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 perpetuated by the generally poor institutional quality of African governments.

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

Keywords: Africa, Slave Trade, Industrialization, Institutional Quality, Instrumental Variable Estimation

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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 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 industrialization today (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.

To access the impact of the historical slave trade on contemporary industrialization in Africa, 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, a nationally representative survey 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 being employed in industrial sectors.

However, relying solely on OLS results is 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 the four major slave trades (i.e., the West Indies and the southern United States) as instruments. The IV estimates reinforce the OLS findings, showing significantly nega-

tive coefficients of interest with a slightly larger magnitude than those in 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 this effect 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.

To identify the specific external factor that sustained the adverse impact of the historical slave trade on contemporary industrialization, I focus on the role of institutional quality since it has been emphasized in the literature as a key factor facilitating industrialization (Acemoglu et al., 2002). Given that government dysfunction and corruption are critical contributors to economic underdevelopment in Africa (Bates, 2008, 2014), I hypothesize that the negative effect of the historical slave trade on contemporary industrialization would be more pronounced in countries with poorer institutional quality. However, 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 and low levels 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. The findings reveal that the adverse impact of the historical slave trade on contemporary industrialization is more pronounced in countries with low pre-colonial institutional centralization, suggesting that institutional factors play a crucial role in perpetuating the long-term 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 resulted in current economic underperformance in Africa documented in Nunn (2008). My work is related to several strands of literatures.

First, this paper contributes to a broader understanding on the persistent effects of the historical slave trade in Africa. As discussed earlier in this section, following Nunn (2008), there have been numerous works exploring various long-term outcomes of the historical slave trade, including ethnic fractionalization (Whatley and Gillezeau, 2011; Green, 2013; Whatley, 2014), trust (Nunn and Wantchekon, 2011), polygyny, and HIV rates (Dalton and Leung, 2014; Bertocchi and Dimico, 2019). However, the exact channel through which the historical slave trade resulted in current economic underperformance remains relatively unexplored. This paper contributes to the literature by not only providing an additional long-term outcome of the historical slave trade but also establishing an important channel through which the historical slave trade stagnated economic growth in African countries.

Secondly, my work contributes to the ongoing exploration in the process and timing of industrialization in non-Western countries. For instance, Amsden (1991) examines the differential timing of industrialization in East Asia, with particular attention to why the Philippines significantly lagged behind other East Asian countries such as Japan, Korea, and Taiwan, despite extensive export promotion policies. Similarly, Hsieh (2002) investigates the industrialization process in East Asia by employing a novel method to calculate total factor productivity growth (TFPG). Baer (1972) analyzes the outcomes of Import Substitution Industrialization (ISI), which was the principal strategy employed to promote industrialization and economic growth in Latin America. However, ISI eventually failed and even contributed to delays in industrial development. Jenkins (1991) compares the experiences of East Asia and Latin America, concluding that greater state autonomy in East Asia facilitated its rapid industrial growth.

In the context of Africa, using Kenya as an illustrative case, Ksoll et al. (2021) argues that violent conflicts, especially during election periods, disrupted production, thereby hindering stable

industrial growth. Furthermore, Diao et al. (2021) and McMillan and Zeufack (2022) highlight that the dominance of small and informal firms with lower productivity in African manufacturing sectors may obstruct industrialization and economic growth. My paper offers a novel perspective: the historical slave trade also significantly delayed contemporary industrialization in Africa.

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.[1] 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 pre-colonial ethnic political centralization and 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 industrialization, even in the face of adverse external shocks such as the slave trade.

Lastly, this research is related to the literature on the enduring economic consequences of historical conflicts. Cassar et al. (2013) utilizes the variation in exposure to civil wars in Tajikistan to assess the detrimental impact of historical conflicts on impersonal exchange through a decline

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

in interpersonal trust. Rohner et al. (2013) investigates county-level differences in the intensity of ethnic conflicts in Uganda and finds that post-conflict recovery was slower in regions characterized by higher ethnic fractionalization. In a broader context, Guiso et al. (2009) explore the relationship between trust, which is often shaped by historical conflicts, and international trade in Europe, finding a generally positive relationship. I contribute to this literature by introducing industrialization as an additional economic outcome of historical events, thereby enhancing our understanding of how the legacy of historical conflicts continues to influence contemporary economic development.

The remainder of the paper is structured as follows. Section 2 describes the data sources, sample construction, and presents descriptive statistics. Section 3 displays a graph showing the negative correlation between the historical slave trade and contemporary industrialization. Section 4 outlines the empirical strategy employed at various levels of analysis. Section 5 presents the main results and establishes that the observed correlation is causal. Section 6 investigates the institutional mechanism through which the adverse impact of the historical slave trade on contemporary industrialization persisted over several centuries. Section 7 concludes the paper.

2 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 descriptive statistics.

2.1 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, Indian Ocean, Red Sea, and trans-Saharan slave trades, spanning four historical periods (1400-1599, 1600-1699, 1700-1799, 1800-1900). This dataset also includes information on the colonizer 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 ethnic group level.[2] This dataset also includes measures of ethnic fractionalization and the level of pre-slave trade development within the regions where these ethnic groups resided. Such measures encompass variables like 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 (i.e., the West Indies and the southern United States), which are employed as instrumental variables in both the country-level and country-based individual-level analysis. Nunn and Wantchekon (2011) offers the distance of an individual's ethnic group from the coast during the periods of historical slave trade, which is used as the instrumental variable in the ethnicity-based individual-level analysis.

[2] 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 ethnic data for the Red Sea and trans-Saharan slave trades, making it difficult to construct reliable estimates of the number of slaves taken from each ethnicity. 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.

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, 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, 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, and service sectors. 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 fundamental 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 mechanisms that persisted the lag in contemporary industrialization resulting from the historical slave trade, 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.

2.2 Sample Construction

In the country-level analysis, all 52 African countries with reliable estimates on the volumes 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, 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, 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.

2.3 Summary Statistics

Appendix 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 standard deviations of the four distance instrumental variables —Atlantic distance$_c$, Indian distance$_c$, Saharan distance$_c$, and Red Sea distance$_c$—are also sufficiently large.

Appendix 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 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). 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.

3 Stylized Fact

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 2000 (Share industrial sector$_c$) and the natural log of slave exports, 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 5.1 Table 1, where no control variables are included in the regression.

Notably, this correlation is not driven by few outliers but rather reflects a general pattern observed 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.

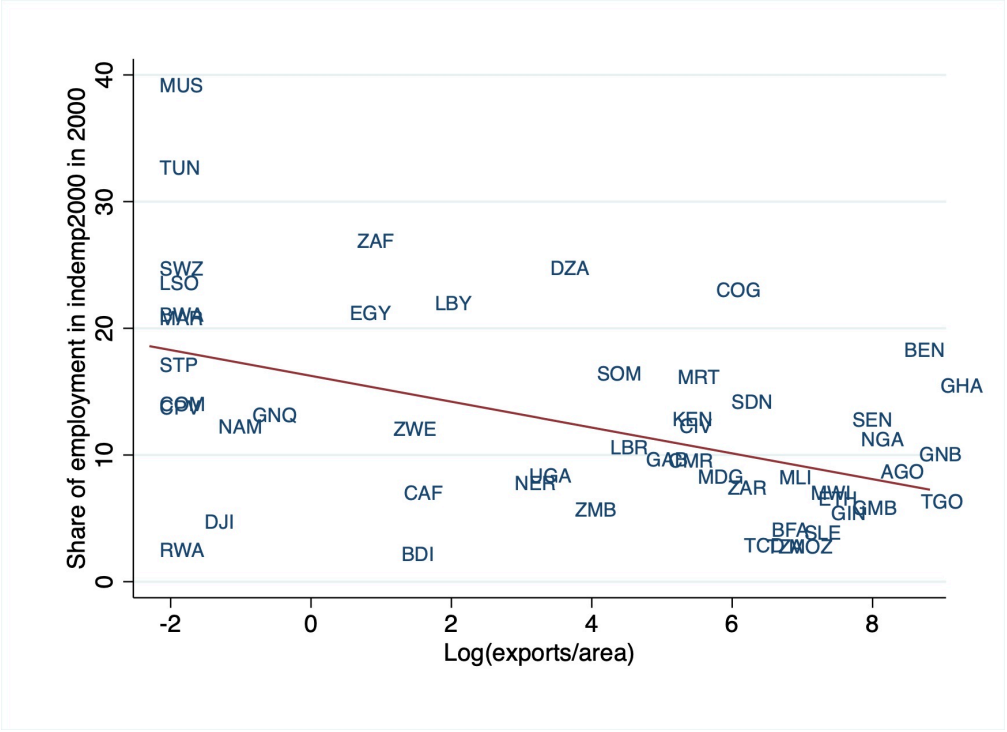


Figure 1: Contemporary Share of Employment in Industrial Sectors and Slaves Exports

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)$_c$).

4 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.

4.1 Country-level Analysis

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

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

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 colonizer prior to the countries' 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 industrialization 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(exports/area)$_c$ with the distances from each country to the primary destinations in each of the four major slave trades (i.e., the West Indies and the southern United States), following the methodology established by Nunn (2008). Detailed tests for the validity of the instrumental variables can be found in the paper.

4.2 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[3] 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,[4] and religion.[5] 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.

4.3 Ethnicity-based Individual-level Analysis

To gauge whether the long-term impact of the historical slave trade on contemporary industrialization is transmitted within regions or across generations through ethnicity, I estimate the following ethnicity-based individual-level[6] equation:

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

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

[3] 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.

[4] Urban or rural residency is categorical with four possible values: 0 for rural, 1 for peri-urban, 2 for semi- urban, and 3 for urban. Education level ranges from 0 to 9, where 0 indicates "no formal schooling" and 9 represents "post-graduate" education. Living conditions are scaled from 1 to 5, with 1 corresponding to "very bad" and 5 to "very good."

[5] Due to the wide variety of religions reported in the sample, I cannot list all possible religious affiliations of the respondents here. They can be found in the codebooks of the Afrobarometer surveys.

[6] 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.

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).[7]

Given that the way of European colonial rule, which can also affect industrialization, is associated with pre-slave trade development in Africa (Acemoglu et al., 2001, 2002), the vector $\mathbf{pre\text{–}slave\ trade\ development}_e^{'}$ encompasses malaria ecology of the land ethnic group e inhabited, pre-colonial settlement patterns of ethnic group e,[8] 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.

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 destination of slaves from particular ethnic groups was less predictable. Therefore, the distance to the coast more intuitively captures each ethnic group's exposure to the historical slave trade. A detailed discussion of the instrument's validity is provided in Nunn's paper. Standard errors here are two-way clustered at ethnicity and respondents' current district of residence.

[7] The only discrepancy is that urban or rural residency here is just a dummy variable taking a value of 1 when the respondent lives in urban areas. Different definitions of this variable arise from different survey questions asked in Round 6 (2016) and Round 3 (2005) Afrobarometer survey.

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

5 Main Results

In this section, I present the estimation results of the empirical designs outlined in Subsections 4.1, 4.2, and 4.3. The results demonstrate a robust causal negative impact of the historical slave trade on contemporary levels of industrialization. At the end of the section, I also explore how the legacy of the historical slave trade was transmitted over several centuries.

5.1 Country-level Results

The OLS results for Equation (1) are reported in Table 1. Column (1) presents the model without any control variables. 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 historical the slave trade.

As outlined in the empirical strategy Section 4 (specifically, Subsection 4.1), I employ an instrumental variable approach to address potential endogeneity concerns. Specifically, I instrument $\ln(\text{exports/area})_c$ using the distances from each country to the primary destinations in each of the four major slave trades (i.e., the West Indies and the southern United States). The results of this IV 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 $\ln(\text{exports/area})_c$. The coefficient of interest (β_1) remains significantly negative across all columns. The magnitude of these coefficients is larger than those estimated by OLS, 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 our instrumental variable strategy, as it effectively addresses these 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 (i.e., the West Indies and the southern United States) are predominantly significantly negative,[9] which aligns with the intuitive expectation that countries located farther from the destinations were less likely to be affected by the slave trades. 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 5.2 Table 4 and Appendix Table A.5. In summary, the instrumental variable estimates corroborate the OLS findings, establishing a causal relationship between the contemporary share of employment in industrial sectors and the volume of the historical slave trade.

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 share of employment in industrial sectors in the year 2000 within my country-level sample is only 12.82%. This suggests that the impact of the historical slave trade on industrialization is not only statistically significant but also economically meaningful.

[9]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.

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.

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 (i.e., the West Indies and the southern United States). 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.

5.2 Country-based Individual-level 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.

To address endogeneity concerns, I also employ instrumental variables 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 instrumental variables. The instrumental variable estimation yields slightly more negative coefficients, consistent with the selection problems and measurement error issues previously discussed. To sum up, the instrumental variable estimation at the individual level reinforces the causal relationship between contemporary industrialization and the historical slave trade 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 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 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.

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 (i.e., the West Indies and the southern United States). 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.

5.3 Ethnicity-based Individual-level Results

Surprisingly, when I merge the volume of the historical slave trade through respondents' ethnicity—thereby conducting an ethnicity-based individual-level analysis by estimating 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 finding is that the historical slave trade influenced contemporary industrialization primarily through external factors such as capital accumulation, infrastructure development, and institutional quality, etc. Given that ethnic groups were dispersed across various countries over time, the impact of the historical slave trade on contemporary industrialization cannot be accurately assessed using the volume of the historical slave trade calculated within ethnic groups. This stands in contrast to the effects of the historical slave trade on mistrust, which has been shown to be transmitted mainly through internal factors such as norms and beliefs across generations (Nunn and Wantchekon, 2011).

Moreover, as illustrated in Appendix Tables A.4 (OLS) and A.5 (IV), the positive coefficients on slave exports calculated within ethnic groups persist 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 impact of the historical slave trade on industrialization through external factors is not diminished by the inclusion of slave exports calculated within ethnic groups. Therefore, in the following section, I will explore how one of the external factors, institutional quality, perpetuated the adverse impact of the historical slave trade on contemporary industrialization.

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-slave trade 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-slave trade 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.

6 Mechanisms of Persistence

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

6.1 Background: Poor Institutional Quality in Africa

As discussed in Subsection 5.3, 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 our subsequent analysis related to institutional factors, we briefly review the markedly deficient institutional quality in Africa as follows.

The industrialization process in Africa is frequently marked by significant government intervention. According to Bates (2008) and Bates (2014), 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 sectors were granted production rights. In practice, authoritarian regimes in Africa frequently imposed policies that favored their political allies, thereby consolidating their 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.

6.2 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, 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, Gennaioli and Rainer (2007) provides evidence that pre-colonial institutional centralization has a significantly positive correlation 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.

6.3 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). The estimated coefficient of interest (β_1) for countries with high pre-colonial institutional centralization is insignificant and even exhibits the opposite (positive) sign. In contrast, for countries with low pre-colonial institutional centralization, the estimated coefficient of interest (β_1) is negative, although it remains statistically insignificant due to the smaller sample size. Although imprecisely estimated, the difference between the coefficients provides preliminary evidence on a heterogeneous impact of the historical slave trades on contemporary industrialization across countries with differing levels of

pre-colonial institutional centralization.[10]

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 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 5.2 Table 4 is statistically insignificant (-0.0041, with a standard error of 0.0279).[11] This suggests that the historical slave trade has significantly less influence on the level of 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 perpetuated the historical slave trade's adverse impact 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,

[10]Note that I do not implement an instrumental variable specification in this country-level analysis due to the insufficient number of observations.

[11]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.

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.

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.

7 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 effect's persistence, I illustrate that the adverse impact of the historical slave trade on contemporary industrialization was perpetuated 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 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 effect through external factors, specifically through institutional quality, contrasts with the emphasis on internal norms and beliefs as mechanisms for transmitting the effects of historical shocks noted in Nunn and Wantchekon (2011). 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-slave trade 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-slave trade 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 (i.e., the West Indies and the southern United States). 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.