

Our work relates to debates about the impact of cultural and institutional differences on social, economic, and financial conditions, which was recently reviewed by Spolaore and Wacziarg (2013). Cultural norms persist for centuries. For example, Voigtländer and Voth (2012) shows that county-level differences in anti-Semitism in Germany have persisted for over 600 years, and D'Acunto, Prokopczuk, Weber (2018) shows that those differences are reflected in household access to financial services today. Similarly, Grosfeld, Rodnyansky, Zhuravskaya (2013) shows that historically-rooted anti-Semitism continues to shape modern attitudes towards markets and social trust. Other work focuses on the long-lasting influences of institutions, including legal (e.g., La Porta et al., 1998; Brown, Cookson, and Heimer, 2017), political institutions (e.g., Engerman and Sokoloff, 1997; Acemoglu, Johnson, and Robinson, 2001), and the broader array of institutions and norms shaping economic decisions and outcomes (e.g., Jha, 2013; Becker et al., 2016; Jedwab, Kerby, and Moradi, 2017).[4] In our work, we contribute to this literature by examining the impact historic slave trade in Africa on modern household financial development.

It is worth noting that this paper is not simply about the 1400-1900 slave trade and Africa; it is about understanding the determinants of household finance and financial development more broadly, and providing insights on policy strategies to improve the operation of current financial systems. For example, the law and finance literature triggered by La Porta et al. (1998) not only demonstrates that the legal systems exported by European colonizer shape the operation of financial systems; it also shows which characteristics of those legal systems support financial development. And, the literature on European colonization and political institutions spurred by

[4] Also, see the work on the historical determinants of organizations by Kluppel, Pierce, and Snyder (2018), and the implications of the slave trades for marriage institutions across Africa (Dalton and Leung, 2014).

Acemoglu, Johnson, and Robinson (2001) is not just about colonization strategies; it also provides insights on the characteristics of political institutions associated with long-run prosperity and financial development. And, the growing body of research documenting the enduring influences of anti-Semitism on economics (Voigtländer and Voth 2012, Grosfeld, Rodnyansky, Zhuravskaya 2013, D'Acunto, Prokopczuk, Weber 2018) is not only about anti-Semitism; it also offers insights on the long-lasting impact of cultural norms on society. Similarly, although our paper exploits the quasi-natural experiment of cross-country and cross-ethnic group differences in the intensity of the African slave trade to evaluate the origins of modern finance across Africa, the research provides insights into the relationship between social cohesion and the operation of financial systems today, which may in turn provide guidance to policy analysts and policymakers.

The remainder of this paper proceeds as follows. Section 2 describes the data. Section 3 presents the analyses of the relationship between country-level slave exports and household finance, while Section 4 provides the ethnicity-level results. Section 5 concludes.

2. DATA

In this section, we define the key data that we use to evaluate the relationship between historical African slave trade and modern household finance. Table 1 gives detailed variable definitions and sources, and Table 2 provides summary statistics.

2.1 The Slave Trade Measure

We use two measures of the historical slave trade. The first measure, constructed by Nunn (2008), is *Slave exports*, which equals the natural logarithm of the total number of slaves taken from each country during the period from 1400 through 1900, divided by the size of the country, as measured in millions of square kilometers. Although we will use the term "slave trade" in referring the capture, enslavement, and exportation of people during the 1400-1900

period, there were four simultaneously, though distinct, slave trades during this period. The largest involved the trans-Atlantic shipment of people from Africa to the Western Hemisphere. The other three slave trades were the movement of slaves from Sub-Saharan to Northern Africa, the transportation of slaves across the Red Sea to the Middle East, and the Indian Ocean slave trade in which people were shipped to India, plantation islands in the Indian Ocean, or the Middle East. To estimate the total number of slaves taken from each country, Nunn (2008) first calculates the total number of slaves shipped from each coastal country in Africa. He then uses ethnic identity data on a sample of slaves exported from Africa to impute the proportion of slaves extracted from each country in Africa during the 1400 – 1900 period. If no slaves were exported from a country, Nunn (2008) uses a value of 0.1 for the total number of slaves exported from a country, so that *Slave exports* is set to -2.3.

As shown in Table 2, *Slave exports* ranges from -2.3 to 8.8, indicating that the total number of slaves taken from a country ranges from 0 to 6,756 relative to a country's land area. Although there are 52 countries in the Nunn (2008) sample, we exclude Somalia due to a lack of financial development data. For our sample of 51 countries, the median ratio of total slaves exported to land area is 102. There is considerable cross-country variation. Angola exported the largest number of slaves (more than 3.6 million), whereas 11 countries, such as Swaziland and Tunisia, exported virtually no slaves.

The second measure, constructed by Nunn and Wantchekon (2011), is *Ethnicity based slave exports*, which equals the natural logarithm of one plus the total number of slaves taken from each ethnic group during the period from 1400 through 1900, divided by the area of land inhabited by the ethnic group, as measured in square kilometers. Due to data availability, the ethnicity-level slave trade measure is based on two of the four slave trades: the transatlantic slave trade, which is the largest of the slave trade, and the Indian Ocean slave trade. There is one observation for each of the 186 distinct ethnic groups. As shown in Table 2, the values of *Ethnicity based slave exports* ranges from 0 to 3.66, indicating that the total number of slaves taken from an ethnic group relative to the land area that it inhabited ranged from 0 to 38.

2.2 Household indicators

We use three sets of measures of household financing patterns on (i) access to and use of financial services, (ii) access to credit, and (iii) usage of mobile finance from the World Bank's *Financial Inclusion Database 2014*. The survey covers a random sample of over 35,000 individuals in 36 African countries. To measure individual access to financial services, we use the following seven indicators. *Account_fin* equals one if a respondent has an account at a financial institution at the time of the survey, and zero otherwise. *Account_deposit* equals one if the respondent has deposited some money, including cash or electronic deposits, or any time money, into his/her personal account(s) during 12 months before the survey and zero otherwise. *Account_withdrawal* equals one if the respondent has taken out some money out of his/her personal account(s), and zero otherwise. This includes cash withdrawals in person or using ATM/debit card, electronic payments or purchases, checks, or any other time money removed from your account. *Debit card* equals one if the respondent owns a debit card connected to an account at a financial institution that allows him/her to withdraw money and take money out of that account right away. *Debit card_use* equals one if the respondent used a debit card to directly make a purchase during 12 months before the survey and zero otherwise. *Saved at financial institutions* equals one if the respondent has saved or set aside some money by using an account at a bank or another type of formal financial institution and zero otherwise. *Saved at savings club* equals one if the respondent has saved or set aside some money by using an informal savings club.

We use six indicators of household access to credit. First, *Borrow from financial institutions* equals one if the respondent borrowed from a formal financial institution during 12 months before the survey and zero otherwise. The average across survey participants with countries varies widely. For example, over 16% of respondents had a received a loan in the last year in Uganda, Botswana, and Mauritius, while less than 2.5% of respondents received a loan in the last year in Cameroon, Niger, and Guinea. Second, *Borrow from stores* equals one if the

respondent borrowed from a store by using installment credit or buying on credit and zero otherwise. Third, *Borrow from friends or family* equals one if the respondent borrowed from family, relatives, or friends and zero otherwise. Fourth, *Credit card* equals one if the respondent reports having a credit card and zero otherwise. *Credit card* also varies materially. The average across survey participants in Mauritius and South Africa is greater than 16%, while it is below 0.5% in Madagascar, Sudan, and Ethiopia. Fifth, *Credit card_use* equals one if the respondent has used a credit card during the past year of the survey time and zero otherwise. Sixth, *Mortgages from financial institutions* equals one if the respondent reports having a loan from a bank or another type of formal financial institution to purchase a home, an apartment, or land.

To measure individuals' usage of mobile finance, we use the following indicators, namely (a) *Account_mobile*, (b) *Transaction via mobile*, (c) *Payment via internet*, and (d) *Remittances via mobile*. *Account_mobile* equals one if a respondent has a mobile money account in the past year of the survey, and zero otherwise. *Transaction via mobile* equals one if the respondent has made a transaction with money from his account at a financial institution using a mobile phone. This includes using a mobile phone to make payments, buy things, or to send or receive money. *Payment via internet* equals one if a respondent has made payments on bills or bought things online using the internet. *Remittances via mobile* equals one if the respondent has sent or received money to or from a relative or friend living in a different area inside a country through a mobile phone.

In addition to these measures of household financing patterns, we examine one potent channel through which the slave trade might influence household finance: the degree to which households trust formal financial institutions. We use the variable, *Lack trust in financial institutions*, which equals one if the respondent indicates not having a bank account because the person does not trust financial institutions, and zero otherwise. We examine mistrust in financial institutions because Nunn and Wantchekon (2011) show that the African slave trade had lasting effects on trust and an extensive literature shows that trust has first-order effects on financial systems (e.g., Guiso, Sapienza, and Zingales, 2004; Aghion et al., 2010). In Mauritius, only 0.3%

of the respondents indicate a lack of trust in banks, while 22% of the respondents from Niger respond that they do not trust banks or other formal financial institutions.

Furthermore, we use the 2005 *Afrobarometer* surveys to measure differences in the degree to which individuals perceive that obtaining finance is a material constraint, while differentiating households by ethnicity. The surveys are conducted on a random sample of over 20,000 individuals in 17 African countries. The surveys contain information on the self-reported ethnicity of each respondent. The *Afrobarometer* asks respondents, "In your opinion, what are the most important problems facing this country that government should address?" We define *Loans/credit as the most important problem* as equal to one if a respondent chooses "Loans/credit" in response to the question, and zero otherwise. Thus, the measure reflects the subjective assessment of the respondent concerning liquidity constraints.

We condition on many household-level characteristics. Specifically, when using *Financial Inclusion Database*, we control for a set of individual demographics, including an education indicator that equals one if an individual's educational attainment is secondary or more, indicators of income quintile, age and age squared, and a gender indicator. When using the *Afrobarometer*, we control for age and age squared, a gender indicator, an indicator of living in an urban area, ten education fixed effects, five living conditions fixed effects, 18 religion fixed effects, and 25 occupation fixed effects.

2.3 Other country-level indicators

In our examination of the relationship between the cross-country variations in slave trade and household finance, we control for many country characteristics. We focus on characteristics that past researchers have found account for financial development, so that we can assess the independent link between the African slave trade and the functioning of modern financial systems across Africa. First, *French legal origin* equals one if the origins of country's legal system are the French civil law and zero if the system has British common law origins, as all of the countries in our sample have either French or British legal origins. We use this measure

based on the seminal findings in La Porta et al. (1998). They show that (1) former colonies that inherited British common law systems tend to have legal systems that better protect creditors and minority shareholders than former colonies with French legal origins and (2) these legal system differences materially shaped cross-country differences in financial development.

Second, as emphasized by Acemoglu, Johnson, and Robinson (2001), Beck, Demirgüç-Kunt, and Levine (2003), Levine (2005), and Easterly and Levine (2003, 2016), Europeans adjusted their colonization strategies based on how familiar and hospitable they found conditions around the world. In places where Europeans found hospitable environments, they tended to settle and create institutions that protect private property rights, check against government power, and reduce contractual and informational impediments to competitive markets. In places with less hospitable conditions, Europeans were more likely to set up extractive states that had enduring, adverse repercussions on the country's institutional development in general and financial development in particular. To quantify cross-country differences in the degree to which Europeans found more or less familiar and hospitable conditions, we use indicators of the location of the country, i.e., its *Latitude* and *Longitude*, the country's climate as summarized by average annual rainfall in the driest month of the year (*Rain min*) and level of humidity in the hottest month of the year (*Humid max*). We also control for the country's European colonizer (*Colonizer*), since this might influence the institutions and strategies imposed on the people.

Third, several researchers stress that religion and the length of time a country has been independent can also influence financial development. For example, Beck, Demirgüç-Kunt, and Levine (2003) find that religious differences shape the functioning of legal and financial institutions. Consequently, we control for each country's religious composition. In particular, *Catholic*, *Muslim*, *Protestant*, and *Other* equals the share of the population that is Catholic, Muslim, Protestant, or another religions respectively. We refer to these four variables as *Culture controls*. In addition, we control for how long each country has been independent. Easterly and Levine (2003) and Beck, Demirgüç-Kunt, and Levine (2003) emphasize that longer periods of independence from colonial rules allowed countries to develop institutions that support economic

and financial development. To capture this view, we control for *Independence*, which equals 2006 minus a country's first year of independence.

3. SLAVE EXPORTS AND HOUSEHOLD FINANCE

In this section, we examine the relation between the intensity with which individuals were captured and exported from African countries during the 1400-1900 period and current measures of (a) household access to financial services, (b) the ability of households to access credit, (c) household use of mobile financial services, and (d) mistrust between households and financial institutions. The analyses are conducted at the household-country level, so that we have measures of each household's access to financial services and credit, use of mobile finance, and trust in financial institutions. We relate these measures of household finance to national differences in the intensity with which people were extracted and exported as slaves during the slave trade era. In the next section, we further differentiate by ethnic groups within countries, as ethnic groups differed with respect to the intensity with which members were enslaved.

3.1 Access to financial services

We begin by examining the impact of the slave trade on household access to financial services. We use the following regression specification that exploits cross-country variations in slave exports:

$$HHF_{i,c} = \alpha + \beta Slave\ exports_c + \boldsymbol{X_c'}\mathbf{M} + +\boldsymbol{X_i'}\mathbf{N} + \varepsilon_{i,c}, \quad (1)$$

where the dependent variable, $HHF_{i,c}$, is one of the seven measures of the degree to which household *i* in country *c* accesses financial services: *Account_fin*, *Account_deposit*, *Account_withdrawal*, *Debit card*, *Debit card_use*, *Saved at financial institutions*, or *Saved at savings club*. With respect to the explanatory variables, $Slave\ exports_c$ is the intensity with which people were extracted as slaves from country *c* during the slave trade. $\boldsymbol{X_c}$ represents an array of country characteristics: *French legal origin*, *Latitude*, *Culture controls*, and

Independence, and **M** are coefficients on these controls.[5] The individual-level control variables, $\boldsymbol{X_i}$, include the person's education, income quintile, gender, age and a quadratic in age. Our coefficient of interest is β, which measures the relationship between historical slave exports and household access to financial services today. We report heteroskedasticity consistent p-values, where the standard errors are clustered at the country level.

As shown in Table 3, the extent to which slaves were exported from a country is strongly, negatively associated with household access to financial services today. For example, consider the regressions in which the dependent variable is whether the household has an account at a formal financial institution (*Account_fin*). *Slave exports* enters negatively and significantly at the one percent level and the estimated coefficient is economically large. The coefficient estimate from column (1) implies that if a country were to move from the 75th percentile of the cross-country distribution of *Slave exports* (6.66) to the 25th percentile (-1.47), the probability of having an account at a formal financial institution would jump by 19.5 percentage points, where the sample mean value of *Account_fin* equals 30 percentage points. Next, consider measures of whether the household uses an account at a formal financial institution, rather than simply having an account. Columns (2) and (3) show that *Slave exports* enters negatively and significantly in the regressions of *Account_deposit* and *Account_withdrawal*, suggesting that exposure to *Slave exports* is negatively associated with households accessing their financial institution accounts to deposit or withdrawal money.

We also find that *Slave exports* is negatively associated with households (a) owning a debit card connected to an account at a financial institution (*Debit card*) and (b) using their debit card to directly make a purchase (*Debit card_use*). As shown in columns (4) and (5), *Slave exports* enters negatively and significantly in both *Debit card* and *Debit card_use* regressions. To illustrate the economic magnitudes, we use the same example from above: If a country were to move from the 75th percentile of the cross-country distribution of *Slave exports* (6.66) to the 25th

[5] In robustness tests reported in the Online Appendix, we show that the results in Tables 3, 4, and 5 hold when controlling for additional geographic and colonial factors.

percentile (-1.47), the coefficient estimate on *Slave exports* (-0.017) from column (4) implies that *Debit card* would increase by 0.138, where the average value of *Debit card* in the sample is 0.182.

Furthermore, we separately examine the relation between historical exposure to the slave trade and modern household savings behavior through either formal or informal savings channels. As described above, we use *Saved at financial institutions* to measure savings via formal mechanisms, and *Saved at savings club* to measure informal, community-based savings methods. Savings clubs, for example, can take the form of rotating savings and credit association and are generally organized within a small group of members (such as close friends, neighbors, and family members), who agree to meet for a defined period in order to save and borrow together. Each member contributes the same amount at each meeting, and one member takes the whole sum once. Each member is the recipient of the funds at least once. Every member observes every transaction within the group and these characteristics make the system transparent and easy to manage. The slave trade may have distinct effects on savings in formal and informal mechanisms. As emphasized above, research suggests that the slave trade will hinder trust and economic activity in ways that impede savings in impersonal, formal financial institutions. There are, however, countervailing influences with respect to savings clubs. On the one hand, the intensity of the historical slave trade may hurt social cohesion and interpersonal trust in ways that also hinder the operation of savings clubs. On the other hand, the slave trade might foster the development of informal savings clubs, as savings vehicles among close friends, neighbors, and family member might be the best modality for mobilizing and allocating savings when there is a strong distrust of larger, impersonal financial institutions.

Consistent with these arguments, we discover that *Slave exports* enters negatively and significantly when the dependent variable is *Saved at financial institutions*, but positively and insignificantly when the dependent variable is *Saved at savings club*. The difference between the estimated coefficients is statistically significant. The economic size of the estimated coefficient on *Saved at financial institutions* is material: If a country were to move from the 75th percentile

of the cross-country distribution of *Slave exports* (6.66) to the 25th percentile (-1.47), the coefficient estimate on *Slave exports* (-0.011) from column (5) suggests that the probability of an average person in that country would have saved at a formal financial institution would increase by 9 percentage points, equivalent to 57% of the sample mean value of *Saved at financial institutions*. The contrasting findings on *Saved at financial institutions* and *Saved at savings club* suggest that the historical slave trade's enduring impact on trust discourages people from saving in formal financial institutions and has ambiguous effects on organized, albeit informal, savings clubs.[6] Moreover, as reported below, we show that (1) greater *Slave exports* is associated with sharply lower trust in financial institutions and (2) the negative relation between *Slave exports* and household finance also holds at the ethnicity-level, where we can abstract from all country-specific characteristics. Taken together, these results emphasize that the intensity of the slave trade had long-lasting effects on social cohesion that continue to shape household access to financial services.

3.2 Household credit

We next turn to the question: Is the intensity with which people were enslaved and exported from African during the 1400 – 1900 period related to household access to credit today? We employ the same regression specification as in equation (1), but the dependent variable is now one of the six measures of the degree to which household *i* in country *c* obtained credit from the financial system. In particular, the dependent variable is either *Borrow from financial institutions*, *Borrow from stores*, *Borrow from friends or family*, *Credit card*, *Credit card_use*, or *Mortgages from financial institutions*, where each is defined in Section 2 above. We use the same explanatory variables as in equation (1) and Table 3.

[6] We repeat the analyses in Table 3 - 5 while breaking the sample into individuals with incomes in the bottom three quintiles of the income distribution and those with incomes in the top two quintiles. We use this split because it yields a roughly even number of households in the bottom- and top-income groups. In these regressions, we control for all of the same variables as noted above, including each household's income group. We discover that the results in Tables 3 – 5 hold for both subsamples, suggesting that the results are not driven only by demand-side factors.

The results in Table 4 indicate that the intensity of the historical slave trade is negatively associated with household access to credit. *Slave exports* enters negatively and significantly when the dependent variable is either *Borrow from financial institutions* or *Borrow from stores*. These findings are consistent with the view that historical exposure to the slave trade has an economic large and long-lasting adverse impact on household access to credit from financial institutions and stores. Moreover, we discover that *Slave exports* enters insignificantly when the dependent variable is *Borrow from friends or family*, as shown in column (3). This is important as it demonstrates that the enduring effect on the slave trade is not on family transactions but on more impersonal financial interactions. With respect to the economic sizes of the estimated coefficients, consider the *Borrow from financial institutions* regression in column (1) of Table 4. The estimates indicate that if a country were to move from the 75th percentile of the cross-country distribution of *Slave exports* (6.66) to the 25th percentile (-1.47), the probability that an average person in that country would have received a loan from a formal financial institution would rise by almost 5 percentage points, which amounts to more than 50% of the sample mean of *Borrow from financial institutions*.

The negative relation between slave exports and household credit also holds when the dependent variable is *Credit card*, *Credit card_use*, or *Mortgages from financial institutions* (columns (4) – (6)). The estimates from columns (5) and (6) indicate that a one standard deviation increase in *Slave exports* (3.9) decreases the probability of using a credit card or having a mortgage from a formal financial institution by about 2.3 and 1.6 percentage points, respectively, This is not small since the sample mean of *Credit card_use* and *Mortgages from financial institutions* equals 2.9 and 6.3 percentage points. Combined together, results in Table 4 suggest that the relationship between the intensity of slave exports during the half a millennium from 1400 until 1900 is powerfully related to the current degree to which households obtain credits from formal financial institutions.

3.3 Household use of mobile finance

In this subsection, we examine the impact of the intensity of slave extraction during the 1400-1900 period on the tendency for households to use mobile financial services, which offers a highly impersonal form of financial services. We use the same regression equation, as formalized in equation (1), which was used in the analyses of access to finance and credit in Tables 3 and 4. For the mobile finance regression, the dependent variable is either *Account_mobile*, *Transaction via mobile*, *Payment via internet*, or *Remittance via mobile*.

As shown in Table 5, households use much less mobile financial services in countries that had more *Slave exports* during the 1400–1900 period.[7] *Slave exports* enters negatively and significantly for each of the four dependent variables that measure the use of mobile finance by households. The estimated economic magnitudes are large. Consider, for example, the coefficients reported in columns (2) and (3). They suggest that if the level of *Slave exports* in a country increases by one standard deviation (3.9), the probability that an average person in that country would have made a transaction with his mobile money account at a financial institution, and made payments or bought things online using the internet would fall by 3 and 0.8 percentage points, respectively, which is equivalent to about 50% of the sample average of *Transaction via mobile* and 28% of the sample average of *Payment via internet*.

Taken together, the findings in Table 3 – 5 indicate that the intensity of the slave trade has had an enduring effect on African countries that hinders the degree to which households (a) access financial institutions, (b) obtain credit, and (c) use mobile finance. We now explore the mechanisms underlying these results and develop an augmented identification strategy to further isolate the impact of the historical slave trade on modern finance.

[7] Mobile phone ownership does not differ significantly between high- and low-slave trade countries; thus, these findings do not reflect differences mobile phone ownership.

3.4 Mistrust

We now explore one potential mechanism through which the extraction of people during the African slave trade from 1400 to 1900 shapes modern household finance: Trust. We examine two ways in which trust could influence access to financial institutions. It could influence the degree to which households trust financial institutions and it could influence the degree to which financial institutions trust households.

With respect to household trust of financial institutions, we ask: Does the intensity of the slave trade account for current levels of distrust in financial institutions across African countries? We again use equation (1) to organize our regression analyses, where the dependent variable is now *Lack trust in financial institutions,* which equals one if the respondent indicates not having a bank account because the person does not trust financial institutions, and zero otherwise.

As shown in Table 6, there is a strong, positive relationship between *Slave exports* and *Lack trust in financial institutions*. Consider first the full sample results. *Slave exports* enters positively and significantly, suggesting that the intensity with which people were enslaved and exported from African countries damages social cohesion, resulting in household distrust in formal financial institutions. The estimated coefficients from Table 6 column (1) imply that the relation is economically large. If a country were to move from the 75th percentile of the cross-country distribution of *Slave exports* (6.66) to the 25th percentile (-1.47), a person in that country would on average report a value of *Lack trust in financial institutions* that is 0.05 lower than his current response. This is large given that the average value of *Lack trust in financial institutions* is 0.09 with a standard deviation of 0.28. We were concerned that the relation between the intensity of slave exports during the slave trade and trust in financial institutions today could differ across income groups, potentially reflecting demand-side factors. Although we control for each individual's education, income group, and other characteristics, we further mitigate this concern by splitting the sample into individuals with incomes in the bottom three quintiles of the income distribution and those with incomes in the top two quintiles and repeat the analyses,

while including the same control variables. As noted above, we use this particular quintile split because it yields about the same number of households in the bottom- and top-income subsamples. As shown in columns (2) – (3) of Table 6, the results hold within each income sub-sample. That is, the association between slave exports and mistrust in financial institutions is significant in both the high- and low-income subsamples, suggesting that the results are not driven solely by demand-side factors associated with income. With respect to differences between the estimated coefficients on *Slave exports* in the bottom- and top-income subsamples, we find that lower-income households have greater distrust of financial institutions.

We next push these analyses further by asking: Is the enduring impact of the historical slave trade on mistrust in financial institutions mitigated by education, or is the slave trade's influence on culture and social cohesion largely independent of the degree of education that an individual has received? To shed some empirical light on this question, we repeat the analyses in Table 6 for two subsamples of individuals: those who completed primary education or less and those that had at least some secondary education. This splits the full sample into two similar sized groups. As shown in columns (4) & (5), there is little difference in the estimated coefficient on *Slave exports* between these two subsamples. These results hold whether excluding or including the additional geographic and colonizer controls (Online Appendix Table A4). Furthermore, the coefficient estimates on *Slave exports* do not vary much across these specifications, emphasizing the independent link between the slave trade and trust in financial institutions.

These findings are consistent with the view that the historical slave trade had an enduring, deleterious effect on social cohesion that in turn manifests as distrust in financial institutions. As summarized in the Introduction, Nunn and Wantchekon (2011) demonstrate that the slave trade created an enduring culture of distrust and a large literature demonstrates that social trust exerts a positive impact on the operation of financial systems by facilitating transactions between

unfamiliar counterparties and transactions that occur over time. In turn, we discover that the slave trade is negatively associated with trust in financial institutions.[8]

3.5 Slave exports and aggregate variations in household finance

We next implement a different strategy for quantifying the degree to which the slave trade accounts for cross-country differences in household (a) access to financial services, (b) credit, (c) use of mobile finance, and (d) mistrust of financial institutions and financial institutions trust of households. To do this, we move to a pure cross-country setting by aggregating each of the 17 household finance indicator examined above to the country level. For example, we calculate the percentage of respondents who report having a bank account (*Account_fin*) for each country; the percentage of respondents who have borrowed from a financial institution (*Borrow from financial institutions*) in each country; etc.

We then compute the increment R-squared in the regression of a country-aggregate household finance measure on a set of country characteristics relative to the regression of the same dependent variable on a set of country characteristics plus *Slave exports*. We use the incremental R-squared to provide additional information concerning the importance of the slave trade in accounting for differences in modern household finance. We provide these estimates—in addition to the household regressions above—to further quantify the impact of the slave trade on households finance.

As reported in Table 7, this exercise indicates that *Slave exports* is associated with material differences in household finance across countries. We first note that the F-statistics on *Slave exports* in the cross-country regressions are statistically significant for each of the 17 household finance indicators. Second, Panel A shows that the increment adjusted R-squared with respect to *Slave exports* ranges between 14% and 22% for the indicators of household access to

[8] In robustness tests, we examine one possible manifestation of high levels of general mistrust: financial institutions might require extensive documentation and information from households before they can open a bank account. We use *Lack documentation required by financial institutions*, which equals one if the household indicates not having a bank account due to insufficient documentation, e.g., identity card, wage slip, etc. As shown in Appendix Table A5, *Slave exports* enters positively and significantly.

financial services. That is, between 14% and 22% of cross-country differences in the indicators of modern household access to financial services are associated with historical differences in each country's exposure to the slave trade. Third, the adjusted R-squared results in Panel B indicate that between 20% and 32% of cross-country differences in the household access to credit from financial institutions today are associated with differential exposure to the historic slave trade. In general, similar magnitudes also hold for the use of mobile finance (Panel C), and household mistrust in formal financial institutions (Panel D). Of course in moving to a cross-country setting, these analyses suffer from standard identification concerns. We next develop an augmented identification strategy to further isolate the impact of the historical slave trade on modern finance.

4. SLAVE EXPORTS BY ETHNICITY AND HOUSEHOLD CREDIT

To better identify the impact of the slave trade on household financing constraints, we differentiate among ethnic groups within countries. We conduct this more granular investigation to address the concern with our earlier examination of the relationship between the intensity of the African slave trade between 1400 and 1900 and modern household finance: There might be country characteristics that are correlated with both the historical slave trade and modern household finance that are omitted from our regressions. Although we control for an array of country-specific and household-specific traits in Tables 3 – 6, this concern about potential omitted variable bias remains. To mitigate this concern, we now differentiate by ethnic groups within countries, so that we can include country fixed effects and better isolate the impact of the extraction of slaves of a particular ethnic group on the financing constraints experienced by households of that ethnic group today. Moving to these ethnicity-level analyses does have a cost, however. We have very limited information on household finance at the ethnicity-level, so we cannot conduct the full array of analyses in Tables 3 – 6.

To implement this enhanced, ethnicity-level identification strategy, we employ two different datasets. First, though more limited in many respects than the World Bank's *Financial*

Inclusion Database, the *Afrobarometer* provides survey data that (a) differentiate households by ethnic origins within countries and (b) include information on the degree to which households from each ethnic group view access bank credit as a major problem. Second, Nunn and Wantchekon (2011) provide data on slave exports by ethnicity. By linking these two datasets, we examine the relation between slave exports by ethnicity during the 1400-1500 period and the degree to which decedents from those same ethnic groups today view access to credit as a major concern.

For these ethnic-level analyses, we use the following regression:

$$HHF_{i,e,c} = \alpha + \varphi Ethnicity\ based\ slave\ exports_e + \boldsymbol{X_i'}\mathbf{P} + \alpha_c + \varepsilon_{i,e,c}, \quad (2)$$

where the dependent variable, $HHF_{i,e,c}$, represents the indicator of whether household *i*, belonging to ethnic group *e*, in country *c* considers access to loans/credit from the formal financial system as the most important problem facing the country: *Loans/credit as the most important problem*. The key explanatory variable, *Ethnicity based slave exports*, equals the natural logarithm of one plus the total number of slaves taken from each ethnic group during the 1400-1900 period, divided by the area of land inhabited by the ethnic group. The vector $\boldsymbol{X_i}$ is the individual-level control variables, including each respondent's gender indicator, an live-in-an-urban-area indicator, age, age squared, ten indicators of education, five indicators of living conditions, 18 fixed effect indicators of different religions, and 25 occupational indicators. We further include country fixed effects to condition out any time-invariant country traits. We estimate the equation using OLS, with heteroskedasticity robust standard errors clustered at the ethnicity-level.

Table 8 shows that the negative association between the historical slave trade and household access to credit holds at the ethnic group level. *Ethnicity based slave exports* enters positively and significantly when estimating equation (2), suggesting that individuals belonging to ethnic groups that were more intensively captured and exported as slaves during the historic slave trade tend to find accessing loans/credit from formal financial institutions a bigger problem

than individuals who are descendants of ethnic groups that were less severely impacted by the 1400-1900 slave trade.

Concerns might arise that two different sources of variation in our key explanatory variable, *Ethnicity based slave exports*, could account for these findings The variable might capture the intensity of slave extraction from different ethnic groups during the slave trade era. *Ethnicity based slave exports* might also reflect differences in pre-1400 period. For example, some ethnic groups might have oppressed other ethnic groups and constrained the oppressed groups to small geographic territories. In this case, even if the same number of individuals were extracted from each ethnic group as slaves, *Ethnicity based slave exports* will be larger for the oppressed ethnicities. Indeed, oppressive ethnic groups might induce greater extraction of individuals from the oppressed groups as slaves. Thus, pre-slave-trade ethnic group oppression could then explain both the degree of slave extraction by ethnic groups during the slave trade era and current levels of household finance. Under these conditions, the regression result that *Ethnicity based slave exports* is positively associated with *Loans/credit as the most important problem* could reflect these pre-slave trade ethnic conflicts and not the impact of the slave trade on household financial constraints. The enduring impact of pre-existing ethnic conflicts and discrimination on modern financial development is consistent with a growing body of research (e.g., Grosfeld, Rodnyansky, Zhuravskaya 2013, D'Acunto, Prokopczuk, Weber 2018). In other words, the findings in Table 8 column (1) can be interpreted in two ways: (a) ethnicities that were enslaved more intensely face higher financial constraints today; or (b) ethnicities that were discriminated against in the distant past are still discriminated against today, and hence face stricter financial constraints today.

To address this concern, we distinguish between these two potential channels by re-estimating equation (2) while simultaneously controlling for (a) the natural logarithm of the area of land the ethnic groups inhabited, *Log Land area*, and (b) the population density of each ethnicity, *Log population density*. We include *Log Land area* and *Log population density* to control for the extent to which ethnic groups were geographically confined, oppressed and

discriminated in the distant past. In this way, we provide evidence on whether the negative association between *Ethnicity based slave exports* and *Loans/credit as the most important problem* is driven by the intensity of slave extraction or the extent to which ethnicities were geographically confined in the distant past.

As shown in Table 8 columns (2) and (3), we discover that the results are more consistent with the view that ethnicities that were enslaved more intensively during the slave trade era face greater financial constraints today. Neither *Log Land area* nor *Log population density* explains the cross-sectional variations of present-day financial constraints when controlling for the intensity of enslavement, *Ethnicity based slave exports*.[9] These findings are consistent with our conjecture that the slave trade created distrust in the financial sector, which in turn hinders access to financial services and credit.

Finally, we conduct additional analyses to assess whether the distrust channel also holds at the ethnicity-level. Given that the *Afrobarometer* (2005) does not provide data on distrust in the financial sector at the ethnicity-level, we (a) calculate the average level of distrust in the financial sector at the country level using data from the *Global Financial Inclusion Database*, and (b) interact this country-specific distrust in financial institutions with our measure of ethnic enslavement. If exposure to the 1400-1900 slave trade affects modern household finance by damaging trust, the relationship between the intensity of ethnic enslavement and the degree to which households view access to finance as a major public policy concern will be stronger in countries with greater mistrust in the financial sector. This is what we find, as reported in Table 8 columns (4) – (6). Thus, the household-ethnic-level analyses are fully consistent with household-country-level examinations presented in Tables 3-6.

[9] The number of observations in column (3) drops because the data on *Log population density* are missing for about 15% of the ethnic groups in the sample (see Nunn and Wantchekon, 2011).

4. CONCLUSIONS

Motivated by findings that finance influences economic growth, poverty, and income distribution, researchers examine the historical determinants of financial development. The law and finance literature stresses that different European colonizers spread distinct legal systems that continue to influence financial markets. The literature on political institutions emphasizes that European colonizers adopted different strategies that led to the creation of distinct political system that have enduring effects on credit markets. More recently, a growing body of research exploits historical events and institutions to explain contemporary finance. If researchers can dissect the historical origins of financial development, this could highlight deep-rooted impediments to improving credit markets and therefore guide future policy reforms.

In this paper, we contribute to the study of the historical determinants of financial development by providing the first evaluation of the impact of the slave trade on household finance. We evaluate whether the historical slave trade in a country affects household access to financial services, the ability of households to obtain credit, the degree to which household use mobile finance, and the level of trust that individuals have in financial institutions today. Moreover, to better identify the impact of the slave trade on household financing constraints, we differentiate among ethnic groups within countries. In particular, we examine the link between slave exports by ethnicity during the 1400-1900 period and the degree to which decedents from those same ethnic groups today view access to credit as a major concern.

We discover that the intensity of the historic slave trade is negatively associated with household finance today. We find that the intensity with which people were captured and exported from Africa as slaves during the 1400 – 1900 period is strongly, negatively associated with (a) access to financial services, (b) the ability to obtain credit, and (c) the use of mobile finance. Moreover, the results hold when differentiating households by ethnicity. We find that the intensity with which people from particular ethnic groups were enslaved and exported from Africa is positively associated with the severity of credit constraints faced by households from those same ethnic groups today. We provide additional evidence suggesting that one mechanism

through which the historic slave trade has enduring effects on household finance is through trust. The intensity of the slave trade is positively associated with distrust between individuals and formal financial institutions. The evidence is consistent with the view that the slave trade had an enduring, deleterious effect on social cohesion that continues to harm the provision and use of household financial services. From a policy perspective, these findings suggest that deeply-rooted differences in households' trust of financial institutions across ethnicities and countries could shape the responsiveness of households to an assortment of financial literacy and inclusion programs, so that addressing issues of trust might be a crucial feature in effectively implementing such programs.

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Table 1 Variable definitions

Variable	Definition	Source
Country- and Ethnicity-level variables		
Slave exports	Natural logarithm of the total number of slaves exported from each country between 1400 and 1900 in the four slave trades normalized by land area, as measured in millions of square kilometers. If no slaves were exported from a country, Nunn (2008) uses a value of 0.1 for the total number of slaves exported from a country	Nunn (2008)
Ethnicity based slave exports	Natural logarithm of one plus the total number of slaves taken from each ethnic group during the period from 1400 through 1900, divided by the area of land inhabited by the ethnic group, as measured in square kilometers. The ethnicity specific slave trade measure uses the number of slaves from two of the four slave trades that have available information on slaves' ethnicity: the transatlantic, which was the largest of slave trades, and Indian Ocean.	Nunn and Wantchekon (2011)
French legal origin	An indicator that equals one if a country implants laws from the French civil law traditions, and zero otherwise.	La Porta, Lopez-de-Silanes, Shleifer, and Vishny (1998)
Latitude	The logarithm of the absolute distance between each country and the equator.	Nunn (2008)
Culture controls	Includes four variables, namely Catholic, Muslim, Protestant, and Other, which equal the shares of the population that are Catholic, Muslim, Protestant, or another religions respectively in 1980.	Beck, Demirgüç-Kunt, and Levine (2003)
Independence	The number of independent years from the first year of independence to the beginning of our sample period, computed as 2006 minus a country's first year of independence.	Beck, Demirgüç-Kunt, and Levine (2003)
Longitude	The longitude of each country's centroid	Nunn (2008)
Rain min	The average total rainfall (in millimeters) in the driest month of the year	
Humid max	Average maximum afternoon humidity (in percentage) during the hottest month of the year	
Colonizer indicators	Eight indicators for the identity of a country's colonizer at the time of its independence, indicating not colonized, colonized by Britain, France, Portugal, Belgium, Spain, Italy or UN	

Log Land area	Log area of land area inhabited by each ethnic group (in square kilometers)	Nunn and Wantchekon (2011)
Log population density	Log population density at the ethnicity level during the colonial period (approximately the early twentieth century)	
Individual-level variables		
Access to financial services		
Account_fin	An indicator that equals to if a respondent has an account at a financial institution, and zero otherwise	Global Financial Inclusion Database (2014),[10] the World Bank
Account_deposit	An indicator that equals one if the respondent has deposited some money, including cash or electronic deposits, or any time money, into his/her personal account(s)	
Account_withdrawal	An indicator that equals one if the respondent has taken out some money from his/her personal account(s). This includes cash withdrawals in person or using ATM/debit card, electronic payments or purchases, checks, or any other time money removed from your account	
Debit card	An indicator that equals one if the respondent is reported to own a debit card connected to an account at a financial institution that allows him/her to withdraw money and take money out of that account right away	
Debit card_use	An indicator that equals one if the respondent is reported to use his/her debit card to directly make a purchase	
Saved at financial institutions	An indicator that equals one if the respondent has saved or set aside some money by using an account at a bank or another type of formal financial institution	
Saved at savings club	An indicator that equals one if the respondent has saved or set aside some money by using an informal savings club	
Access to Credit		
Borrow from financial institutions	An indicator that equals one if a respondent borrowed from a bank or another formal financial institution, and zero otherwise	
Borrow from stores	An indicator that equals one if a respondent borrowed from a store by using installment credit or buying on credit	
Borrow from friends or family	An indicator that equals one if a respondent borrowed from family, relatives, or friends	
Credit card	An indicator that equals one if the respondent reports having a credit card that allows one to borrow money in order to make payments or buy things, and one can pay the balance off later.	

[10] For more details, see http://microdata.worldbank.org/index.php/catalog/2512.

Credit card_use	An indicator that equals one if the respondent has used his/her credit card, and zero otherwise	
Mortgages from financial institutions	An indicator that equals one if the respondent has a loan from a bank or another type of formal financial institution to purchase a home, an apartment, or land.	
Use of Mobile finance		
Account_mobile	An indicator equal to one if a respondent has a mobile money account, and zero otherwise.	
Transaction via mobile	An indicator equal to one if a respondent has made a transaction with money from his account at a financial institution using a mobile phone. This includes using a mobile phone to make payments, buy things, or to send or receive money.	
Payment via internet	An indicator equal to one if a respondent has made payments on bills or bought things online using the internet.	
Remittances via mobile	An indicator that equals one if the respondent has sent or received money to or from a relative or friend living in a different area inside a country through a mobile phone	
Other Measures		
Lack trust in financial institutions	An indicator that equals one if a respondent indicates not having a bank account because he/she does not trust financial institutions, and zero otherwise.	
Education	An indicator that equals one if an individual's educational attainment is secondary or more, and zero otherwise.	
Income	Household income quintile indicators within each country.	
Female	An indicator that equals one if the respondent is female, and zero otherwise.	
Age	Natural logarithm of the respondent age.	
Individual-level variables from Afrobarometer		
Loans/credit as the most important problem	An indicator that equals one if a respondent chooses "Loans/credit" in response to the question "*In your opinion, what are the most important problems facing this country that government should address?*", and zero otherwise.	Afrobarometer (2005)
Age	The respondent's reported age.	Nunn and Wantchekon (2011)
Gender	An indicator that equals one if the respondent is male, and zero otherwise.	
Urban	An indicator that equals one if the respondent lives in urban area, and zero otherwise.	

Education	Ten indicators of the respondent's education categories, including (1) no formal schooling, (2) informal schooling only, (3) some primary schooling, (4) primary school completed, (5) some secondary school/high school, (6) secondary school completed/high school, (7) post-secondary qualifications, but no university, (8) some university, (9) university completed, and (10) post-graduate.
Occupation	25 indicators of the respondent's main occupation, see the Afrobarometer manual for more detail.
Religion	18 indicators of the respondent's religion, see the Afrobarometer manual for more detail.
Living conditions	Five indicators of the respondent's view of their present living conditions: (1) very bad, (2) fairly bad, (3) neither good nor bad, (4) fairly good, or (5) very good.

Table 2 Summary statistics

Variable	N	Mean	SD	Min	P25	P50	P75	Max
Country- and Ethnicity-level variables								
Slave exports	51	3.247	3.932	-2.303	-1.465	4.627	6.66	8.818
Ethnicity based slave exports	186	0.257	0.624	0	0	0.004	0.191	3.656
Log Land area	186	10.13	1.09	7.276	9.481	10.137	10.951	12.669
Log population density	157	2.04	1.51	-4.274	1.200	2.269	3.073	5.870
French legal origin	51	0.667	0.476	0	0	1	1	1
Catholic	51	25.6	27.1	0.1	1.9	18.5	35	95.9
Muslim	51	33.735	37.308	0	0.9	16.4	73	99.7
Protestant	51	12.286	14.789	0	0.2	4.9	21.4	64.2
Latitude	51	13.718	9.882	0.2	6	12	20	36
Independence	51	53.529	38.288	16	40	46	46	206
Longitude	51	16.126	19.984	-24.044	-1.207	17.541	30.042	57.794
Rain min	51	9.039	16.165	0	0	3	13	69
Humid max	51	71.510	12.007	35	67	73	78	95
Household-level variables from Global Financial Inclusion								
Account_fin	35982	0.303	0.459	0	0	0	1	1
Account_deposit	35144	0.222	0.416	0	0	0	0	1
Account_withdrawal	35117	0.216	0.412	0	0	0	0	1
Debit card	35641	0.182	0.386	0	0	0	0	1
Debit card_use	35614	0.090	0.286	0	0	0	0	1
Saved at financial institutions	35927	0.157	0.364	0	0	0	0	1
Saved at savings club	35925	0.216	0.412	0	0	0	0	1
Borrow from financial institutions	35825	0.068	0.251	0	0	0	0	1
Borrow from stores	34774	0.075	0.264	0	0	0	0	1
Borrow from friends or family	35790	0.374	0.484	0	0	0	1	1
Credit card	35579	0.039	0.194	0	0	0	0	1
Credit card_use	35568	0.029	0.168	0	0	0	0	1

Mortgages from financial institutions	35769	0.063	0.242	0	0	0	0	1
Lack trust in financial institutions	35415	0.088	0.284	0	0	0	0	1
Lack documentation required by financial institutions	35591	0.145	0.353	0	0	0	0	1
Account_mobile	32990	0.122	0.327	0	0	0	0	1
Transaction via mobile	35142	0.062	0.242	0	0	0	0	1
Payment via internet	35602	0.028	0.166	0	0	0	0	1
Remittance via mobile	35417	0.130	0.336	0	0	0	0	1
Education	35982	0.470	0.499	0	0	0	1	1
Income	35982	3.241	1.430	1	2	3	5	5
Female	35982	0.492	0.500	0	0	0	1	1
Age	35982	34.933	15.322	15	23	31	44	99
Household-level variables from Afrobarometer								
Loans/credit as the most important problem	21135	0.010	0.099	0	0	0	0	1
Age	21135	36.392	14.662	18	25	33	45	130
Gender	21135	0.503	0.500	0	0	1	1	1
Urban	21135	0.368	0.482	0	0	0	1	1
Education	21135	3.102	1.995	0	2	3	4	9
Occupation	21135	15.932	76.632	0	2	7	20	995
Religion	21135	28.356	105.875	0	2	4	10	995
Living conditions	21135	2.558	1.204	1	2	2	4	5

Table 3 Slave exports and access to financial services

This table reports OLS regression results of household access to financial services on historical slave exports. The dependent variable, *Account_fin*, equals to one if a respondent has an account at a financial institution, and zero otherwise. *Account_deposit* is an indicator that equals one if the respondent has deposited some money into his/her personal account(s). *Account_withdrawal* is an indicator that equals one if the respondent has taken out some money from his/her personal account(s). *Debit card* is an indicator that equals one if the respondent is reported to own a debit card connected to an account at a financial institution. *Debit card_use* is an indicator that equals one if the respondent is reported to use his/her debit card to directly make a purchase. *Saved at financial institutions* (*Saved at savings club*) is an indicator that equals one if the respondent is reported to saved or set aside any money by using an account at a bank or another type of formal financial institution (using an informal savings club). The key explanatory variable, *Slave exports*, is from Nunn (2008) and equals the natural logarithm of the total number of slaves exported from each country between 1400 and 1900 normalized by land area. *Individual controls* include a gender indicator, age, age squared, three respondent education fixed effects (the omit group: education (completed tertiary or more)), and five household income level fixed effects (the omit group: Income (richest 20%)). *Country controls* include *French legal origin*, *Culture controls*, *Latitude*, and *Independence*. See the Table 1 for more detailed variable definitions and data sources. P-values calculated using heteroskedasticity robust standard errors clustered at the country level are reported in parentheses. *,**, and *** indicate significance at 10%, 5%, and 1%.

	Account _fin	Account _deposit	Account _withdrawal	Debit card	Debit card _use	Saved at financial institutions	Saved at savings club
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Slave exports	-0.024***	-0.021***	-0.020**	-0.017*	-0.012**	-0.011**	0.004
	(0.007)	(0.006)	(0.010)	(0.052)	(0.012)	(0.010)	(0.371)
Education (secondary or more)	0.225***	0.192***	0.191***	0.176***	0.095***	0.130***	-0.005
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.726)
Income (second 20%)	0.022***	0.024***	0.017**	0.005	0.002	0.006	0.043***
	(0.005)	(0.002)	(0.015)	(0.396)	(0.583)	(0.343)	(0.000)
Income (middle 20%)	0.068***	0.065***	0.053***	0.032***	0.015**	0.035***	0.061***
	(0.000)	(0.000)	(0.000)	(0.001)	(0.040)	(0.000)	(0.000)
Income (fourth 20%)	0.120***	0.116***	0.102***	0.074***	0.041***	0.075***	0.071***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Income (richest 20%)	0.226***	0.221***	0.206***	0.163***	0.095***	0.164***	0.072***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Female	-0.039***	-0.040***	-0.040***	-0.028***	-0.016***	-0.026***	0.052***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)
Age	1.525***	1.336***	1.336***	1.156***	0.638***	1.068***	1.600***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)

Age squared	-0.192***	-0.169***	-0.168***	-0.149***	-0.084***	-0.138***	-0.223***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Country controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	35,982	35,144	35,117	35,641	35,614	35,927	35,925
R-squared	0.211	0.200	0.196	0.202	0.143	0.129	0.055
# of countries	36	36	36	36	36	36	36

Table 4 Slave exports and household access to credit

This table reports OLS regression results of household access to finance on historical slave exports. The dependent variable, *Borrow from financial institutions*, equals to one if a respondent borrowed any money from a bank or another formal financial institution, and zero otherwise. *Borrow from stores*, equals to one if a respondent borrowed any money from a store by using installment credit or buying on credit. *Borrow from friends or family*, equals to one if a respondent borrowed any money from family, relatives, or friends. *Credit card* is an indicator that equals one if the respondent is reported to own a credit card that allows one to borrow money in order to make payments or buy things, and one can pay the balance off later. *Credit card_use* is an indicator that equals one if the respondent has used his/her credit card, and zero otherwise. *Mortgages from financial institutions* is an indicator equal to one if the respondent has a loan from a bank or other financial institutions to purchase a home, an apartment, or land. The key explanatory variable, *Slave exports*, is from Nunn (2008) and equals the natural logarithm of the total number of slaves exported from each country between 1400 and 1900 normalized by land area. *Individual controls* include a gender indicator, age, age squared, three respondent education fixed effects (the omit group: education (completed tertiary or more)), and five household income level fixed effects (the omit group: Income (richest 20%)). *Country controls* include *French legal origin*, *Culture controls*, *Latitude*, and *Independence*. See the Table 1 for more detailed variable definitions and data sources. P-values calculated using heteroskedasticity robust standard errors clustered at the country level are reported in parentheses. *,**, and *** indicate significance at 10%, 5%, and 1%.

	Borrow from financial institutions	Borrow from stores	Borrow from friends or family	Credit card	Credit card _use	Mortgages from financial institutions
	(1)	(2)	(3)	(4)	(5)	(6)
Slave exports	-0.006***	-0.007***	-0.005	-0.007***	-0.006***	-0.004**
	(0.000)	(0.001)	(0.571)	(0.004)	(0.003)	(0.012)
Individual controls	Yes	Yes	Yes	Yes	Yes	Yes
Country controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	35,825	34,774	35,790	35,579	35,568	35,769
R-squared	0.042	0.023	0.052	0.048	0.046	0.033
# of countries	36	35	36	36	36	36

Table 5 Slave exports and household use of mobile finance

This table reports OLS regression results of household usage of mobile finance on historical slave exports. The dependent variable, *Account_mobile*, equals one if a respondent has a mobile money account, and zero otherwise. *Transaction via mobile*, equals one if a respondent has ever made a traction with money from his account at a financial institution using a mobile phone. This includes using a mobile phone to make payments, buy things, or to send or receive money. *Payment via internet*, equals one if a respondent has ever made payments on bills or bought things online using the internet. *Remittance via mobile* is an indicator equal to one if the respondent has sent or received money to or from a relative or friend living in a different area inside a country through a mobile phone. The key explanatory variable, *Slave exports*, is from Nunn (2008) and equals the natural logarithm of the total number of slaves exported from each country between 1400 and 1900 normalized by land area. *Individual controls* include a gender indicator, age, age squared, three respondent education fixed effects (the omit group: education (completed tertiary or more)), and five household income level fixed effects (the omit group: Income (richest 20%)). *Country controls* include *French legal origin*, *Culture controls*, *Latitude*, and *Independence*. See the Table 1 for more detailed variable definitions and data sources. P-values calculated using heteroskedasticity robust standard errors clustered at the country level are reported in parentheses. *,**, and *** indicate significance at 10%, 5%, and 1%.

	Account_mobile	Transaction via mobile	Payment via internet	Remittance via mobile
	(1)	(2)	(3)	(4)
Slave exports	-0.009**	-0.008***	-0.002***	-0.011**
	(0.020)	(0.001)	(0.001)	(0.012)
Individual controls	Yes	Yes	Yes	Yes
Country controls	Yes	Yes	Yes	Yes
Observations	32,990	35,142	35,602	35,417
R-squared	0.133	0.099	0.022	0.155
# of countries	33	36	36	36

Table 6 Slave exports and household mistrust in financial institutions

This table reports OLS regression results of household mistrust in financial institutions on historical slave exports. The dependent variable, *Lack trust in financial institutions*, is an indicator that equals one if a respondent does not have an account at financial institutions because he/she does not trust financial institutions, and zero otherwise. Column (1) uses the full sample, while columns 2 and 3 (4 and 5) use the subsamples based on the level of income (education). The key explanatory variable, *Slave exports*, is from Nunn (2008) and equals the natural logarithm of the total number of slaves exported from each country between 1400 and 1900 normalized by land area. *Individual controls* include a gender indicator, age, age squared, three respondent education fixed effects (the omit group: education (completed tertiary or more)), and five household income level fixed effects (the omit group: Income (richest 20%)). *Country controls* include *French legal origin*, *Culture controls*, *Latitude*, and *Independence*. See the Table 1 for more detailed variable definitions and data sources. P-values calculated using heteroskedasticity robust standard errors clustered at the country level are reported in parentheses. *, **, and *** indicate significance at 10%, 5%, and 1%.

	Lack trust in financial institutions				
	Overall sample	Income bottom 60%	Income top 40%	Education: completed primary or less	Education: secondary or more
	(1)	(2)	(3)	(4)	(5)
Slave exports	0.006***	0.008***	0.004**	0.007***	0.005**
	(0.009)	(0.004)	(0.037)	(0.004)	(0.023)
Individual controls	Yes	Yes	Yes	Yes	Yes
Country controls	Yes	Yes	Yes	Yes	Yes
F-statistic (β_High-β_Low=0)		7.39***		1.58	
Prob > chi2		(0.007)		(0.209)	
Observations	35,415	18,447	16,968	18,680	16,735
R-squared	0.017	0.015	0.015	0.012	0.015
# of countries	36	36	36	36	36

Table 7 Slave exports and country-aggregate variations in household financing patterns

This table reports the incremental explanatory power of our key variable, *Slave exports*, in the regressions of household finance at the country level. The dependent variable is one of the measures on household financing patterns aggregated at the country level. Country-level *Account_fin*, for example, equals the percentage of respondents who report having an account at a bank or another type of formal financial institutions. We use similar approach to calculate all other household financing measures at the country level. Column 2 reports F-statistics for the significance of *Slave exports*, along with their corresponding p-values in parentheses. Column 3 reports the number of countries. Columns 4 and 5 report the increment R2 and the increment adjusted R2 between the model that accounts for *Country chars.* only, and the model that accounts for both *Country chars.* and *Slave exports*. *Country chars.* include *French legal origin*, *Culture controls*, *Latitude*, and *Independence*. *,**, and *** indicate significance at 10%, 5%, and 1%.

	F-tests on Slave exports	N	Comparison of controlling for Country chars. VS. Country chars. + Slave exports	
			ΔR2	Δadj.R2
Panel A: Access to financial services				
Account_fin	6.84** (0.0142)	36	0.202	0.218
Account_deposit	7.31** (0.0115)	36	0.221	0.242
Account_withdrawal	6.29** (0.0182)	36	0.215	0.235
Debit card	3.44* (0.0741)	36	0.133	0.138
Debit card_use	5.51** (0.0262)	36	0.148	0.159
Saved at financial institutions	6.91** (0.0138)	36	0.162	0.172
Panel B: Access to credit				
Borrow from financial institutions	18.12*** (0.0002)	36	0.260	0.295
Borrow from stores	12.43*** (0.0015)	35	0.167	0.175
Credit card	7.10** (0.0127)	36	0.278	0.312
Credit card_use	7.42** (0.0110)	36	0.284	0.319
Mortgages from financial institutions	5.87** (0.0221)	36	0.186	0.199
Panel C: Usage of mobile finance				
Account_mobile	4.78** (0.0383)	33	0.042	0.028
Transaction via mobile	10.94*** (0.0026)	36	0.144	0.161
Payment via internet	8.79*** (0.0061)	36	0.122	0.121
Remittance through a mobile phone	5.95** (0.0213)	36	0.051	0.041
Panel D: Mistrust in financial institutions				
Lack trust in financial institutions	7.56** (0.0103)	36	0.139	0.136

Table 8 Slave exports and individual perception on financing problems, slave trade at the ethnic-group level

This table reports OLS regression results of the extent to which individuals consider loans/credit as the most important problem facing the country on historical slave exports at the ethnicity-group level, using individual-level data from the 2005 Afrobarometer survey. The dependent variable, *Loans/credit as the most important problem*, equals to one if a respondent chooses "loans/credit" in response to the question: "In your opinion, what are the most important problems facing this country that government should address?", and zero otherwise. The key explanatory variable, *Ethnicity based slave exports*, is from Nunn and Wantchekon (2011) and equals the natural logarithm of the total number of slaves exported from each respondent's ethnic group between 1400 and 1900 normalized by land area. *High %mistrust in financial institutions* is a dummy variable equal to one if the percentage of people who trust in financial institutions falls below the sample tertile, and zero otherwise. *Individual controls* include a gender indicator, an live-in-an-urban-area indicator, age, age squared, ten education fixed effects, five living conditions fixed effects, 18 religion fixed effects, and 25 occupation fixed effects. We include country fixed effects in all columns. See the Table 1 for more detailed variable definitions and data sources. P-values calculated using heteroskedasticity robust standard errors clustered at the ethnicity level are reported in parentheses. *,**, and *** indicate significance at 10%, 5%, and 1%.

	Loans /credit as the most important problem					
	(1)	(2)	(3)	(4)	(5)	(6)
Ethnicity based slave exports	0.005**	0.005**	0.005**	0.000	0.000	0.000
	(0.019)	(0.028)	(0.038)	(0.840)	(0.982)	(0.992)
Ethnicity based slave exports * High %mistrust in financial institutions				0.008***	0.008***	0.008***
				(0.005)	(0.006)	(0.007)
Log Land area		0.001	0.001		0.001	0.0004
		(0.333)	(0.619)		(0.365)	(0.739)
Log population density			0.000			-0.0001
			(0.826)			(0.872)
Individual controls	Yes	Yes	Yes	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	21,135	21,135	17,893	18,934	18,934	16,444
R-squared	0.021	0.022	0.023	0.023	0.023	0.024
# ethnicities	186	186	157	182	182	155