The Long-term Impact of the Historical Slave Trade in Africa on Contemporary Industrialization[*]

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Abstract

This study seeks to elucidate one of the channels through which the historical slave trade in Africa contributed to the region's current economic underperformance. By integrating contemporary individual-level occupational data with the volume of slave exports during the four major slave trades from 1400 to 1900, I identify a negative relationship between the historical slave trade and contemporary industrialization. Through rigorous controls for confounding factors and applying an instrumental variable strategy, I establish that this relationship is causal. Furthermore, I demonstrate that the impact of the historical slave trade persisted over time through its interaction with external factors. Specifically, by analyzing the differential impact of the historical slave trade across countries with varying degrees of pre-colonial institutional centralization, I find that the adverse impact of the historical slave trade on contemporary industrialization was sustained by the generally poor institutional quality of African governments.

JEL Codes: C36, N47, N67, O14, O43, O55

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1 Introduction

The historical slave trade has been identified as a significant factor contributing to Africa's current economic underperformance (Nunn, 2008). Building on Nunn's pioneering work, a substantial body of research has explored the long-term effects of the historical slave trade on various other outcomes (as will be discussed in the literature review below). However, there remains a gap in understanding the channels through which the historical slave trade led to current economic underperformance except Nunn and Wantchekon (2011), which suggests mistrust as a channel through which the historical slave trade persistently affected the region's current economic performance.

Given the widely accepted view that industrialization can significantly spur economic growth (Solow, 1956; Kaldor, 1966, 1967; Kuznets, 1973; Kogan et al., 2017) and the observation that African countries still lag in contemporary industrialization (Diao et al., 2017; Nguimkeu and Zeufack, 2024), this paper investigates whether the historical slave trade impeded Africa's economic development by hindering its industrialization process.

I begin by introducing the qualitative historical context relevant to the subjects of analysis. First, I highlight the emergence of a vicious cycle in African societies during the historical slave trade, illustrating how it likely impeded collective efforts toward industrialization. Second, I discuss the early stages of industrialization in African countries after they gained independence in the mid-twentieth century, which were characterized by significant government intervention and sowed the seeds of subsequent deterioration in institutional quality (Bates, 2014, 2015). Lastly, I explore the history of institutional development in Africa, with a focus on the relationship between pre-colonial institutional centralization and current institutional quality (Gennaioli and Rainer, 2007).

Motivated by the qualitative historical evidence that the historical slave trade might hinder the process of contemporary industrialization in Africa, I investigate the impact of the historical slave trade on contemporary industrialization quantitatively. In practice, I employ data on the volume of the historical slave trade at the country level from Nunn (2008), at the ethnicity level from Nunn and Wantchekon (2011), and the contemporary share of workers in industrial sectors from WorldBank (2023). Additionally, I analyze individual-level occupational data from the 2016 (Round 6) and 2005 (Round 3) Afrobarometer survey (Afrobarometer, 2005, 2016), which are nationally representative surveys encompassing up to 36 African countries. The results from country-level regressions reveal

a negative correlation between the volume of the historical slave trade and the contemporary share of workers in industrial sectors. This finding is further supported by individual-level regressions, which show a negative correlation between the volume of the historical slave trade and the probability of respondents currently being employed in industrial sectors.

Following the methodology outlined in Altonji et al. (2005) and Bellows and Miguel (2009), I compute the extent to which the selection on unobservable factors must exceed that of observable factors in order to fully explain away my estimates. The calculation indicates that the impact of unobservable factors would need to be 2.5 to 4.5 times larger than that of observable factors to nullify the observed OLS negative relationship. Given that I incorporate multiple sets of meticulous controls in both country-level and individual-level regressions, it is unlikely that my OLS estimates suffer from significant bias.

However, relying solely on OLS results is still insufficient to establish a causal relationship. To establish causality, I carefully control for individual characteristics in the Afrobarometer survey, as well as country-level geographical and climatic factors that could bias the estimates. Furthermore, I employ an instrumental variable (IV) approach, using the distances from each country to the primary destinations of each of the four major slave trades as instruments. The instrumental variable estimates reinforce the OLS findings, showing significantly negative coefficients of interest with a slightly larger magnitude than the OLS estimates. The controls and the instrumental variable strategy provide robust evidence that the historical slave trade did causally hamper the process of contemporary industrialization in Africa.

To examine how the impact of the historical slave trade on industrialization persisted over several centuries, I first investigate whether the impact was transmitted through internal factors, such as norms and beliefs, or external factors, such as capital accumulation, infrastructure development, and institutional quality. The analysis reveals that when the volume of the historical slave trade is calculated within ethnic groups, the adverse impact of the historical slave trade on contemporary industrialization disappears. This finding suggests that the persistence of the historical slave trade's impact on contemporary industrialization is primarily attributable to external factors.

Historical qualitative evidence indicates that the trajectory of contemporary industrialization in Africa has been markedly influenced by significant government intervention (Rweyemamu, 1979;

Steel and Evans, 1981). In light of this, I focus on the role of institutional quality as the primary external factor sustaining the adverse impact of the historical slave trade on contemporary industrialization. This focus is also supported by existing literature, which emphasizes the importance of institutional quality as a key determinant in facilitating industrialization (Acemoglu et al., 2002). Considering that government dysfunction and corruption are critical obstacles to economic development in Africa (Bates, 2014, 2015), I hypothesize that the negative impact of the historical slave trade on contemporary industrialization is likely to be more pronounced in countries with lower institutional quality.

Testing my hypothesis requires some additional techniques because current institutional quality may be endogenous, potentially influenced by the historical slave trade itself. To address this issue, I estimate the effect of the historical slave trade on contemporary industrialization separately for countries with high or low degrees of pre-colonial institutional centralization, which is associated with current institutional quality (Gennaioli and Rainer, 2007) but not a consequence of the historical slave trade as it predates the slave trade. The findings reveal that the adverse impact of the historical slave trade on contemporary industrialization is more pronounced in countries with low degree of pre-colonial institutional centralization, suggesting that institutional factors played a crucial role in sustaining or even exacerbating the long-term adverse impact of the historical slave trade on contemporary industrialization.

Contributions to the Literature

To the best of my knowledge, this paper is the first to formally explore the relationship between the historical slave trade and contemporary industrialization in Africa. By doing so, I provide a possible channel through which the historical slave trade contributed to current economic underperformance in Africa documented in Nunn (2008). My work is related to several strands of literatures.

First, this paper contributes to the broader understanding of the long-term impacts of the historical slave trade in Africa. As discussed earlier in this section, following Nunn (2008), numerous studies have examined various long-term consequences of the historical slave trade, such as ethnic fractionalization (Whatley and Gillezeau, 2011; Green, 2013; Whatley, 2014), trust (Nunn and Wantchekon, 2011), female labor force participation, gender norms (Teso, 2019), and polygyny (Ed-

lund and Ku, 2011; Dalton and Leung, 2014; Bertocchi and Dimico, 2019). Moreover, Bertocchi and Dimico (2019) further establishes a link between the prevalence of polygyny and rising HIV rates. However, the exact channels through which the historical slave trade led to current economic underperformance remain relatively understudied. This paper makes a significant contribution by not only identifying an additional long-term outcome of the historical slave trade but also by establishing a key channel—industrialization—through which the historical slave stagnated economic growth in African countries.

Secondly, my work contributes to the ongoing exploration of the process and timing of industrialization in non-Western countries. For instance, Amsden (1991) investigates the divergent industrialization trajectories in East Asia, with particular attention to why the Philippines lagged behind other East Asian countries such as Japan, Korea, and Taiwan, despite the adoption of extensive export promotion policies. Similarly, Hsieh (2002) explores the industrialization process in East Asia using a novel approach to estimate total factor productivity growth (TFPG). In Latin America, Baer (1972) evaluates the outcomes of Import Substitution Industrialization (ISI), the dominant strategy employed to foster industrialization and economic growth in the region. However, ISI ultimately failed and, in some cases, caused delays in industrial development. Further comparisons between East Asia and Latin America by Jenkins (1991) suggest that greater state autonomy in East Asia facilitated its rapid industrialization. In post-independence India, ISI was also initially implemented as a strategy to promote industrial growth, later transitioning toward more export-oriented policies (Kuruvilla, 1996). Additionally, Bell and Rousseau (2001) highlights the critical role that the development of financial intermediaries played in advancing industrialization in India.

In the context of Africa, using Kenya as an illustrative case, Ksoll et al. (2021) argues that violent conflicts, particularly during election periods, disrupted production and impeded sustained industrial growth. Moreover, McMillan and Zeufack (2022) and Rodrik et al. (2022) emphasize that the dominance of small, informal firms with lower productivity in African manufacturing sectors recent years posed a significant barrier to industrialization and economic progress.[1] My paper offers a novel perspective: the historical slave trade also played a critical role in hampering contemporary industrialization in Africa.

[1] As will be further discussed in Subsection 7.1, even larger firms with large-scale establishments often lack efficiency and, in some cases, prove redundant.

Third, I contribute to the literature on the role of institutions in shaping economic growth. Early research highlights the importance of institutions that protect private property in fostering economic development (DeLong and Shleifer, 1993; Jones, 2003). Building on this foundation, Acemoglu et al. (2001, 2002) demonstrate that former European colonies experienced stronger economic growth when institutions emphasizing the protection of private property and checks on governmental power were established, as evidenced by the experiences of the New World countries.[2] In contrast, in regions where extractive institutions were implemented—particularly in most African countries—income levels remained stagnant. Furthermore, Acemoglu and Johnson (2005) finds that institutions focusing on the protection of property rights (property rights institutions) have a more substantial positive impact on the economy compared to those focusing on enabling private contracts between citizens (contracting institutions). Institutions also play a crucial role in the context of financial markets. For instance, Acemoglu et al. (2003) demonstrates that extractive institutions are more responsible for economic volatility and crises than macroeconomic policies. Similarly, Beck et al. (2003) finds that institutions protecting private property rights facilitated better development of financial intermediaries.

The closest work to my paper is Michalopoulos and Papaioannou (2013), which identifies a strong association between the degree of pre-colonial institutional centralization and current regional development. I extend this body of literature by emphasizing the role of centralized pre-colonial institutions, which is associated with subsequent institutional quality (Gennaioli and Rainer, 2007), in safeguarding the process of contemporary industrialization, even in the face of adverse external shocks such as the historical slave trade.

Lastly, this research is related to the literature on the enduring economic consequences of historical conflicts. Civil wars, in particular, have been shown to exert persistent negative effects on economic development (Collier et al., 2009). For instance, Cassar et al. (2013) utilizes variation in exposure to civil wars in Tajikistan to assess how historical conflicts undermine impersonal exchanges by eroding interpersonal trust. Similarly, Rohner et al. (2013) examines regional differences in the intensity of ethnic conflicts in Uganda, demonstrating that post-conflict recovery was slower in areas with higher ethnic fractionalization. In a broader context, Guiso et al. (2009) investigates the

[2] Specifically, the New World countries here refer to Australia, Canada, New Zealand, and the United States.

relationship between trust—often shaped by historical conflicts—and international trade in Europe, finding a generally positive association.

There is also literature addressing the legacy of pre-colonial historical conflicts in Africa. Notably, Besley and Reynal-Querol (2014) finds that presence pre-colonial historical conflicts is associated with a greater the prevalence of post-colonial conflicts and economic underdevelopment in Africa. My research contributes to this body of work by introducing industrialization as an additional economic consequence of historical conflicts, thus deepening our understanding of how the legacy of historical conflicts continues to shape contemporary economic development.

The remainder of the paper is structured as follows. The next section details the historical backgrounds, providing qualitative foundation to the subjects of my analysis. Section 3 describes the data sources, sample construction, and presents descriptive statistics. Section 4 displays two correlation graphs: one explores the negative correlation between the volume of the historical slave trade and contemporary industrialization, while the other shows the relevance condition of the instrumental variables. Section 5 outlines the empirical strategy employed at various levels of analysis. Section 6 presents the main results and establishes that the observed negative correlation between the historical slave trade and contemporary industrialization is causal. Section 7 investigates the institutional mechanism through which the adverse impact of the historical slave trade on contemporary industrialization persisted over several centuries. Section 8 concludes the paper.

2 Historical Background

In this section, I detail the historical background of the slave trade, the early stages of industrialization, and institutional development in Africa, which provides qualitative evidence in support of the main quantitative analysis in this paper.

2.1 The Historical Slave Trade in Africa

The historical slave trade in Africa comprised four major slave trades: the trans-Atlantic, trans-Saharan, Indian Ocean, and Red Sea slave trades. Among them, the trans-Atlantic slave trade was the largest and most well-known, involving the shipment of slaves from Central Africa (including

West-Central and East-Central Africa) to the New World countries[3], which were European colonies at the time. Approximately 12 million slaves were exported in the trans-Atlantic slave trade, a figure that far exceeds the combined total of the other three slave trades, which amounted to roughly half that number (Manning, 1990). The trans-Atlantic slave trade's dominance in volume can also be seen in the Stylized Facts Section 4 Figure 2 as well as Appendix B Figures B.1, B.2, and B.3. A significantly large negative correlation is observed only between the volume of the historical slave trade and the distances from each country to the primary destinations of the trans-Atlantic slave trade.[4]

Through the slave trade, a vicious cycle emerged. In a climate of pervasive insecurity brought about by the slave trades, Africans were compelled to seek weapons for self-defense against enslavement. These weapons were often obtained from Europeans, who exchanged them for slaves. Consequently, Africans armed with guns would enslave others to protect themselves from being enslaved, further exacerbating the region's insecurity (Alpers, 1969; Isaacman, 1989; Hawthorne, 1999; Klein, 2001; Lovejoy, 2011). Given the existence of such a brutal cycle, it is difficult to envision how societies with this history could later unite to foster industrialization, which inherently require much cooperation and stably effective institutions.

2.2 The Early Stages of Industrialization in Africa

Prior to independence, industrialization in Africa was limited to few select industries, such as food processing, textiles, and wood products, primarily to serve the interests of colonial powers (Ewing, 1968). Infrastructure, taking railways as an example, were also constructed primarily to meet the military and imperial demands of the colonizers (Kamarck, 1971). As a result, by the time African countries gained independence, they generally lacked the necessary conditions for industrialization, including capital, human resources, and infrastructure. Even after achieving political independence, African economies remained heavily dependent on foreign exports, technologies, and capital (Roemer, 1981). To illustrate the extent of African countries' reliance on foreign economies, it is notable that even in the most industrialized nations in the region, such as Zimbabwe, Kenya, and Uganda,

[3] Here, the New World countries again refer to Australia, Canada, New Zealand, and the United States.

[4] There is also a minor negative correlation between the volume of the historical slave trade and the distances from each country to the primary destinations of the trans-Saharan slave trade.

there were no domestically owned establishments with more than 10 employees in the 1960s, the time they gained independence (Acharya, 1981).

Therefore, at that time, government intervention was widely accepted as essential for promoting industrial development. Consequently, many African nations adopted import substitution policies, which involved raising tariffs and implementing protective trade policies (Rweyemamu, 1979). These policies initially indeed spurred growth in industrial sectors (Steel and Evans, 1981). However, the persistence of government intervention, often characterized by corruption and inefficiency, has since become a barrier to contemporary industrialization (Bates, 2014, 2015), as will be discussed further in Subsection 7.1.

2.3 Institutional Development in Africa

As proposed by Michalopoulos and Papaioannou (2013), pre-colonial ethnic institutions played a crucial role in shaping subsequent regional development. There was considerable heterogeneity in the degree of political centralization across pre-colonial African ethnic groups, ranging from small village chiefdoms to large centralized states with formal administrative structures and hierarchical organizations, as documented by Murdock (1959, 1967).

One might suggest that pre-colonial ethnic institutions were drastically altered by European colonial powers. However, contrary to this suspicion, European colonial rule imposed relatively limited changes on the structure of these pre-colonial institutions, largely due to the constraints of both the duration and the scope of colonial control (Herbst, 2014; Mamdani, 2018). As a result, current institutional quality remains influenced by pre-colonial institutions, as highlighted by Gennaioli and Rainer (2007), which provides me a solution to address the endogeneity of current institutional quality in Subsection 7.2.

For comprehensiveness, it is important to acknowledge a parallel body of literature that explores the varying styles of European colonial rule in Africa and the underlying factors driving these differences. Acemoglu et al. (2001) argues that the mortality rates of European settlers, affected by the local malaria ecology, shaped the type of institutions established. In areas with high settler mortality, extractive institutions were implemented, while regions with lower mortality saw the establishment of institutions that protected property rights. These differences in colonial institutions were shown

to have a significant and lasting impact on regional disparities in current income levels (Acemoglu et al., 2002). However, this paper primarily utilizes the positive relationship between the degree of pre-colonial institutional centralization and current institutional quality, as highlighted by Gennaioli and Rainer (2007), rather than the institutional differences introduced during the colonial period because the primary focus of my analysis is the impact of the historical slave trade instead of the broader colonial experience.

3 Data

I combine several sources of data to evaluate the impact of the historical slave trade on contemporary industrialization and investigate how the impact persisted over several centuries. In this section, I describe data sources, sample construction, and present descriptive statistics.

3.1 Data Sources

Slave Exports I utilize country-level historical slave export data for 52 African nations, as provided by Nunn (2008), which estimates the volumes associated with the four major slave trades: the trans-Atlantic, trans-Saharan, Indian Ocean, and Red Sea slave trades, spanning four historical periods (1400-1599, 1600-1699, 1700-1799, 1800-1900). This dataset also includes information on the colonial power prior to African countries' independence, as well as geographical variables such as absolute latitude (distance from the equator), longitude, and proximity to the ocean (measured by the natural log of coastline divided by land area). Additionally, climatic variables are collected, including minimum monthly rainfall, maximum monthly afternoon average humidity, and the minimum average monthly lowest temperature. These variables are incorporated as controls to mitigate potential selection in regions that were disproportionately more targeted by the historical slave trade.

For ethnicity-level slave export data, I employ the dataset from Nunn and Wantchekon (2011), which disaggregates country-level slave export figures to ethnicity level.[5] This dataset also includes

[5] As noted in Nunn and Wantchekon (2011), the ethnicity-level slave export data include only the trans-Atlantic and Indian Ocean slave trades due to the lack of sufficiently detailed ethnicity data for the trans-Saharan and Red Sea slave trades, making it difficult to construct reliable estimates of the number of slaves taken from each ethnic group. Nevertheless, since Nunn (2008) has demonstrated that the overall impact of the slave trades is predominantly driven by the trans-Atlantic slave trade, the ethnicity-level slave export data remains a reliable source for analysis.

measures of ethnic fractionalization and the level of pre-colonial development within the regions where these ethnic groups resided. Such measures encompass the average malaria ecology, pre-colonial settlement patterns, the presence of any city in 1400, and the number of pre-colonial jurisdictional hierarchies beyond the local community. Additionally, the dataset incorporates several ethnicity-level variables capturing non-slave trade European influences, including contact with European explorers, the total number of Catholic and Protestant missions per land area, and the network of colonial railway. These variables serve as controls to mitigate potential selection in ethnic groups that were more heavily raided by the historical slave trade.

Distances to Destinations of the Slave Trades or Coast Nunn (2008) provides the distances from each country to the primary destinations of the four major slave trades, which are employed as instrumental variables in both the country-level and country-based individual-level analysis. Nunn and Wantchekon (2011) offers the distances of the place where each ethnic group inhibited from the coast during the periods of historical slave trade, which are used as instrumental variables in the ethnicity-based individual-level analysis.

Contemporary Industrialization Levels To assess contemporary country-level industrialization, I utilize data from WorldBank (2023). This dataset offers various indicators related to industrialization, with the share of employment in industrial sectors in the year 2000 being the primary measure used in this study. The choice of the year 2000 ensures consistency and comparability with the results from Nunn (2008), which uses GDP in the year 2000 as a proxy of current economic performance.

For the individual-level analysis merged with country-level slave export data, I utilize the 2016 (Round 6) Afrobarometer survey (Afrobarometer, 2016), which includes responses from 36 African countries, the largest number of surveyed countries across all Afrobarometer surveys, with a sample size of 53,935 respondents. For the individual-level analysis merged with ethnicity-level slave export data, I employ the 2005 (Round 3) Afrobarometer survey (Afrobarometer, 2005), as it contains the most closely aligned ethnicity categorization with the ethnicity-level slave export data, despite a relatively smaller sample size of 25,397 respondents.

Both surveys ask respondents to provide information about their current occupation or their previous occupation if they are currently unemployed. I categorize these responses into agricultural,

industrial, or service sectors.[6] Respondents with missing values for occupation, as well as those reporting "never had a job" or "student," are excluded from the analysis. The Afrobarometer surveys also collect basic individual characteristics such as age, gender, urban or rural residency, education level, religion, and current living conditions. These variables allow for precise control and reduce potential omitted variable bias in the analysis.

Pre-colonial Institutional Centralization To investigate the institutional mechanism that persisted the adverse impact of the historical slave trade on contemporary industrialization, I utilize the "jurisdictional hierarchy beyond the local community level" index from Murdock (1967). This index quantifies the degree of centralization among pre-colonial ethnic institutions in Africa, with scores of 1 or 2 indicating low centralization (chiefdoms) and scores of 3 or 4 signifying high centralization (part of larger states). The original variable in Murdock (1967) is defined at the ethnicity-country level. For the purposes of my country-based analysis of this mechanism, I adopt the maximum score across ethnic groups within each country as a proxy for the degree of institutional centralization at the country level.

3.2 Sample Construction

In the country-level analysis, all 52 African countries with reliable estimates on the volume of slave exports associated with the four major slave trades are included, except Seychelles, which is excluded due to the lack of data on the share of employment in industrial sectors in the year 2000.

For the individual-level analysis merged with country-level slave export data (hereafter, this will be called "country-based individual-level analysis"), respondents with missing occupation data, as well as those reporting "never had a job" or "student," are excluded from the analysis. As a result, the sample size is reduced from 53,935 to 40,666 respondents, while still covering 36 African countries.

Similarly, in the individual-level analysis merged with ethnicity-level slave export data (hereafter, this will be called "ethnicity-based individual-level analysis"), respondents with missing occupation data, as well as those who reported "never had a job" or identified as students, are excluded from the analysis. Consequently, the sample size is reduced from 25,397 to 17,028 respondents, spanning 18 African countries.

[6] See detailed occupations in Appendix C.

3.3 Summary Statistics

Appendix A Table A.1 presents the summary statistics for the country-level variables. Due to the absence of data on the main dependent variable (Share industrial sector$_c$), Seychelles is excluded from the sample, resulting in an analysis of 51 African countries. The table reveals that the proportion of workers employed in industrial sectors in 2000 is relatively low (12.82%), showing the limited extent of contemporary industrialization in Africa. There is significant variation (a mean of 3.3687 associated with a 3.8526 standard deviation) in the primary independent variable of interest, the volume of the historical slave trade, ln(exports/area)$_c$, which serves as the foundation of the analysis. In addition, the variation in the four distance instrumental variables—Atlantic distance$_c$, Indian distance$_c$, Saharan distance$_c$, and Red Sea distance$_c$—are also sufficiently large.

Appendix A Tables A.2 and A.3 report the summary statistics for the variables employed in the country-based individual-level analysis and ethnicity-based individual-level analysis, respectively. The data indicates that the probability of a respondent being employed in industrial sectors is relatively low, standing at 16.96% in 2005 and 21.94% in 2016. Although there appears to be a modest upward trend in industrialization, these figures still fall significantly short when compared to those in developed or even similarly developing countries.

The average and median ages of the respondents range between 35 and 40, as students are excluded from the sample, and the sex ratio is approximately balanced at 1:1. Educational attainment among the respondents is generally low, with the median respondent having only completed primary school (coded as 3 in the Afrobarometer survey). Furthermore, more than half of the respondents reside in rural areas (coded as 0 in the Afrobarometer survey).[7] The summary statistics of educational attainment and urban or rural residency potentially suggest the low level of industrialization within the sampling countries. Thus, in all individual-level regressions, I specifically control for all these individual characteristics to effectively mitigate potential omitted variable bias. Last but not least, the main independent variable of interest, along with the instrumental variables, exhibits significant variation, thereby facilitating a meaningful analysis.

[7] See more details about the coding of Afrobarometer survey in Appendix C

4 Stylized Facts

In this section, I present two stylized correlation graphs: the first displays the relationship between the volume of the historical slave trade and contemporary industrialization, while the second exhibits the correlation between the distances of each country to the primary destinations of the trans-Atlantic slave trade and the volume of the historical slave trade.

Fact 1. Contemporary Industrialization Is Negatively Correlated with the Volume of the Historical Slave Trades

To explore the relationship between the historical slave trade and contemporary industrialization, a preliminary correlation analysis is conducted between the share of employment in industrial sectors in the year 2000 (Share industrial sector$_c$) and the natural log of the number of slaves exported from each country between 1400 and 1900 during the four major slave trades, normalized by land area, ln(exports/area)$_c$. The correlation plot presented in Figure 1 reveals a clear negative relationship between these two variables, suggesting that countries with higher historical slave exports tend to exhibit lower contemporary industrial employment shares. The statistics associated with the OLS fit depicted in the figure are provided in Column (1) of Subsection 6.1 Table 1, where no control variables are included in the regression.

Notably, the observed negative correlation between the volume of the historical slave trade and contemporary industrialization is not driven by few outliers but rather reflects a general pattern across most African countries. Motivated by this correlation, naturally, the next step is to rigorously assess whether this observed negative correlation is causal, which will be systematically tested in the subsequent sections.

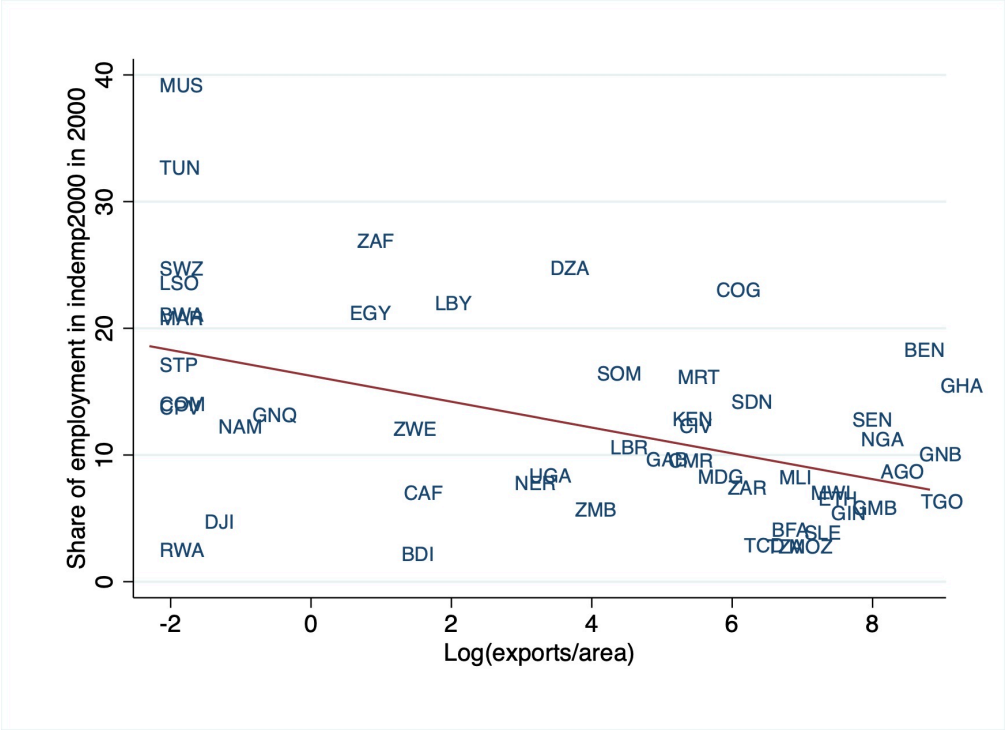


Figure 1: Contemporary Share of Employment in Industrial Sectors and The Volume of the Historical Slave Trades

Notes: The figure displays the correlation between the share of employment in industrial sectors in 2000 (Share industrial sector$_c$) and the natural log of the number of slaves exported from each country between 1400 and 1900 during the four major slave trades, normalized by land area (ln(exports/area)$_c$).

Fact 2. The Volume of the Historical Slave Trades is Negatively Correlated with the Distances from Each Country to the Primary Destinations of the Trans-Atlantic Slave Trade

The second stylized fact illustrates the relevance condition of the instrumental variables, the distances from each country to the primary destinations of the four major slave trades. As noted in Nunn (2008) and my historical background Subsection 2.1, the trans-Atlantic slave trade had the most significant impact among the four historical slave trades. Thus, I present the correlation between the volume of the historical slave trade, ln(exports/area)$_c$, and the distances from each country to the primary destinations (i.e., the West Indies and the southern United States) of the trans-Atlantic slave trade (Atlantic distance$_c$). Figure 2 reveals a negative correlation between the two variables, suggesting that the volume of the historical slave trade was largely driven by a country's proximity to the primary destinations of the trans-Atlantic slave trade: the closer the country to the destinations,

the greater the number of slaves exported. This evidence reinforces the validity[8] of using distances from each country to the primary destinations of major slave trades as instrumental variables.

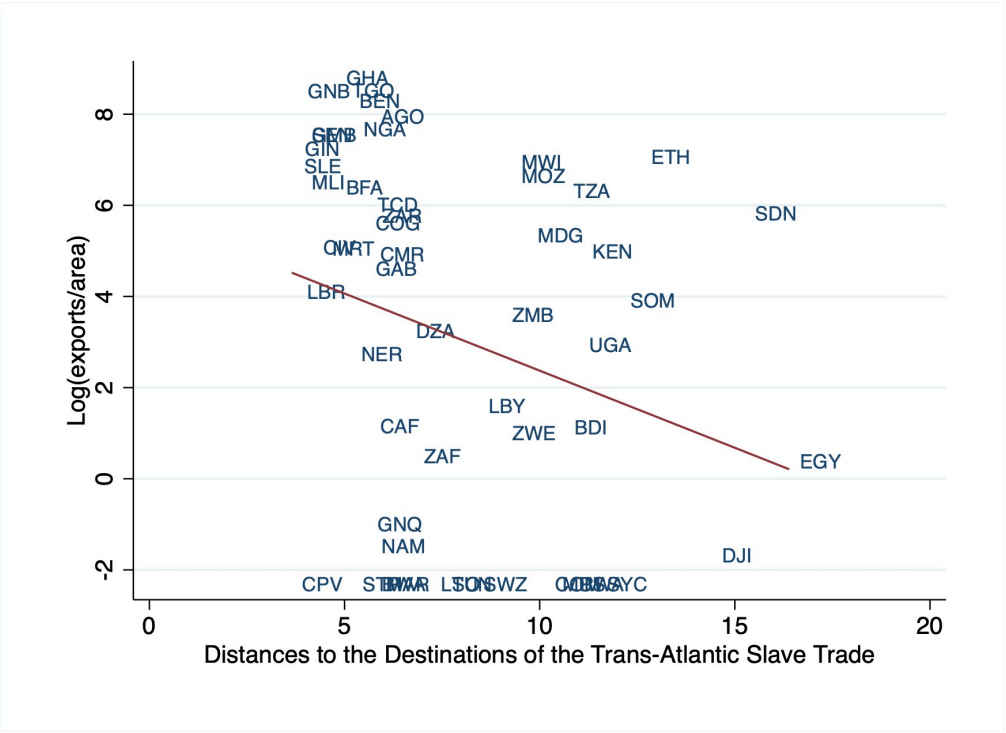


Figure 2: The Volume of the Historical Slave Trades and Distances from each Country to the Primary Destinations of the Trans-Atlantic Slave Trade

Notes: The figure displays the correlation between the natural log of the number of slaves exported from each country between 1400 and 1900 during the four major slave trades, normalized by land area ($\ln(\text{exports/area})_c$) and the distances from each country to the primary destinations (i.e., the West Indies and the southern United States) of the trans-Atlantic slave trade ($\text{Atlantic distance}_c$).

In Appendix B, Figures B.1, B.2, and B.3 present correlation analyses analogous to Figure 2 for the trans-Saharan, Indian Ocean, and Red Sea slave trades. Interestingly, The results reveal a negative correlation only for the trans-Saharan slave trade, highlighting the dominance of the trans-Atlantic slave trade in the overall volume of the historical slave trade, consistent with Nunn (2008) and the historical background provided in Subsection 2.1. Nonetheless, the absence of a negative correlation between the volume of the historical slave trade and the distances from each country to the primary destinations of the Indian Ocean and Red Sea slave trades[9] does not undermine the

[8] It is important to note that while this graph demonstrates the relevance condition, readers should refer to Nunn (2008) for a detailed discussion of the exclusion restriction condition for the instrumental variables.

[9] There is in fact a slightly positive correlation, though it is negligible.

validity of these distances as instrumental variables. When the distances from each country to the primary destinations of each of the four slave trades are included simultaneously, they collectively exhibit significantly negative coefficients at various points in the first-stage regressions, as will be demonstrated in Tables 2 and 4.

5 Empirical Strategy

In this section, I detail the empirical strategy at each level of analysis. Different definitions of the independent variable of interest and their corresponding control variables are also introduced in details as they appear.

5.1 Country-level Analysis

To formally test the correlation in Stylized Facts Section 4 Figure 1, I first estimate the following country-level equation:

$$\text{Share industrial sector}_c = \beta_0 + \beta_1 \ln(\text{exports/area})_c + \mathbf{colony}_c^{'}\delta + \mathbf{geo}_c^{'}\gamma + \mathbf{climate}_c^{'}\Phi + \varepsilon_c \tag{1}$$

where Share industrial sector$_c$ represents the proportion of employment in industrial sectors in country c as of the year 2000. ln(exports/area)$_c$ denotes the natural log of the number of slaves exported from country c between 1400 and 1900 during the four major slave trades, normalized by land area.

The vector $\mathbf{colony}_c^{'}$ includes a set of dummy variables indicating the colonial power prior to country c's independence. The vector $\mathbf{geo}_c^{'}$ encompasses geographical controls, including absolute latitude (distance from the equator), longitude, and proximity to the ocean (measured by the natural log of coastline divided by land area). The vector $\mathbf{climate}_c^{'}$ includes climatic variables, specifically, minimum monthly rainfall, maximum monthly afternoon average humidity, and the minimum of the average monthly lowest temperature. Most of these geographical and climatic variables are intended to account for whether a country has a tropical climate, which influences the prevalence of infectious diseases and affects agricultural productivity (Kamarck, 1976; Sachs et al., 2001). The inclusion of them also rules out potential arguments that geographical differences impacted indus-

trialization based on the "geographical hypothesis" (Sachs, 2000, 2001; Lewis, 2009).

To more rigorously assess whether the observed negative relationship between the historical slave trade and contemporary industrialization is causal, I instrument $\ln(\text{exports/area})_c$ with the distances from each country to the primary destinations in each of the four major slave trades, following the methodology established by Nunn (2008). In Stylized Facts Section 4 Figure 2 I have shown the relevance condition of the instrumental variables, while detailed justification and tests on the exclusion condition of the instrumental variables can be found in Nunn's paper.

5.2 Country-based Individual-level Analysis

Country-level analysis is inevitably constrained by a small number of observations. To increase the sample size and thereby enhance statistical significance of the findings, I employ the following country-based individual-level[10] regression:

$$\mathbb{1}\{\text{Industrial job}\}_i = \alpha_0 + \alpha_1 \ln(\text{exports/area})_c + \mathbf{X}_i'\theta + \mathbf{colony}_c'\delta + \mathbf{geo}_c'\gamma + \mathbf{climate}_c'\Phi + \epsilon_i \tag{2}$$

where $\mathbb{1}\{\text{Industrial job}\}_i$ is a binary variable indicating whether individual i works in an industrial job at the time of survey (2016). $\mathbf{X}_i'$ is a vector of individual-level controls, including the respondent's age, age squared, gender, urban or rural residency, education level, living conditions, and religion.[11] Again, to address potential endogeneity concerns, $\ln(\text{export/area})_c$ is instrumented using the distances from each country to the most significant destinations in the four major slave trades. Standard errors here are clustered at country level.

5.3 Ethnicity-based Individual-level Analysis

To gauge whether the long-term impact of the historical slave trade on contemporary industrialization was transmitted within countries or across generations through ethnicity, I estimate the follow-

[10] Country-based individual-level analysis means an individual-level analysis where the volume of the historical slave trade is merged to each individual through his/her country of citizenship.

[11] See Appendix C.1 for detailed explanation of these variables.

ing ethnicity-based individual-level[12] equation:

$$\begin{aligned}\mathbb{1}\{\text{Industrial job}\}_i = \alpha_0 + \alpha_1 \ln(\text{exports/area})_e + \mathbf{X}_i^{'}\theta + \mathbf{pre\text{–}colonial\ development}_e^{'}\gamma \\ + \mathbf{non\text{–}slave\ trade\ European\ influence}_e^{'}\Phi \\ + \mathbf{ethnic\ fractionalization}_d^{'}\eta + \delta_c + \epsilon_i \end{aligned} \tag{3}$$

where $\mathbb{1}\{\text{Industrial job}\}_i$ is a binary variable indicating whether individual i works in an industrial job at the time of survey (2005). $\ln(\text{exports/area})_e$ denotes the natural log of the number of slaves exported from ethnic group e between 1400 and 1900 during the trans-Atlantic and Indian Ocean slave trades, normalized by the area of land inhabited by the ethnic group during the nineteenth century. $\mathbf{X}_i^{'}$ is a vector of individual-level controls same with the one in Equation (2).[13]

Given that the way of European colonial rule, which might also affect contemporary industrialization, is associated with pre-colonial development and European mortality based on malaria environment in Africa (Acemoglu et al., 2001, 2002), the vector $\mathbf{pre\text{–}colonial\ development}_e^{'}$ encompasses malaria ecology of the land ethnic group e inhabited, pre-colonial settlement patterns of ethnic group e,[14] the presence of any city where ethnic group e lived in 1400, and the number of pre-colonial jurisdictional hierarchies beyond the local community of ethnic group e.

The vector $\mathbf{non\text{–}slave\ trade\ European\ influence}_e^{'}$ includes whether ethnic group e has any contact with European explorers, the total number of Catholic and Protestant missions ethnic group e encountered per land area, and whether any railway network was built by Europeans on lands historically inhabited by ethnic group e. Lastly, inspired by the relationship between ethnic fractionalization and economic development documented in Easterly and Levine (1997), the vector $\mathbf{ethnic\ fractionalization}_d^{'}$ includes ethnic fractionalization and the share of population in the same ethnicity with the respondent in district d where the respondent currently lives. Country fixed effects δ_c is also allowed be added because my main variable of interest here is at ethnicity level. Standard errors here are two-way clustered at ethnicity and respondents' current district of residency.

[12] Ethnicity-based individual-level analysis means an individual-level analysis where the volume of the historical slave trade is merged to each individual through his/her reported ethnicity.

[13] See Appendix C.2 for detailed explanation of these variables.

[14] This variable ranges from 1 to 8, where 1 corresponds to "nomadic or fully migratory" and 8 represents "complex settlements."

The instrumental variable used here differs slightly from that employed in the country-based analysis. Following Nunn and Wantchekon (2011), I use the distance of an individual's ethnic group from the coast during the period of historical slave trades as the instrument. Unlike country-level slave exports, which are tied to specific destinations, the destinations of slaves from particular ethnic groups was less predictable. Therefore, the distances to the coast more intuitively capture each ethnic group's exposure to the historical slave trade. The relevance condition of this instrumental variable is evident as the historical slave trade progressed in waves, which originated from the coast (Miller, 1997). Detailed discussion and tests on the exclusion condition of the instrumental variable is provided in Nunn and Wantchekon's paper.

6 Main Results

In this section, I present the estimation results of the empirical designs outlined in Subsections 5.1, 5.2, and 5.3. The results demonstrate a robust causal adverse impact of the historical slave trade on contemporary industrialization. At the end of the section, I also explore how the legacy of the historical slave trade was transmitted over several centuries.

6.1 Country-level Results

6.1.1 OLS Results

The OLS results for Equation (1) are reported in Table 1. Column (1) presents the model without any control variables, which mirror the OLS fit depicted in Stylized Facts Section 4 Figure 1. In Column (2), colonizer dummies are added to account for differences in colonial history. Column (3) introduces geographical and climatic controls. As an additional robustness check, Column (4) excludes island nations and North African countries to ensure that the results are not driven by these distant regions, which were relatively less affected by the historical slave trade. Across all specifications, the coefficient of interest (β_1) remains consistently significant, demonstrating a robust negative relationship between the contemporary share of employment in industrial sectors and the volume of the historical the slave trade.

Table 1: Country-level OLS Estimation: Contemporary Share of Employment in Industrial Sectors and the Historical Slave Trade

	(1)	(2)	(3)	(4)
	Share industrial sector$_c$			
ln(exports/area)$_c$	-1.0191***	-1.1329***	-0.7252**	-0.7000*
	(0.3050)	(0.3133)	(0.3252)	(0.3753)
Implied effect of one standard deviation increase	-3.9262	-4.3645	-2.7937	-2.4478
Implied effect of 25 to 75 percentile movement	-7.7903	-8.6599	-5.5433	-4.0585
Colonizer dummies	-	✓	✓	✓
Geographical controls	-	-	✓	✓
Climatic controls	-	-	✓	✓
N	51	51	51	42
R^2	0.2282	0.3955	0.5479	0.4131

Notes: Table reports OLS estimates of Equation (1). The dependent variable is the share of employment in industrial sectors in 2000 (Share industrial sector$_c$). The independent variable is the natural log of the number of slaves exported from each country between 1400 and 1900 during the four major slave trades, normalized by land area (ln(exports/area)$_c$). Column (4) excludes island nations and North African countries. Country-level sample is used. Robust standard errors are displayed in parentheses below each coefficient. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

6.1.2 Selection on Unobservables

To assess the potential influence of unobservable factors on my estimates, I employ the methodology proposed by Altonji et al. (2005) and Bellows and Miguel (2009). Their approach calculates the extent to which the effect of unobservable factors would need to exceed that of observable factors in order to fully explain away the results. To introduce their method, consider the estimated coefficient of interest (β_1) in column (1), where no controls are included; let this be denoted as β_1^1. Similarly, denote the estimated coefficient in column (3), where all available controls are included and no country is dropped, as β_1^3. The ratio of interest is then calculated as $\frac{\beta_1^3}{\beta_1^1 - \beta_1^3}$.[15]

To understand the intuition behind this ratio, it is helpful to decompose it into the numerator and denominator. First, the measure increases as the denominator ($\beta_1^1 - \beta_1^3$) decreases. This im-

[15] For further details on the derivation and interpretation of this measure, see Altonji et al. (2005) and Bellows and Miguel (2009).

plies that when the difference between β_1^1 and β_1^3 is small, the estimate is less affected by selection on observables, meaning the selection on unobservables would need to be substantially stronger, relative to observables, to fully explain away the estimated effect. Second, the measure is increasing in the numerator (β_1^3), which is intuitive becuase the larger the value of β_1^3, the more significant is the effect that needs to be explained by selection on unobservables.

Using this method, I calculate that selection on unobservable factors would need to be approximately 2.47 ($\frac{-0.7252}{-1.0191-(-0.7252)}$) times stronger than selection on observable factors to fully explain away the whole OLS estimates. Given that I already account for a wide range of observable variables, as detailed in Empirical Strategy Subsection 5.1, this degree of selection on unobservables is unlikely. Thus, the OLS estimates are unlikely to suffer from substantial bias.

6.1.3 IV Results

Although it seems that my OLS estimates are not substantially biased, I still try to further address selection on unobservables and potential reverse causality by implementing an instrumental variable approach, as outlined in the Empirical Strategy Subection 5.1. To elaborate, I instrument the main independent variable of interest, ln(exports/area)$_c$, using the distances from each country to the primary destinations in each of the four major slave trades. The results of this instrumental variable analysis are presented in Table 2. The specifications in the four columns parallel those in Table 1, with the key difference being the use of instrumental variables for ln(exports/area)$_c$. The coefficient of interest (β_1) remains significantly negative across all columns. The magnitude of these coefficients is larger than OLS estimates, which is consistent with my expectation. This increase in magnitude may be attributed to potential upward bias arising from the unobservable selective involvement of certain types of societies in the historical slave trade, which underscores the value of the instrumental variable strategy, as it effectively mitigates potential selection on unobservable factors that cannot be directly controlled for. Additionally, the attenuation effect caused by measurement error in the estimation of the volume of the historical slave trade could also contribute to the increase in magnitude.

In the first-stage results, the coefficients for the distances from each country to the primary destinations of the four major slave trades are predominantly significantly negative,[16] which aligns with the intuitive expectation that countries located farther from the destinations were less likely to be targeted by the slave trades, as discussed in the second part of the Stylized Facts Section 4. The only concern here is that the F-statistics on excluded instruments are generally low, which potentially suggests a weak instrument problem. However, my F-statistics on excluded instruments are close to those in Nunn (2008). Furthermore, these F-statistics on excluded instruments increase in the individual-level analysis, specifically, in Subsection 6.2 Table 4 and Appendix A Table A.5. In summary, the instrumental variable estimates corroborate the OLS findings, establishing a causal negative relationship between the volume of the historical slave trade and the contemporary share of employment in industrial sectors.

Quantitatively, based on the baseline specification in Column (3) of Table 2, a one standard deviation increase in the volume of the historical slave trade corresponds to an 8.75% decrease in the contemporary share of employment in industrial sectors. Alternatively, shifting a country from the 25th percentile to the 75th percentile in the volume of the historical slave trade, while holding all other factors constant, results in a 17.36% decrease in the contemporary share of employment in industrial sectors. These figures are notably large, considering that the mean contemporary share of employment in industrial sectors as of the year 2000 within my country-level sample is merely 12.82%. This suggests that the impact of the historical slave trade on contemporary industrialization is not only statistically significant but also economically meaningful.

[16] The coefficients on the distances from each country to the primary destinations of the Red Sea slave trade are insignificant, but this is similar to the estimation results in Table IV of Nunn (2008), suggesting that the influence of the Red Sea slave trade is relatively minor among the four major slave trades.

Table 2: Country-level IV Estimation: Contemporary Share of Employment in Industrial Sectors and the Historical Slave Trade

	(1)	(2)	(3)	(4)
	Share industrial sector$_c$			
ln(exports/area)$_c$	-2.1518***	-2.0699***	-2.2703*	-1.5867**
	(0.5984)	(0.5012)	(1.1655)	(0.6546)
Implied effect of one standard deviation increase	-8.2901	-7.9744	-8.7467	-5.5481
Implied effect of 25 to 75 percentile movement	-16.4491	-15.8226	-17.3550	-9.1991
	First Stage. Dependent Variable: ln(exports/area)$_c$			
Atlantic distance$_c$	-1.2787***	-1.6955***	-1.3131	-1.6856**
	(0.3591)	(0.4343)	(0.7779)	(0.6798)
Indian distance$_c$	-1.0789***	-1.4132**	-1.0776	-1.5704*
	(0.3806)	(0.5355)	(0.7148)	(0.8007)
Saharan distance$_c$	-2.3720***	-2.9295***	-1.1447	-4.0756**
	(0.8267)	(1.0639)	(1.6267)	(1.5518)
Red Sea distance$_c$	-0.0142	-0.1362	-1.2038	2.1297
	(0.7113)	(0.8195)	(1.9209)	(2.4038)
F-stat of excluded instruments	4.10	4.32	0.76	2.86
Colonizer dummies	-	✓	✓	✓
Geographical controls	-	-	✓	✓
Climatic controls	-	-	✓	✓
N	51	51	51	42

Notes: The table reports IV estimates of Equation (1). The dependent variable is the share of employment in industrial sectors in 2000 (Share industrial sector$_c$). The independent variable is the natural log of the number of slaves exported from each country between 1400 and 1900 during the four major slave trades, normalized by land area (ln(exports/area)$_c$). Column (4) excludes island nations and North African countries. The excluded instruments are the distances from each country to the primary destinations in each of the four major slave trades. Country-level sample is used. Robust standard errors are displayed in parentheses below each coefficient. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

6.2 Country-based Individual-level Results

6.2.1 OLS Results

To estimate the impact of the historical slave trade on contemporary industrialization at the individual level, I implement Equation (2) and present the results in Table 3. Column (1) provides estimates without any controls. Individual-level controls are introduced in Column (2), followed by the inclusion of colonial history controls in Column (3). Geographical and climatic variables are further incorporated in Column (4). Across all specifications, the coefficient of interest (α_1) remains consistently negative and statistically significant, mirroring the negative relationship between contemporary industrialization and the historical slave trade observed in the country-level analysis shown in Table 1.

Table 3: Country-based Individual-level OLS Estimation: Indicator Variable of Industrial Job and the Historical Slave Trade

	(1)	(2)	(3)	(4)
	$\mathbb{1}\{\text{Industrial job}\}_i$			
$\ln(\text{exports/area})_c$	-0.0186***	-0.0181***	-0.0206***	-0.0152***
	(0.0055)	(0.0051)	(0.0046)	(0.0043)
Implied effect of one standard deviation increase	-0.0688	-0.0670	-0.0765	-0.0564
Implied effect of 25 to 75 percentile movement	-0.1141	-0.1110	-0.1268	-0.0936
Individual controls	-	✓	✓	✓
Colonizer dummies	-	-	✓	✓
Geographical controls	-	-	-	✓
Climatic controls	-	-	-	✓
N	40666	39514	39514	39514
R^2	0.0276	0.1267	0.1398	0.1493

Notes: The table reports OLS estimates of Equation (2). The dependent variable is an indicator variable of whether individual i works in industrial sectors or not ($\mathbb{1}\{\text{Industrial job}\}_i$). The independent variable is the natural log of the number of slaves exported from each country between 1400 and 1900 during the four major slave trades, normalized by land area ($\ln(\text{exports/area})_c$). Individual-level sample from Round 6 (2016) Afrobarometer survey is used. Standard errors are clustered at country level. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

6.2.2 Selection on Unobservables

Using the methodology described in Subsubsection 6.1.2, I estimate the extent to which the influence of unobservable factors would need to exceed that of observable factors to fully explain away the OLS estimates. Specifically, I apply the procedure to the coefficient on the variable of interest (α_1) in column (1) of Table 3, denoted as α_1^1. Similarly, I denote the coefficient on the variable of interest in column (4) as α_1^4, and then calculate the ratio $\frac{\alpha_1^4}{\alpha_1^1-\alpha_1^4}$. In this case, selection on unobservables would have to be approximately 4.47 ($\frac{-0.0152}{-0.0186-(-0.0152)}$) times greater than selection on observables to nullify the whole OLS estimates, indicating that the possibility of substantial bias in this country-based individual-level OLS estimates is even lower than at the country level. This further strengthens the reliability of my OLS results.

6.2.3 IV Results

Nevertheless, I still employ instrumental variable strategy in this country-based individual-level analysis. The estimations, presented in Table 4, follow the same specifications as those in Table 3 except the use of the instrumental variables. The instrumental variable estimation yields slightly more negative coefficients, consistent with the problem of potential selection on unobservables and measurement error issues previously discussed. To sum up, the instrumental variable estimation at the individual level reinforces the causal negative relationship between the historical slave trade and contemporary industrialization observed at country level in Table 2.

According to the baseline specification in Column (4) of Table 4, a one standard deviation increase in the volume of the historical slave trade corresponds to a 5.94% decrease in the probability of a respondent being employed in industrial sectors. Alternatively, transitioning a respondent from a country in the 25th percentile to one in the 75th percentile in terms of the volume of the historical slave trade, while holding all other variables constant, results in a 9.84% decrease in the probability of that respondent being employed in industrial sectors. These figures are economically significant, given that the average probability of being employed in industrial sectors for a country-based individual-level sample respondent is only 21.94% from summary statistics in Appendix A Table A.2. This underscores that the long-term impact of the historical slave trade on contemporary industrialization is also evident at the individual level using microdata.

Table 4: Country-based Individual-level IV Estimation: Indicator Variable of Industrial Job and the Historical Slave Trade

	(1)	(2)	(3)	(4)
	$\mathbb{1}\{\text{Industrial job}\}_i$			
$\ln(\text{exports/area})_c$	-0.0323***	-0.0336***	-0.0347***	-0.0160**
	(0.0090)	(0.0079)	(0.0079)	(0.0064)
Implied effect of one standard deviation increase	-0.1200	-0.1246	-0.1289	-0.0594
Implied effect of 25 to 75 percentile movement	-0.1989	-0.2065	-0.2137	-0.0984
	First Stage. Dependent Variable: $\ln(\text{exports/area})_c$			
$\text{Atlantic distance}_c$	-1.7939***	-1.6295***	-1.5549***	-0.9696
	(0.4255)	(0.4861)	(0.4833)	(0.7209)
Indian distance_c	-1.6668***	-1.6409***	-1.6230***	-1.3273*
	(0.4468)	(0.4427)	(0.4908)	(0.7413)
$\text{Saharan distance}_c$	-3.1466***	-3.0581***	-3.0557***	1.1155
	(0.9079)	(1.0191)	(1.1770)	(1.7356)
$\text{Red Sea distance}_c$	-0.3533	-0.2346	-0.1084	-5.5374***
	(0.8864)	(1.1250)	(1.2147)	(1.7851)
F-stat of excluded instruments	5.14	5.10	4.06	3.56
Individual controls	-	✓	✓	✓
Colonizer dummies	-	-	✓	✓
Geographical controls	-	-	-	✓
Climatic controls	-	-	-	✓
N	40666	39514	39514	39514

Notes: The table reports IV estimates of Equation (2). The dependent variable is an indicator variable of whether individual i works in industrial sectors or not ($\mathbb{1}\{\text{Industrial job}\}_i$). The independent variable is the natural log of the number of slaves exported from each country between 1400 and 1900 during the four major slave trades, normalized by land area ($\ln(\text{exports/area})_c$). The excluded instruments are the distances from each country to the primary destinations in each of the four major slave trades. Individual-level sample from Round 6 (2016) Afrobarometer survey is used. Standard errors are clustered at country level. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

6.3 Ethnicity-based Individual-level Results

Surprisingly, when I merge the volume of the historical slave trade through respondents' ethnicity rather than country—thereby conducting an ethnicity-based individual-level analysis using Equation (3)—the coefficients on $\ln(\text{exports/area})_e$ exhibit the opposite (positive) sign, as shown in Tables 5 (OLS) and 6 (IV). My interpretation of this result is that, since ethnic groups have dispersed across multiple countries over time, the adverse impact of the historical slave trade on contemporary industrialization, which is location-based, cannot be accurately estimated using the volume of the historical slave trade calculated at the ethnic group level. This finding also suggests that the adverse impact of the historical slave trade on contemporary industrialization is primarily sustained through external factors, such as capital accumulation, infrastructure development, and institutional quality, etc., given that the adverse impact of the historical slave trade on contemporary industrialization can only be observed when the volume of the historical slave trade is calculated within countries. This stands in contrast to the effects of the historical slave trade on trust and gender norms, which have been shown to be transmitted primarily through internal factors like cultural norms and beliefs across generations (Nunn and Wantchekon, 2011; Teso, 2019).

Table 5: Ethnicity-based Individual-level OLS Estimation: Indicator Variable of Industrial Job and the Historical Slave Trade

	(1)	(2)	(3)	(4)	(5)
	$\mathbb{1}\{\text{Industrial job}\}_i$				
$\ln(\text{exports/area})_e$	0.0083*	0.0085**	0.0336***	0.0309***	0.0325***
	(0.0048)	(0.0042)	(0.0051)	(0.0055)	(0.0055)
Individual controls	-	✓	✓	✓	✓
Country fixed effects	-	-	✓	✓	✓
pre-colonial development controls	-	-	-	✓	✓
non-slave trade European influence controls	-	-	-	✓	✓
Ethnic fractionalization controls	-	-	-	-	✓
N	17028	16508	16508	15573	15209
R^2	0.0005	0.0823	0.1260	0.1317	0.1333

Notes: The table reports OLS estimates of Equation (3). The dependent variable is an indicator variable of whether individual i works in industrial sectors or not ($\mathbb{1}\{\text{Industrial job}\}_i$). The independent variable is the natural log of the number of slaves exported from an ethnic group between 1400 and 1900 during the trans-Atlantic and Indian Ocean slave trades, normalized by the area of land inhabited by the ethnic group during the nineteenth century ($\ln(\text{exports/area})_e$). Individual-level sample from Round 3 (2005) Afrobarometer survey is used. Standard errors are two-way clustered at ethnic group and respondents' current district of residency. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Table 6: Ethnicity-based Individual-level IV Estimation: Indicator Variable of Industrial Job and the Historical Slave Trade

	(1)	(2)	(3)	(4)	(5)
	$\mathbb{1}\{\text{Industrial job}\}_i$				
$\ln(\text{exports/area})_e$	0.0771***	0.0611***	0.0663***	0.0461***	0.0484***
	(0.0112)	(0.0099)	(0.0125)	(0.0122)	(0.0127)
	First Stage. Dependent Variable: $\ln(\text{exports/area})_e$				
Distance from coast_e	-0.0013***	-0.0014***	-0.0013***	-0.0015***	-0.0014***
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
F-stat of excluded instruments	263.60	283.88	222.73	233.96	217.37
Individual controls	-	✓	✓	✓	✓
Country fixed effects	-	-	✓	✓	✓
pre-colonial development controls	-	-	-	✓	✓
non-slave trade European influence controls	-	-	-	✓	✓
Ethnic fractionalization controls	-	-	-	-	✓
N	17028	16508	16508	15573	15209

Notes: The table reports IV estimates of Equation (3). The dependent variable is an indicator variable of whether individual i works in industrial sectors or not ($\mathbb{1}\{\text{Industrial job}\}_i$). The independent variable is the natural log of the number of slaves exported from an ethnic group between 1400 and 1900 during the trans-Atlantic and Indian Ocean slave trades, normalized by the area of land inhabited by the ethnic group during the nineteenth century ($\ln(\text{exports/area})_e$). The excluded instrument is the distance of an individual's ethnic group from the coast during the periods of historical slave trades. Individual-level sample from Round 3 (2005) Afrobarometer survey is used. Standard errors are two-way clustered at ethnic group and respondents' current district of residency. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Moreover, as illustrated in Appendix A Tables A.4 (OLS) and A.5 (IV), the positive coefficients on slave exports calculated within ethnic groups remain even when slave exports calculated at the country level are simultaneously included. Reassuringly, the significantly negative coefficients on slave exports calculated within countries, $\ln(\text{exports/area})_c$, also remain robust in this specification, indicating that the adverse impact of the historical slave trade on contemporary industrialization sustained through external factors is not diminished by the inclusion of slave exports calculated within ethnic groups. Therefore, in the next section, I will explore how one of the external factors, institutional quality, sustained and even exacerbated the adverse impact of the historical slave trade

on contemporary industrialization.

Before delving deeper into the external factor, institutional quality, which sustained and even exacerbated the adverse effects of the historical slave trade on contemporary industrialization, it is worth making some remarks on the significantly positive estimated coefficients on the volume of the historical slave trade calculated within ethnic groups, $\ln(\text{exports/area})_e$. One potential explanation for these positive estimates is that individuals from ethnic groups that were heavily targeted by the historical slave trade might have been more inclined to participate in industrial jobs, which was relatively novel at the time. As suggested by Nunn and Wantchekon (2011), individuals from ethnic groups that were heavily targeted by the historical slave trade had lower levels of trust on others and the society, possibly making them less attached to their original occupations, which involved untrustworthy colleagues. Consequently, they might have been more willing to transition to new industrial jobs. However, this explanation is speculative, requiring more empirical evidence to verify. Thus, in the next section, I will go back to the main focus of this paper—the adverse impact of the historical slave trade on contemporary industrialization and its persistence through external factors —most notably, institutional quality.

7 Mechanisms of Persistence

In this section, I examine how the adverse impact of the historical slave trade on contemporary industrialization persisted over several centuries. In particular, I explore how institutional factors sustained or even exacerbated the detrimental impact of the historical slave trade on the process of contemporary industrialization in Africa.

7.1 Background: Poor Institutional Quality in Africa

As discussed in Subsection 6.3, the enduring adverse impact of the historical slave trade has largely been sustained through external factors. Among the possible external factors such as capital accumulation, infrastructure development, and institutional quality, etc., institutional quality stands out as the most compelling one, given that the historical slave trade induced long-term political instability, leading to weakened and fragmented states (Nunn, 2008). Furthermore, as established by

Acemoglu et al. (2002), institutions encouraging investments are critical in promoting industrialization in Africa. To lay the groundwork for my subsequent analysis related to institutional factors, I briefly review the markedly deficient institutional quality in Africa as follows.

Following the discussion on the early stages of industrialization of African countries in the Historical Background Subsection 2.2, the industrialization process in Africa is frequently marked by significant government intervention. According to Bates (2014, 2015), policies such as import licensing and protective tariffs were often implemented with the (originally good) intention of fostering domestic industries in African nations. Additionally, the production rights for specific industrial goods were subject to strict government regulation. However, these interventions often prioritized political connections over economic efficiency in determining which sectors received protection and which firms were granted production rights. In practice, authoritarian regimes in Africa frequently imposed policies that favored their political allies, thereby consolidating their ruling power. As a result, the post-independence industrial sectors in Africa became highly monopolized and inefficient, characterized by large but redundant production facilities, which significantly hindered its contemporary industrialization process.

7.2 Empirical Challenges

Given the crucial role that governments played in shaping the trajectory of contemporary industrialization in Africa and the well-established fact that better institutions facilitate industrialization (Acemoglu et al., 2002), it seems intuitive to investigate how the adverse impact of the historical slave trade on industrialization varies across countries with differing levels of institutional quality. However, current institutional quality may itself be an outcome of the historical slave trade, potentially leading to biased estimates. For instance, if the historical slave trade led to a decline in current institutional quality, then observing a more pronounced negative impact of the historical slave trade on contemporary industrialization in countries currently with lower institutional quality might be misleading because the historical slave trade simultaneously hampered both institutional development and the process of industrialization. In other words, the observed stronger negative impact of the historical slave trade on contemporary industrialization in countries currently with lower institutional quality might be simply reflecting the fact that these countries were more heavily raided by

the historical slave trade from the first place.

Fortunately, as marked in Subsection 2.3, Gennaioli and Rainer (2007) provides evidence that pre-colonial institutional centralization has a significantly positive association with current institutional quality. The degree of pre-colonial institutional centralization is associated with current institutional quality but, unlike the latter, it is not a consequence of the historical slave trade, as it predates the slave trade. Therefore, by examining whether the adverse impact of the historical slave trade on contemporary industrialization is more pronounced in regions with lower pre-colonial institutional centralization, I can accurately access whether poorer institutional quality sustained the adverse impact of the historical slave trade on contemporary industrialization.

7.3 Results

Building on the rationale discussed above, I first conduct a country-level analysis by estimating Equation (1) separately for countries with high pre-colonial institutional centralization and those with low pre-colonial institutional centralization. The results are presented in Panel A of Table 7. Column (1) includes countries characterized by low pre-colonial institutional centralization (chiefdoms), while column (2) includes the remaining half, consisting of countries marked by high pre-colonial institutional centralization (part of larger states). Unfortunately, due to the extremely small sample sizes, the estimated coefficients in both samples are statistically insignificant. Consequently, no reliable inferences can be drawn from these imprecisely estimated coefficients, which motivates the adoption of individual-level analysis.[17]

To enhance statistical significance, I conduct a country-based individual-level analysis by estimating Equation (2) separately for respondents residing in countries with high pre-colonial institutional centralization and those residing in countries with low pre-colonial institutional centralization. As presented in Panel B of Table 7, the estimated coefficient of interest (α_1) for respondents living in countries with high pre-colonial institutional centralization (-0.014) is considerably smaller in magnitude than that for respondents living in countries with low pre-colonial institutional centralization (-0.0489). Both coefficients are at least marginally significant, with the coefficient for respondents in countries with low pre-colonial institutional centralization being significant at the

[17] Note that I do not employ an instrumental variable strategy in the country-level analysis due to the insufficient number of observations.

1% level. Furthermore, the estimated coefficient for respondents in countries with high pre-colonial institutional centralization in the instrumental variable specification analogous to column (4) of Subsection 6.2 Table 4 is statistically insignificant (-0.0041, with a standard error of 0.0279).[18] This suggests that the historical slave trade has significantly less influence on contemporary industrialization in regions characterized by high pre-colonial institutional centralization, where the subsequent institutional quality was also expected to be better (Gennaioli and Rainer, 2007).

Given the evidence presented, I propose an institutional explanation to how the historical slave trade persistently influenced contemporary industrialization: The absence of reliable institutions exacerbated the difficulties faced by African countries raided by the historical slave trade in developing industrial sectors, as industrialization in these countries was often impeded by dysfunctional or even discriminatory governance. Therefore, poor institutional quality sustained and even exacerbated the adverse impact of the historical slave trade on contemporary industrialization.

Quantitatively, according to the estimates in Panel B of Table 7, a one standard deviation increase in the volume of the historical slave trade corresponds to a 5.07% decrease in the probability of a respondent being employed in industrial sectors in countries with high pre-colonial institutional centralization, while in countries with low pre-colonial institutional centralization, the analogous implied effect is nearly 2.5 times larger. A similar difference can be observed when comparing respondents from a country in the 25th percentile to one in the 75th percentile in terms of the volume of the historical slave trade, although the difference is slightly smaller due to the larger interquartile range in countries with high pre-colonial institutional centralization.

[18] The variation in the variable of interest ($\ln(\text{exports/area})_c$) is insufficient in the sample of respondents in countries with low pre-colonial institutional centralization, resulting in collinearity with the instrumental variables. Consequently, I cannot perform the instrumental variable estimation in the sample of respondents in countries with low pre-colonial institutional centralization.

Table 7: Country-level and Country-based Individual-level OLS Estimation: Industrialization, the Historical Slave Trade, and Pre-colonial Institutional Centralization

	(1)	(2)
Pre-colonial Institutional Centralization	Low	High
Panel A. Country-level Analysis, Dependent Variable: Share industrial sector$_c$		
ln(exports/area)$_c$	2.3921	-0.3450
	(1.9238)	(0.3876)
Institutional centralization score	✓	✓
Colonizer dummies	✓	✓
Geographical controls	✓	✓
Climatic controls	✓	✓
N	14	33
R^2	0.888	0.782
Panel B. Country-based Individual-level Analysis, Dependent Variable: $\mathbb{1}\{\text{Industrial job}\}_i$		
ln(exports/area)$_c$	-0.0489***	-0.0140*
	(0.0068)	(0.0081)
Implied effect of one standard deviation increase	-0.1213	-0.0507
Implied effect of 25 to 75 percentile movement	-0.1146	-0.0829
Institutional centralization score	✓	✓
Individual controls	✓	✓
Colonizer dummies	✓	✓
Geographical controls	✓	✓
Climatic controls	✓	✓
N	8676	28195
R^2	0.1423	0.1672

Notes: The table reports OLS estimates of Equation (1) and Equation (2) using the sample of countries with high pre-colonial institutional centralization and those with low pre-colonial institutional centralization separately. The dependent variable is the share of employment in industrial sectors in 2000 (Share industrial sector$_c$) in Panel A, and an indicator variable of whether individual i works in industrial sectors or not ($\mathbb{1}\{\text{Industrial job}\}_i$) in Panel B. The independent variable is the natural log of the number of slaves exported from each country between 1400 and 1900 during the four major slave trades, normalized by land area (ln(exports/area)$_c$) in both panels. Country-level sample is used in Panel A. Individual-level sample from Round 6 (2016) Afrobarometer survey is used in Panel B. Standard errors are clustered at country level in Panel B. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

8 Conclusion

In this study, I demonstrate a negative relationship between the historical slave trade and contemporary industrialization in Africa. This relationship is shown to be causal, as it remains robust after accounting for various control variables and applying an instrumental variable strategy. Regarding the persistence of the impact, I illustrate that the adverse impact of the historical slave trade on contemporary industrialization was sustained by external factors, particularly institutional quality. By examining the differential impacts of the historical slave trade across countries with varying degrees of pre-colonial institutional centralization, I find that the adverse impact of the historical slave trade on contemporary industrialization was sustained and even exacerbated by the generally poor institutional quality of African governments.

Unlike previous studies that explore various long-term cultural or health-related outcomes of the historical slave trade, my findings highlight the adverse impact of the historical slave trade on contemporary industrialization as a significant channel through which it contributed to Africa's current economic underperformance (Nunn, 2008). Furthermore, the persistence of this impact through external factors, specifically through institutional quality, contrasts with the emphasis on internal norms and beliefs as key mechanisms for transmitting the effects of historical shocks noted in Nunn and Wantchekon (2011) and Teso (2019). This suggests that both external and internal factors play crucial roles in the transmission of the long-term effects of historical shocks.

For African countries to converge with the rest of the world in terms of income levels, industrialization is definitely necessary (Solow, 1956). Achieving this requires the establishment of stable political institutions that can facilitate industrialization (Acemoglu et al., 2002) and, in turn, promote economic growth (DeLong and Shleifer, 1993; Acemoglu et al., 2001). My research disentangles the persistent adverse impact of the historical slave trade on contemporary industrialization from an institutional perspective, aiming to provide some motivations for African governments to take practical and informed actions.

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Appendix A Additional Tables

Table A.1: Country-level Summary Statistics

	Obs.	Mean	Std. Dev.	P10	P50	P90
Share industrial sector$_c$	51	12.8153	8.2187	3.9353	11.3161	23.6408
ln(exports/area)$_c$	51	3.3687	3.8526	-2.3026	4.6274	7.6908
Latitude (distance from the equator)$_c$	51	13.7373	9.8629	3	12	29
Longitude$_c$	51	15.9404	19.6543	-10.9392	17.5414	39.6198
Lowest monthly rainfall$_c$	51	7.6863	13.7543	0	0	23
Average maximum humidity$_c$	51	71.549	12.0321	57	73	82
Average minimum temperature$_c$	51	8.549	7.4197	-1	10	17
ln(coastline/area)$_c$	51	-0.3794	3.1004	-4.6052	0.2469	2.6584
Atlantic distance$_c$	51	7.3009	3.2613	3.8888	5.6863	11.0833
Indian distance$_c$	51	7.036	4.2162	2.3583	8.3668	11.5998
Saharan distance$_c$	51	3.4892	1.5753	1.7682	3.3531	5.8565
Red Sea distance$_c$	51	3.4689	1.4714	1.3613	3.5289	5.2588

Notes: The table presents the summary statistics of the variables used in my country-level analysis. The country sample comprises 51 countries in Africa.

Table A.2: Country-based Individual-level Summary Statistics

	Obs.	Mean	Std. Dev.	P10	P50	P90
$\mathbb{1}\{\text{Industrial job}\}_i$	40,666	0.2194	0.4139	0	0	1
$\ln(\text{exports/area})_c$	40,666	3.7137	3.7083	-2.3026	4.9991	7.6908
Age_i	40,464	39.2464	14.0869	23	36	60
$\mathbb{1}\{\text{Male}\}_i$	40,666	0.4999	0.5	0	0	1
$\text{Urban or rural residency}_i$	40,666	1.1989	1.4627	0	0	3
Education level_i	40,573	3.2842	2.2309	0	3	6
$\text{Living condition}_i$	40,591	2.7413	1.2676	1	3	4
$\text{Latitude (distance from the equator)}_c$	40,666	14.4927	10.2497	2	14	30
Longitude_c	40,666	17.304	18.9573	-9.3071	23.8204	37.8576
$\text{Lowest monthly rainfall}_c$	40,666	9.0527	12.5317	0	3	25
$\text{Average maximum humidity}_c$	40,666	68.9841	12.0232	56	72	82
$\text{Average minimum temperature}_c$	40,666	7.2561	7.3476	-2	8	17
$\ln(\text{coastline/area})_c$	40,666	-0.7333	2.9253	-4.6052	0.0684	1.9477
$\text{Atlantic distance}_c$	40,666	7.5462	3.1173	3.8975	6.7659	10.9957
Indian distance_c	40,666	6.3142	4.1508	2.1832	5.7646	10.7907
$\text{Saharan distance}_c$	40,666	3.7145	1.6485	1.7682	3.3589	6.2739
$\text{Red Sea distance}_c$	40,666	3.5627	1.2688	1.6499	3.6955	5.2275

Notes: The table presents the summary statistics for the variables utilized in my country-based individual-level analysis. The sample includes 40,666 respondents from 36 African countries based on Round 6 (2016) Afrobarometer survey.

Table A.3: Ethnicity-based Individual-level Summary Statistics

	Obs.	Mean	Std. Dev.	P10	P50	P90
$\mathbb{1}\{\text{Industrial job}\}_i$	17,028	0.1696	0.3753	0	0	1
$\ln(\text{exports/area})_e$	17,028	0.5699	0.9658	0	0.0692	1.9887
Age_i	16,792	38.338	14.4105	22	35	60
$\mathbb{1}\{\text{Male}\}_i$	17,028	0.5039	0.5	0	1	1
$\text{Urban or rural residency}_i$	17,028	0.3413	0.4742	0	0	1
Education level_i	16,958	2.8397	1.9959	0	3	5
$\text{Living condition}_i$	16,974	2.5526	1.1877	1	2	4
Malaria ecology_e	17,028	12.0909	9.8285	0.3421	8.9009	26.6423
Settlement_e	16,019	6.1423	1.2341	5	7	7
City dummy 1400_e	17,028	0.1235	0.329	0	0	1
$\text{Jurisdictional hierarchies}_e$	16,030	2.8897	0.9426	2	3	4
$\text{Explorer contact}_e$	17,028	0.4587	0.4983	0	0	1
$\text{Total missions per area}_e$	17,028	0.0002	0.0003	0	0.0001	0.0006
Railway network_e	17,028	0.3901	0.4878	0	0	1
$\text{Ethnic fractionalization}_d$	16,626	0.4172	0.2934	0	0.4203	0.8177
$\text{Share same ethnicity}_d$	16,626	0.5881	0.3466	0.0833	0.6667	1
$\text{Distance from coast}_e$	17,028	443.8086	319.8645	59.1767	390.9112	919.7967

Notes: This table presents the summary statistics for the variables used in my ethnicity-based individual-level analysis. The sample comprises 17,028 respondents from 18 African countries based on Round 3 (2005) Afrobarometer survey.

Table A.4: Ethnicity-based + Country-based Individual-level OLS Estimation: Indicator Variable of Industrial Job and the Historical Slave Trade

	(1)	(2)	(3)	(4)	(5)	(6)
	$\mathbb{1}\{\text{Industrial job}\}_i$					
$\ln(\text{exports/area})_e$	0.0492***	0.0451***	0.0219***	0.0222***	0.0235***	0.0321***
	(0.0051)	(0.0046)	(0.0055)	(0.0056)	(0.0055)	(0.0053)
$\ln(\text{exports/area})_c$	-0.0217***	-0.0200***	-0.0152***	-0.0135***	-0.0157***	-0.0170***
	(0.0014)	(0.0014)	(0.0018)	(0.0019)	(0.0021)	(0.0030)
Individual controls	-	✓	✓	✓	✓	✓
pre-colonial development controls	-	-	✓	✓	✓	✓
non-slave trade European influence controls	-	-	✓	✓	✓	✓
Ethnic fractionalization controls	-	-	-	✓	✓	✓
Colonizer dummies	-	-	-	-	✓	✓
Geographical controls	-	-	-	-	-	✓
Climatic controls	-	-	-	-	-	✓
N	17028	16508	15573	15209	15209	15209
R^2	0.0293	0.1016	0.1179	0.1196	0.1214	0.1324

Notes: The table reports OLS estimates combining Equation (2) and (3). The dependent variable is an indicator variable of whether individual i works in industrial sectors or not ($\mathbb{1}\{\text{Industrial job}\}_i$). The independent variable is the natural log of the number of slaves exported from an ethnic group between 1400 and 1900 during the trans-Atlantic and Indian Ocean slave trades, normalized by the area of land inhabited by the ethnic group during the nineteenth century ($\ln(\text{exports/area})_e$) as well as the natural log of the number of slaves exported from each country between 1400 and 1900 during the four major slave trades, normalized by land area ($\ln(\text{exports/area})_c$). Individual-level sample from Round 3 (2005) Afrobarometer survey is used. Standard errors are two-way clustered at ethnic group and respondents' current district of residency. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Table A.5: Ethnicity-based + Country-based Individual-level IV Estimation: Indicator Variable of Industrial Job and the Historical Slave Trade

	(1)	(2)	(3)	(4)	(5)	(6)
	$\mathbb{1}\{\text{Industrial job}\}_i$					
$\ln(\text{exports/area})_e$	0.1352***	0.1112***	0.0888***	0.0934***	0.1344***	0.0399***
	(0.0109)	(0.0098)	(0.0166)	(0.0173)	(0.0223)	(0.0100)
$\ln(\text{exports/area})_c$	-0.0371***	-0.0324***	-0.0258***	-0.0246***	-0.0375***	-0.0170***
	(0.0023)	(0.0023)	(0.0035)	(0.0035)	(0.0050)	(0.0032)
	First Stage. Dependent Variable: $\ln(\text{exports/area})_e$					
Distance from coast_e	-0.0016***	-0.0015***	-0.0014***	-0.0013***	-0.0013***	-0.0014***
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
F-stat of excluded instruments	122.02	136.50	56.75	50.52	51.89	73.36
	First Stage. Dependent Variable: $\ln(\text{exports/area})_c$					
Atlantic distance_c	-3.3654***	-3.5079***	-2.5044***	-2.4266***	-2.3218***	-7.6562***
	(0.1827)	(0.2565)	(0.2550)	(0.2435)	(0.2559)	(0.2474)
Indian distance_c	-3.8246***	-3.8974***	-2.9395***	-2.9084***	-2.7886***	-7.0811***
	(0.1536)	(0.1878)	(0.2007)	(0.1938)	(0.2117)	(0.1816)
Saharan distance_c	-6.6500***	-6.6009***	-5.1976***	-5.1737***	-5.1247***	-7.5341***
	(0.1570)	(0.1555)	(0.2273)	(0.2178)	(0.2470)	(0.0770)
Red Sea distance_c	1.2611***	1.0501***	0.9228***	1.1164***	1.2459***	0.9356***
	(0.0787)	(0.1713)	(0.1641)	(0.1537)	(0.1629)	(0.1706)
F-stat of excluded instruments	1771.64	1330.18	297.84	293.08	190.33	2604.93
Individual controls	-	✓	✓	✓	✓	✓
pre-colonial development controls	-	-	✓	✓	✓	✓
non-slave trade European influence controls	-	-	✓	✓	✓	✓
Ethnic fractionalization controls	-	-	-	✓	✓	✓
Colonizer dummies	-	-	-	-	✓	✓
Geographical controls	-	-	-	-	-	✓
Climatic controls	-	-	-	-	-	✓
N	17028	16508	15573	15209	15209	15209

Notes: The table reports IV estimates combining Equation (2) and (3). The dependent variable is an indicator variable of whether individual i works in industrial sectors or not ($\mathbb{1}\{\text{Industrial job}\}_i$). The independent variable is the natural log of the number of slaves exported from an ethnic group between 1400 and 1900 during the trans-Atlantic and Indian Ocean slave trades, normalized by the area of land inhabited by the ethnic group during the nineteenth century ($\ln(\text{exports/area})_e$) as well as the natural log of the number of slaves exported from each country between 1400 and 1900 during the four major slave trades, normalized by land area ($\ln(\text{exports/area})_c$). The excluded instruments are the distance of an individual's ethnic group from the coast as well as the distances from each country to the primary destinations in each of the four major slave trades. Individual-level sample from Round 3 (2005) Afrobarometer survey is used. Standard errors are two-way clustered at ethnic group and respondents' current district of residency. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Appendix B Additional Figures

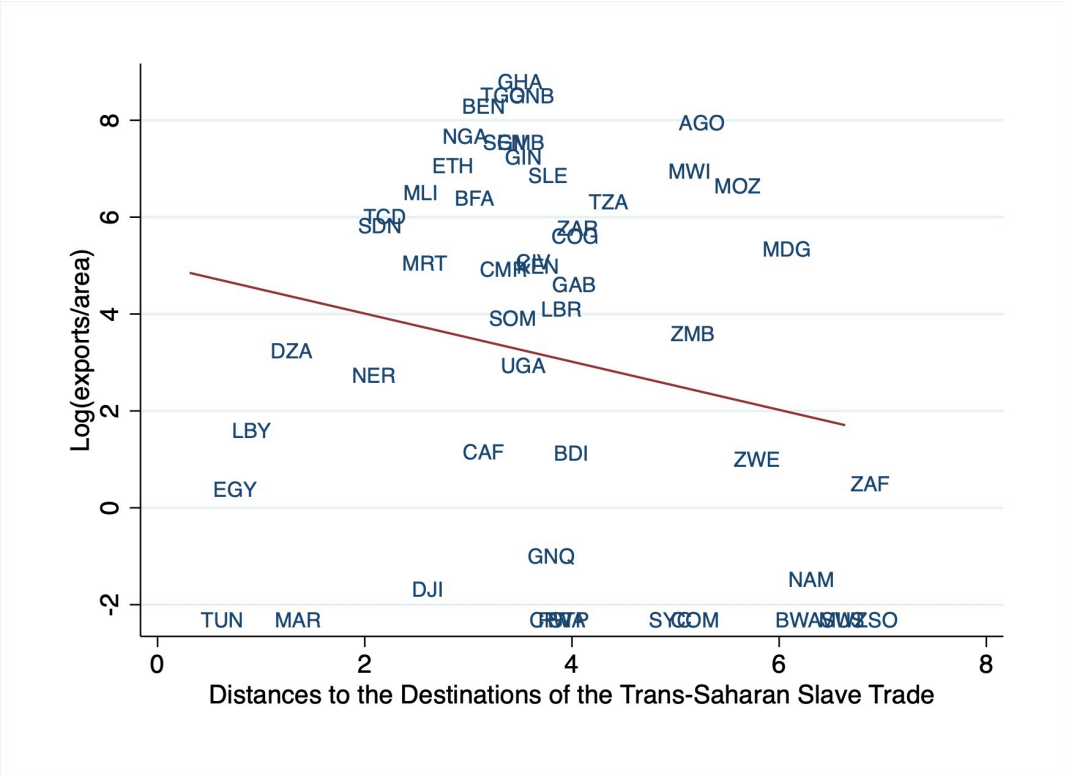


Figure B.1: The Volume of the Historical Slave Trades and Distances from each Country to the Primary Destinations of the Trans-Saharan Slave Trade

Notes: The figure displays the correlation between the natural log of the number of slaves exported from each country between 1400 and 1900 during the four major slave trades, normalized by land area ($\ln(\text{exports/area})_c$) and the distances from each country to the primary destinations of the trans-Saharan slave trade Saharan distance$_c$.

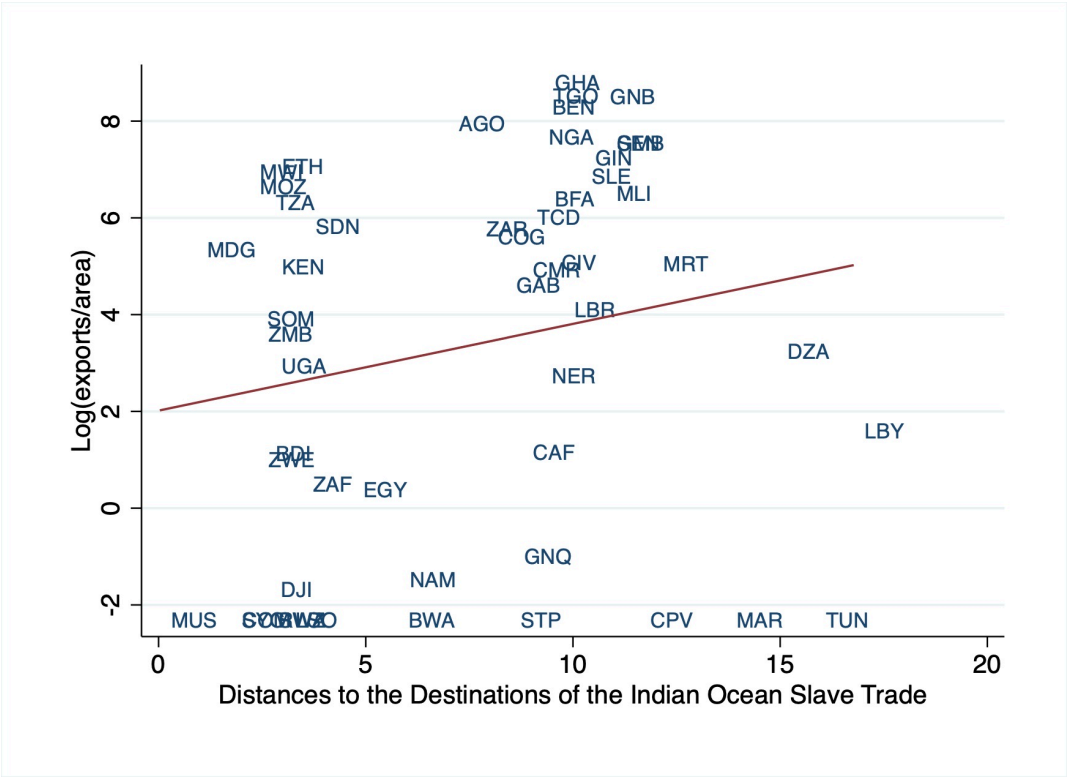


Figure B.2: The Volume of the Historical Slave Trades and Distances from each Country to the Primary Destinations of the Indian Ocean Slave Trade

Notes: The figure displays the correlation between the natural log of the number of slaves exported from each country between 1400 and 1900 during the four major slave trades, normalized by land area ($\ln(\text{exports/area})_c$) and the distances from each country to the primary destinations of the Indian Ocean slave trade (Indian distance_c).

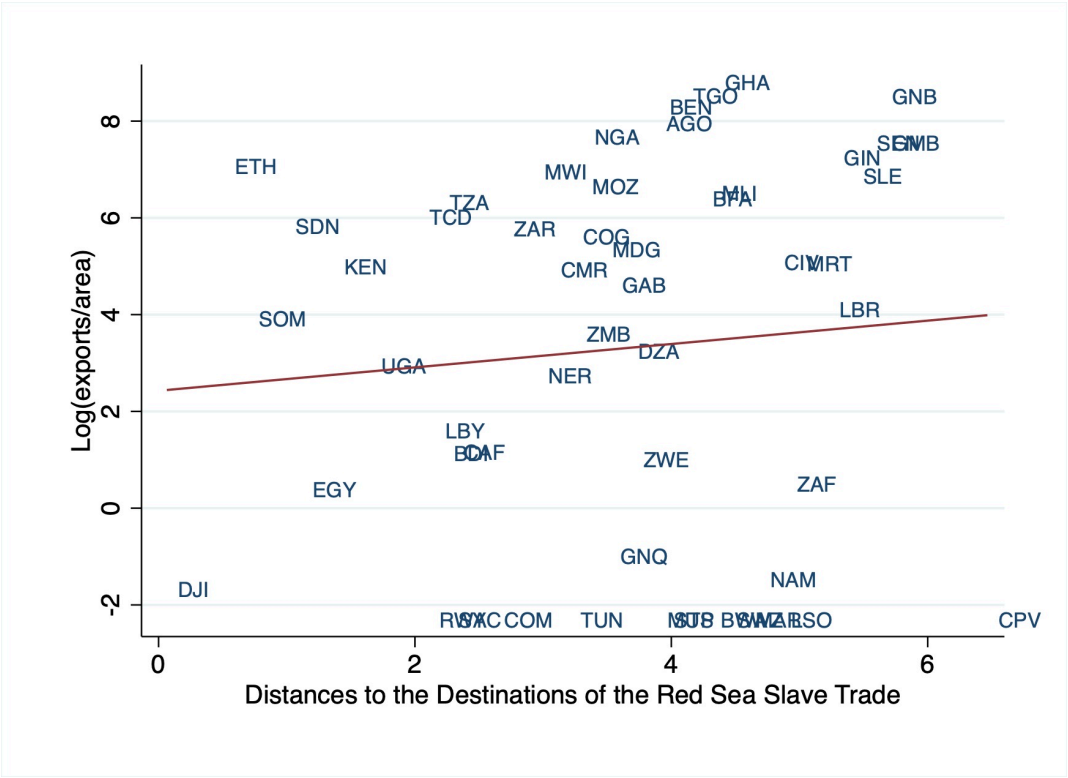


Figure B.3: The Volume of the Historical Slave Trades and Distances from each Country to the Primary Destinations of the Red Sea Slave Trade

Notes: The figure displays the correlation between the natural log of the number of slaves exported from each country between 1400 and 1900 during the four major slave trades, normalized by land area ($\ln(\text{exports/area})_c$) and the distances from each country to the primary destinations of the Red Sea slave trade ($\text{Red Sea distance}_c$).

Appendix C Detailed Afrobarometer Survey Questions

In this appendix, I present the corresponding Afrobarometer survey questions used to construct the variables in this paper, sourced from the 2016 (Round 6) Afrobarometer survey (Afrobarometer, 2016) and the 2005 (Round 3) Afrobarometer survey (Afrobarometer, 2005). The survey questions and possible answers are obtained from the Afrobarometer codebooks.

C.1 2016 (Round 6) Afrobarometer Survey

The survey questions and possible answers are obtained from the Afrobarometer Merged Round 6 Codebook (36 Countries) (2016).

- Variable: $\mathbb{1}\{\text{Industrial job}\}_i$

  Question: What is your main occupation?

  Answers: 0=Never had a job, 1=Student, 2=Housewife / homemaker, 3=Agriculture / farming / fishing / forestry, 4=Trader / hawker / vendor, 5=Retail / Shop, 6=Unskilled manual worker (e.g., cleaner, laborer, domestic help, unskilled manufacturing worker), 7=Artisan or skilled manual worker (e.g., trades like electrician, mechanic, machinist or skilled manufacturing worker), 8=Clerical or secretarial, 9=Supervisor / Foreman / Senior Manager, 10=Security services (police, army, private security), 11=Mid-level professional (e.g., teacher, nurse, mid-level government officer), 12=Upper-level professional (e.g., banker/finance, doctor, lawyer, engineer, accountant, professor, senior-level government officer), 95=Other, 99=Don't know, 98=Refused to answer, -1=Missing

- Variable: Age_i

  Question: How old are you?

  Answers: 18-105, 998=Refused to answer, 999=Don't know, -1=Missing

- Variable: $\mathbb{1}\{\text{Male}\}_i$

  Question: Respondent's gender

  Answers: 1=Male, 2=Female

- Variable: Urban or rural residency$_i$

  Question: Urban or Rural Residency

  Answers: 0=Rural, 1=Peri-urban, 2=Semi-urban, 3=Urban

- Variable: Education level$_i$

  Question: What is your highest level of education?

  Answers: 0=No formal schooling, 1=Informal schooling only (including Koranic schooling), 2=Some primary schooling, 3=Primary school completed, 4=Intermediate school or Some secondary school / high school, 5=Secondary school / high school completed, 6=Post-secondary qualifications, other than university e.g. a diploma or degree from a polytechnic or college, 7=Some university, 8=University completed, 9=Post-graduate, 99=Don't know [Do not read], 98=Refused to answer, -1=Missing

- Variable: Religion$_i$

  Question: What is your religion, if any?

  Answers: 0=None, 1=Christian only (i.e., respondents says only "Christian", without identifying a specific sub-group), 2=Roman Catholic, 3=Orthodox, 4=Coptic, 5=Anglican, 6=Lutheran, 7=Methodist, 8=Presbyterian, 9=Baptist, 10=Quaker/Friends, 11=Mennonite, 12=Evangelical, 13=Pentecostal (e.g.,"Born Again" and/or "Saved"), 14=Independent (e.g., "African Independent Church"), 15=Jehovah's Witness, 16=Seventh Day Adventist, 17=Mormon, 18=Muslim only (i.e., respondents says only "Muslim", without identifying a specific sub-group), 19=Sunni only (i.e., respondents says only "Sunni Muslim", without identifying a specific sub-group), 20=Ismaeli, 21=Mouridiya Brotherhood, 22=Tijaniya Brotherhood, 23=Qadiriya Brotherhood, 24=Shia, 25=Traditional/ethnic religion, 26=Hindu, 27=Bahai, 28=Agnostic (Do not know if there is a God), 29=Atheist (Do not believe in a God), 30=Dutch Reformed, 31=Calvinist, 32=Church of Christ, 33=Zionist Christian Church, 34=Jewish, 35=Assemblies of God Church, 36=New Apostolic, 99=NOT ASKED IN THIS COUNTRY, 100=Celestial Christianity, 220=Christian Rationalism, 260=Apostolic Church, 300=African Inland Church, 420=Apokalypsy, 421=FPVM, 422=Shine, 460=Last Church of God, 461=African International, 462=African Abraham Church, 463=New Apostolic Church, 500=Hamadiya Brotherhood, 501=Wahhabiya Brotherhood, 502=Hamalite / Chérif de Nioro

Brotherhood, 503=Ansardine Brotherhood, 540=Old Apostolic, 541=Nazaren Church, 620=Izala, 660=Layene, 820=United Church of Zamia, 822=Christian Missions in Many Lands, 860=Salvation Army, 900=Tamil, 901=Telegu, 902=Marathi, 930=Bashariya Mission, 931=Hisbulah Mission, 1260=Alliance Chrétienne et Missionnaire, 9995=Other, 9998=Refused to answer, 9999=Don't know, -1=Missing

- Variable: Country$_i$ (for merging with ln(exports/area)$_c$)
  Question: Country
  Answers: 1=Algeria, 2=Benin, 3=Botswana, 4=Burkina Faso, 5=Burundi, 6=Cameroon, 7=Cape Verde, 8=Cote d'Ivoire, 9=Egypt, 10=Gabon, 11=Ghana, 12=Guinea, 13=Kenya, 14=Lesotho, 15=Liberia, 16=Madagascar, 17=Malawi, 18=Mali, 19=Mauritius, 20=Morocco, 21=Mozambique, 22=Namibia, 23=Niger, 24=Nigeria, 25=São Tomé and Príncipe, 26=Senegal, 27=Sierra Leone, 28=South Africa, 29=Sudan, 30=Swaziland, 31=Tanzania, 32=Togo, 33=Tunisia, 34=Uganda, 35=Zambia, 36=Zimbabwe

C.2 2005 (Round 3) Afrobarometer Survey

The survey questions and possible answers are obtained from the Afrobarometer Merged Round 3 Codebook (18 countries) (2005).

- Variable: $\mathbb{1}\{\text{Industrial job}\}_i$
  Question: What is your main occupation? (If unemployed, retired, or disabled, what was your last main occupation?)
  Answers: 0=Never had a job, 1=Subsistence Farmer (produces only for home consumption), 2=Peasant Farmer (produces both for own consumption and some surplus produce for sale), 3=Commercial Farmer (produces mainly for sale), 4=Farm worker, 5=Fisherman, 6=Trader/Hawker/Vendor, 7=Miner, 8=Domestic Worker/Maid/Char/Househelp, 9=Armed Services/Police/Security Personnel, 10=Artisan/skilled manual worker - formal sector, 11= Artisan/skilled manual worker - informal sector, 12=Clerical Worker, 13= Unskilled manual in the formal sector, 14= Unskilled manual worker in the informal sector, 15= Businessperson (works in the company of others), 16= Businessperson (Owns small business of less than 10

employees), 17=Businessperson (Owns large business of more than 10 employees), 18= Professional Worker (e.g., lawyer, accountant, nurse, engineer, etc.), 19= Supervisor/Foreman, 20=Teacher, 21=Government Worker, 22=Retail worker, 23= Student, 24=Housewife/Works In the Household, 25=Pastoralist/herder/raise livestock, 201=Pastoralist, 220=Priest, 221=Tradtional healer, 222=Sells homemade beer, 223=Herdboy, 224=Disabled, 225=Politician, 320=Employee at NGO, 321=Artisan/skilled manual worker: not sure formal or informal, 322=Unskilled manual worker: not sure formal or informal, 340=Clergy/Imam/Pastor, 341=Musician, 342=Politician, 990=Unemployed, 991=Retired, 992=Disabled, 993=Anything, 995=Other, 998=Refused to Answer, 999=Don't Know, -1=Missing Data

- Variable: Age_i
  Question: How old are you?
  Answers: 18-110, 998=Refused to Answer, 999=Don't Know, -1=Missing Data

- Variable: $\mathbb{1}\{\text{Male}\}_i$
  Question: Respondent's gender
  Answers: 1=Male, 2=Female

- Variable: Urban or rural residency_i
  Question: Urban or Rural Residency
  Answers: 0=Rural, 1=Urban

- Variable: Education level_i
  Question: What is the highest level of education you have completed?
  Answers: 0=No formal schooling, 1=Informal schooling (including Koranic schooling), 2=Some primary schooling, 3=Primary school completed, 4=Some secondary school/ High school, 5=Secondary school completed/High school, 6=Post-secondary qualifications, other than university e.g. a diploma or degree from a technical/polytechnic/college, 7=Some university, 8=University completed, 9=Post-graduate, 98=Refused to Answer, 99=Don't Know, -1=Missing Data

- Variable: Religion_i
  Question: What is your religion, if any?

Answers: 0=None, 2=Catholic, 3=Protestant (Mainstream),
4=Protestant (Evangelical/Pentecostal), 5=African Independent Church, 6=Traditional religion, 7=Hindu, 8=Agnostic (Do not know if there is a God), 9=Atheist (Do not believe in a God), 10=Christian (General), 11=Muslim, Sunni, 12=Muslim, Shiite, 13=Jehovah's Witness, 14=Seventh Day Adventist, 15=Muslim (general/other), 100=Muslim (general), 101=Assembly of God, 102=Dutch Reform/NG, 103=ZCC, 104=Church of Christ, 105=St. John, 106=AME, 107=VGK,108=Universal Church, 200=Muslim general, 241=Anglican, 242=Protestant flm, 320=Protestant, 321=Other Churches, 342=Other Muslim, 360=Muslim Tijane, 361=Muslim Mouride, 362=Muslim Layene, 363=Muslim Khadre, 995=Other, 998=Refused to Answer, 999=Don't Know, -1=Missing Data

- Variable: Country$_i$ (for country fixed effects)
  Question: Country
  Answers: 1=Benin, 2=Botswana, 3=Cape Verde, 4=Ghana, 5=Kenya, 6=Lesotho, 7=Madagascar, 8=Malawi, 9=Mali, 10=Mozambique, 11=Namibia, 12=Nigeria, 13=Senegal, 14=South Africa, 15=Tanzania, 16=Uganda, 17=Zambia, 18=Zimbabwe

- Variable: Ethnicity$_i$ (for merging with ln(exports/area)$_e$)
  Question: What is your tribe? You know, your ethnic or cultural group.
  Answers: 1=English, 2=Francais, 3=Portugais, 100=Afrikaans/Afrikaner/Boer, 101=Ndebele, 102=Xhosa, 103=Pedi/Spedi/North Sotho, 104=Sesotho/Sotho/South Sotho, 105=Setswana/Tswana, 106=Shangaan, 107=Swazi, 108=Venda, 109=Zulu, 110=Other White/European, 111=Couloured, 112=Indian, 113=English, 120=Fon, 121=Adja, 122=Bariba, 123=Dendi, 124=Yoruba, 125=Ditamari, 126=Peulh, 127=Yoa, 128=Haoussa, 129=Idé, 130=Lamba, 140=Mokgatla, 141=Mokwena, 142=Mongwato, 143=Mongwaketse, 144=Motlokwa, 145=Moherero, 146=Morolong, 147=Mosarwa, 148=Mokalanga, 149=Molete, 150=Mmirwa, 151=Motswapong, 152=Mosobea, 153=Motawana, 154=Mokgalagadi, 155=Moyei, 156=Mohurutshe, 157=Mombukushu, 158=Monajwa, 159=Mokhurutshe, 160=Motalaote, 169=Related to island origin, 170=African, 171=American or European, 172=Related to age, 173=Related to gender, 174=Related to occupation/profession, 175=Related to religion, 176=Related to class, 177=related to race, 178=Related to politics/partisan,

180=Akan, 181=Ewe, 182=Ga/Damgbe, 183= Other northern languages, 184=Gagomba, 185=Dagaati, 200=Kikuyu, 201=Luo, 202=Luhya, 203=Kamba, 204=Meru, 205=Kisii, 206=Kalenjin, 207=Masaai, 208=MijiKenda, 209=Taita, 210=Somali, 211=Pokot, 212=Turkana, 213=Bajuni, 214=Kuria, 215=Teso, 216=Rendille, 217=Embu, 218=Borana, 219=Samburu, 220=Bakoena, 221=Basiea, 222=Bafokeng, 223=Bahlakoana, 224=Batsoeneng, 225=Batloung, 226=Bataung, 227=Baphuthing, 228=Batebele, 229=Bathepu, 230=Batlokoa, 231=Bakhatla, 232=Makholokoe, 233=Makhoakhoa, 234=Barolong, 235=Banareng, 236=Mapele, 237=Bakubung, 238=Maswati, 239=Mchegu, 240=Antakarana, 241=Antambahoaka, 242=Antandroy, 243=Antanosy, 244=Antefasy , 245=Antemoro , 246=Antesaka, 248=Bara, 249=Betsileo, 250=Betsimisaraka , 251=Bezanozano , 252=Mahafaly, 253=Merina, 254=Sakalava , 255=Sihanaka , 256=Tanala, 257=Tsimihety, 258=Vezo, 260=Tumbuka, 261=Nkhonde, 262=Lambya, 263=Chewa, 264=Yao, 265=Ngoni, 266=Lomwe, 267=Mang'anja, 268=Sena, 269=Sukwa, 270=Senga, 271=Tonga, 280=Bambara, 281=Peuhl/Fulfulde, 282=Senufo, 283=Mianka, 284=Mossi, 285=Sonink, 286=Malink, 287=Khasonk, 288=Dogon, 289=Bobo, 290=Bozo, 291=Arabe, 292=Maure, 293=Kakolo, 294=Samoko, 295=Sonrha, 296=Bella, 297=Tamasheq, 298=Dafing, 300=Makua, 301=Sena, 302=Ndau, 303=Nyanja, 304=Changana, 305=Chope, 306=Bitonga, 307=Makonde, 308=Chuabo, 309=Ajua, 320=Oshiwambo, 321=Herero, 322=Caprivian, 323=Rukwangali, 324=German, 325=Afrikaaner, 326=English, 327=Nama, 328=Damara, 329=Lozi, 330=Subia, 331=White, 332=Black, 333=Coloured, 334=Baster, 335=Setswana, 336=Angolan:Portuguese, 337=Angolan:Rumbundu, 338=Ndembele (Zimbabwe), 339=Kavango, 340=Hausa, 341=Igbo, 342=Yoruba, 344=Efik, 345=Ebira, 346=Fulani, 347=Isoko, 348=Ibibio, 349=Kanuri, 350=Tiv, 351=Nupe, 352=Ijaw, 353=Edo, 354=Igala, 355=Urhobo, 356=Idoma, 357=Itsekiri, 358=Ikwere, 360=Wolof, 361=Pular, 362=Serer, 363=Mandinka, 364=Soninke, 365=Diola, 366=Manjack, 367=Bambara, 368=Bainouk, 369=Bassari, 380=Mnyakyusa, 381=Mchaga, 382=Mhaya, 383=Mngoni, 384=Mkwere, 385=Mpare, 386=Mhehe, 387=Mmakonde, 388=Myamwezi, 389=Msukuma, 390=Mmasai, 391=Mmeru, 392=Mkurya, 393=Mgogo, 394=Mluguru, 395=Mfipa, 396=Mmanyema, 397=Mnyiramba, 398=Mnyaturu, 405=Akaramojonj, 406=Alur, 407=Ateso, 408=Japadhola, 409=Jonam, 410=Kakwa, 411=Kumam, 412=Kuksabin, 413=Luo,

414=Lugbara, 415=Mugwere, 416=Madi, 417=Muganda, 418=Mugishu, 419=Musoga, 420=Bemba, 422=Tonga, 423=Lozi, 424=Chewa, 425=Nsenga, 426=Tumbuka, 427=Kaonde, 428=Luvale, 429=Namwanga, 430=Mambwe, 431=Lenje, 432=Lunda, 433=Ngoni, 435=Bisa, 436=Ila, 437=Nkoya, 438=Lala, 439=Mbunda, 500=Munyoli, 501=Mufumbira, 502=Muhororo, 503=Mukiga, 504=Mukonzo, 505=Munyarwanda, 506=Munyoro, 507=Mutagwenda, 508=Mutooro, 509=Mwamba, 510=Munyankole, 511=Samia, 517=Mutagwenda, 550=Awori, 551=Tapa, 553=Kalabari, 554=Birom, 555=Shuwa-Arab, 556=Jukun, 558=Gwari, 559=Anang, 560=Ekoi, 561=Ukwani, 562=Igede, 563=Ekpeye, 564=Taroh, 565=Ogoni, 566=Sayawa, 567=Okpella, 568=Okirika, 570=Bavudie, 571=Mapokwana, 572=Mantsosa, 573=Baropoli, 575=Balafe, 800=Arab, 801=Swahili, 802=Indian, 803=Digo, 804=Giriama, 805=Duruma, 806=Chonyi, 807=Mijikenda, 808=Arab, 809=Gunya, 810=Teso, 811=Wanga, 812=Kabarasi, 813=Bukusu, 814=Ombuya, 815=Nyala, 816=Vatsotso, 817=Tachoni, 818=Nyore, 819=Maragoli, 820=Marama, 821=Sabaot, 822=Nandi, 823=Kipsigis, 824=Tugen, 825=Keiyo, 826=Ethiopian/Kenyan, 827=Burji, 828=Murule, 829=Dagodia, 830=Gari, 831=Mupule, 832=Shabelle, 833=Gabawen, 834=Garmug, 835=Maimai, 860=Senga, 861=Swahili, 862=Nyanja, 863=Soli, 864=Chokwe, 865=Nyika, 866=Luchazi, 867=Lamba, 868=Kunda, 869=Tabwa, 870=Takaleya, 871=Aushi, 872=Kalunda, 873=Kwamashi, 874=Lambia, 875=Chisinga, 990=National identity only, 995=Other, 997=Not Asked, 998=Refused, 999=Don’t know,-1=Missing Data