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Beyond Distance and Tariffs: The Gravity of Institutions in African Trade

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Abstract

This study examines the effect of institutional quality on bilateral trade flows among 37 Sub-Saharan African countries and 124 of their trading partners over the period 2000–2019. Against the backdrop of Africa's persistent trade underperformance relative to the rest of the world, the study aims at; assess the heterogeneous effects of political (governance) institutions on bilateral trade flows; and evaluate the role of economic institutions in shaping bilateral trade in Sub-Saharan Africa. Using the Poisson Pseudo Maximum Likelihood with High-Dimensional Fixed Effects (PPMLHDFE) to estimate the structural gravity model, the study finds that institutional quality exerts significant but heterogeneous effects on bilateral trade flows. Specifically, government effectiveness, regulatory quality, and voice and accountability promote bilateral trade, while control of corruption and rule of law are associated with lower exports but higher imports. Political instability is positively associated with bilateral trade flows. All components of economic institutions are positively related to bilateral trade. These findings contribute to the thin literature on the institutions–trade nexus in Africa by providing the first comprehensive disaggregated analysis of both political and economic institutions using an appropriate estimator that controls for multilateral resistance terms. African countries are therefore urged to pursue deep trade agreements and institutional reforms that improve governance quality to enhance bilateral trade flows.

Keywords: Bilateral Trade, Gravity Model, Institutional Quality, Sub-Saharan Africa
JEL Classification Codes: E02, F10, F12, N77

1. Introduction

It is firmly established in both theoretical and empirical literature that trade enhances economic outcomes. Researchers and policymakers have focused their attention on the determinants of trade flows. Africa's trade performance, however, remains disproportionately low relative to its share of world GDP. According to the World Trade Organization (2018), Africa accounts for only about 2.6% of world merchandise exports despite representing over 16% of the global population. Intra-African trade remains similarly depressed, averaging about 15–17% of total African exports compared to over 60% for Europe and over 50% for Asia (WTO, 2018).

This stark trade underperformance has motivated scholars to examine the structural and institutional determinants of trade flows in the continent. Despite a growing body of research linking institutional quality to trade outcomes globally (de Groot et al., 2004; Levchenko, 2007; Souva & Smith, 2008; Papaioannou, 2009; Dutt & Traca, 2010; de Jong & Bogmans, 2011; Angkinard & Chiu, 2011; Gil-pareja et al., 2017; Akhtaruzzaman et al., 2018; Álvarez et al., 2018; Beverelli et al., 2018; Yushi & Borojo, 2018; Nordås, 2018), little research has been done on institutional quality as the driver of bilateral trade flows specifically in Africa. The impact of economic institutions on trade in Africa is yet to be fully explored.

North (1990) describes institutions in this context as "the rules of the game in a society or, more formally, are the humanly devised constraints that shape human interaction" They are the rules and regulations, norms and conventions that shape the economic, political and social interactions." Institutions could be formal rules (for instance, constitutions, laws, property rights), informal constraints (for example, sanctions, taboos, traditions, customs, norms, conventions, self-imposed codes of conduct), and the features of their enforcement. Institutions (both political and economic institutions) harmonize the actions of actors, prescribe the appropriate behavior, and structure incentives in human exchange. As such, institutions reduce transaction costs, reduce the uncertainty of outcomes of decisions and create a level playing ground for all actors of international trade. Reduction in transaction costs and uncertainties encourages foreign investors and traders to increase trade (de Groot et al. (2004).

In other words, strong political and economic institutions (sustained democracy, preserved property right, rule of law, impartial judiciary, bureaucratic quality, economic freedom, freedom from corruption, et cetera), encourages international trade. For instance, many studies (de Groot et al., 2004; Levchenko, 2007; Souva & Smith, 2008; Papaioannou, 2009; Dutt & Traca, 2010; de Jong & Bogmans, 2011; Angkinard & Chiu, 2011; Gil-Pareja & Martínez-Serrano, 2017; Akhtaruzzaman et al., 2018; Álvarez et al., 2018; Beverelli, Keck, Larch, & Yotov; 2018; Yushi & Borojo, 2018; Nordås, 2018) find that political institutions have a positive impact on trade flows and countries that have strong political institutions attract more trade.

Specifically for Africa, Yushi and Borojo (2019), and Bankole et al. (2014) focused on the nexus between trade and political institutions in aggregate. They failed to consider the components of the political institutions. In such a case, it becomes difficult, if not impossible, to identify the heterogeneous effect of the political institutions on bilateral trade. Some of the components hurt trade while others have a positive effect. This cannot be captured by using the aggregate measure of political institutions. Moreover, the previous studies ignored the nexus between economic institutions and bilateral trade. Although political and economic institutions are closely related, reforms in economic institutions create growth faster than reforms in political institutions do (Kilishi, 2017). Also, these studies failed to apply appropriate techniques because they failed to properly control multilateral resistance terms (MRT) in their analysis. Consequently, their estimates are biased and unreliable (Anderson & Van Wincoop, 2003), and their findings remain less tenable. It is important to study both economic and political institutions as determinants of bilateral trade flows in Africa using appropriate techniques.

Against this backdrop, this study explores the impact of formal institutions, both political and economic, on bilateral trade in Africa using the structural gravity model. The study is motivated by the need to fill critical gaps in the literature: (1) the neglect of economic institutions in Africa-focused trade studies; (2) the use of aggregate institutional indices that obscure heterogeneous effects of specific institutional dimensions; and (3) the failure of prior Africa-focused studies to adequately control for multilateral resistance terms (MRTs). This study distinguishes itself from prior work, including Yushi and Borojo (2018) and Bankole et al. (2015), in four important ways. First, we simultaneously include both political and economic institutions in the structural gravity model, departing from studies that examine only political institutions (Yushi & Borojo, 2019; Bankole et al., 2015) or only economic institutions (Kucharčuková et al., 2012).

Second, we use disaggregated components of institutional quality instead of overall indices, which would otherwise obscure the heterogeneous effects of specific institutional dimensions on bilateral trade. Third, we apply the PPMLHDFE estimator (Larch et al., 2019), which provides consistent estimates in the presence of heteroscedasticity, zero trade flows, and high-dimensional fixed effects, thereby properly accounting for MRTs, a shortcoming in prior Africa-focused gravity models (Anderson & Van Wincoop, 2003). Fourth, instead of consecutive yearly data used in previous studies, we employ 4-year interval panel data to effectively capture the slow-changing dynamics of institutional quality in Africa. The objectives of this study are to: examine the heterogeneous effects of political (governance) institutional quality on bilateral trade flows in Sub-Saharan Africa; and evaluate the role of economic institutional quality in shaping bilateral trade in the region.

2. Literature Review

Understanding the nexus between institutional quality and bilateral trade flows has attracted the global attention of scholars and policymakers. Both theoretical and empirical literature is growing due to an increasing wave of globalization. This section reviews the theoretical foundations and empirical evidence that underpin the study.

2.1 Theoretical Review

The theoretical link between institutions and trade finds its roots in transaction cost economics and new institutional economics. North (1990) argues that institutions, defined as the humanly devised constraints that shape human interaction, reduce transaction costs and uncertainty, thereby facilitating economic exchange. Applied to international trade, well-functioning institutions lower trade costs by enforcing contracts, protecting property rights, and providing regulatory predictability. This theoretical rationale forms the basis of the institutional augmentation of the gravity model (Anderson & Van Wincoop, 2003; de Groot et al., 2004). Belloc (2006) provides a formal theoretical evaluation of the role of domestic institutional environment on trade competitiveness, arguing that institutional design determines relative advantages and disadvantages in international trade through its effects on production and transaction costs.

Levchenko (2007) develops a theoretical model in which institutional quality constitutes a source of comparative advantage: countries with better institutions specialize in and export goods that require more complex contractual arrangements. Similarly, Nunn (2007) shows that countries with better contract enforcement have a comparative advantage in industries that rely heavily on relationship-specific investments. These theoretical frameworks collectively provide the justification for incorporating institutional quality indicators directly into the structural gravity model, as implemented in this study. The structural gravity model of Anderson and Van Wincoop (2003) serves as the theoretical backbone of the empirical analysis: it provides a theoretically grounded and econometrically tractable framework for estimating bilateral trade flows while properly accounting for multilateral resistance terms, a key innovation of this study over earlier Africa-focused work.

2.2 Empirical Review

Many empirical studies were carried out on bilateral trade-institutions nexus across the globe. For example, Zeynalov (2016) examines the effect of institutions on international trade in the resource-rich country of Azerbaijan and submits that although the similarity in the level of income will boost international trade, the main determinant is the quality of institutions. The study revealed that a strong rule of law and effective control

of corruption boosts confidence and promotes international trade. Therefore, the study observed that reliable countries (countries with strong institutions) tend to trade more with each other and less with unreliable countries (countries with weak institutions.)

Moreover, unreliable countries actively trade with each other and less with reliable ones. Thus, a large deviation in the level of institutional quality reduces bilateral trade across countries. The fundamental question is why African countries do not trade more with other African countries despite the existence of a similar level of institutional quality (weak institutions) and the fact that most are resource-rich countries. This is an indication that the findings of Zeynalov (2016) cannot be generalized to the African situation of international trade. Similarly, Soeng and Cuyvers (2017) observed that domestic institutions such as regulatory quality, rule of law, control of corruption, government effectiveness, and political stability promote export performance in Cambodia.

Furthermore, some literature has assessed the link between institutions and different categories of exports. Meon and Sekkat (2008) assess the extent of the institutional framework on total exports, manufactured goods export, and non-manufactured goods exports, and indicates that the quality of institutions positively affects only manufactured good exports. The quality of institutions of the domestic countries does not significantly affect total exports and non-manufactured goods exports. Further, Kucharčuková et al. (2012) use Poisson Pseudo Maximum likelihood (PPML) and Tobit estimates of the gravity model, to examine the effect of the quality of economic institutions on international trade of southeast Europe (SEE) and the Commonwealth of Independent States (CIS) countries. It finds that the low quality of economic institutions in the SEE and CIS countries contributes to the low international trade performance of the countries.

Nonetheless, there is no consensus on the kind of institution that significantly affect trade. Souva et al. (2008) argue that the promotion of trade comes from market protecting (economic) institutions, property rights, banking, and insurance laws, and the common standard of measurement. Political and other kinds of institutions do not matter for trade. Balding (2011) reexamines the nexus between international trade and democracy with a sample of 150 countries over the 1950-1999 period using the gravity model. The author argues that democracy does not have a significant impact on international trade. However, there is agreement that the quality of governance does have a broad economic and statistical impact on international trade.

Recently, Aziz et al. (2018) finds that strong political institutions enhance vertical inter-industry trade (IIT), but do not increase horizontal inter-industry trade (IIT). Osabuohien et al. (2018) show that good institutions reduce protectionism. The country's level of protectionism

depends largely on the level of institutional development. Rin et al. (2018) find that trust enhances Foreign Direct Investment and increases the probability of co-investment and trade with partners across Europe. Regarding institutional differences, Karam and Zaki (2018) find that institutional gaps have a significant negative impact on the trade flows of MENA countries. The authors argue that the level of institutional quality does not matter but the gap between the institutional qualities of trading countries does matter.

Consequently, it is argued that the smaller the institutional gap, the more countries engage in trade. The effect of institutional reform was also examined. For instance, Angkinand and Chiu (2011) evaluate the effect of permanent and temporary institutional reforms (political, legal, and administrative reforms) on trade flows of 62 countries over the period 1980-to 2008. The study found that institutional reforms, especially permanent ones, enhance bilateral trade flows.

Despite the plethora of studies on the relationship between institutions and trade, very few have studied the African continent regarding the issue. Jiang and Borojo (2018) examine the effect of institutions, transport efficiency, and physical and communication infrastructure on overall and intra-African trade. The study used a sample of 44 African countries with 173 trade partners from 2000 to 2014. It finds that institutions robustly determine international trade flows.

However, the study used an index of institutional quality and thus failed to identify the particular institutional characteristic that matters for international trade. In addition, it considered overall trade rather than bilateral imports and exports individually. This approach makes it difficult, if not impossible, to proffer specific policy suggestions regarding the form of institutions that require attention for the promotion of bilateral trade flows in the continent. The study used the Heckman two-step procedure instead of PPML, which has become an outstanding estimation of gravity model due to its desirable properties.

The shortcoming of the Heckman two-step procedure is that it imposes identification restrictions that are difficult to find. It is more effective when the dependent variable (trade flow) is censored. Additionally, using per capita GDP instead of aggregate nominal GDP will not adequately account for the Multilateral Resistance term. The estimates are therefore likely to be misleading (Anderson & Van Wincoop, 2003; Shepherd, 2013). Drawing lessons from this extensive body of literature, several important insights emerge: (i) institutional quality, both political and economic, matters for trade, though the direction and magnitude of effects vary considerably across institutional dimensions, country groups, and estimation methods; (ii) aggregate institutional indices mask important heterogeneity across specific institutional components that may have opposing effects on trade; (iii) the failure to properly account for multilateral resistance terms in the gravity

model leads to biased and inconsistent estimates, undermining the reliability of prior findings; and (iv) studies focused on Africa have largely neglected economic institutions and relied on suboptimal estimation strategies.

These gaps motivate the present study, which contributes to the literature by: providing the first comprehensive disaggregated analysis of both political and economic institutional dimensions in a single gravity framework for Sub-Saharan Africa; applying the state-of-the-art PPMLHDFE estimator that properly controls for MRTs and addresses zero trade flows; and using 4-year interval panel data to capture the slow-changing nature of institutional quality. To fill this research gap, this study explores the impact of formal institutions (both political and economic institutions) on bilateral trade in sub-Sahara Africa using the PPML estimation of the Structural Gravity Model.

3. Data and Methods

3.1 Data and Sources

The data used for empirical analysis are gathered from several sources. Bilateral trade data is from the International Monetary Fund (IMF) Direction of Trade Statistics (DOT), and the data on GDP is obtained from World Bank World Development Indicators (WDI). The data covers the period from 2000 to 2019 and includes 37 Sub-Saharan African countries and 124 of their trading partners. Significant dynamics in the trade flow of the African continent existed in this period. However, the quality of institutions often changes gradually and the effect on bilateral trade may not be simultaneous. Therefore, an interval of four years is used to properly capture the dynamics of institutional quality indicators and their effect on bilateral trade. Although zero trade flows are handled properly by the PPML technique, the number of trading partners is limited to 124 to minimize zero trade flows.

Indicators of basic gravity variables, physical (geographical) distance, colonial connection, and language proximity are taken from the CEPII database while the Regional Trade Agreements data is obtained from Mario Larch's Regional Trade Agreements database (https://www.ewf.uni-bayreuth.de/en/research/RTA-data/index.html). To account for the quality of political institutions, the data on the indicators of political (governance) institutional quality are gathered from the World Bank World Governance Indicators (WGI). The WGI project reports aggregate and individual governance indicators for over 200 countries and territories, based on over 30 underlying data sources from surveys of households, firms, and non-governmental organizations (Kaufmann et al., 2011).

Each indicator is measured as a standardized score in standard normal units ranging from approximately -2.5 to 2.5, with higher values indicating better institutional outcomes. The six WGI indicators used in this study are: control of corruption (CC), government effectiveness (GE),

regulatory quality (RQ), political stability and absence of violence/terrorism (PS), rule of law (RL), and voice and accountability (VA). What distinguishes the WGI from other governance datasets, such as the ICRG or Freedom House, is its composite nature, drawing on multiple independent data sources using an unobserved components model, which reduces measurement error and increases cross-country comparability. This makes it particularly suitable for panel gravity analysis involving diverse country pairs (Kaufmann et al., 2011).

The Heritage Foundation Index of Economic Freedom database is used to capture the indicators of the quality of economic institutions. The components of the economic institutions included are; property rights, government integrity, government spending, business freedom, monetary freedom, investment freedom, and financial freedom. The components, rather than the overall score, are used to examine the effect of specific aspects of institutional quality on trade flows. The use of the overall score could make it difficult to understand the effect of the specific institutional factors on the bilateral trade flows. Each of the components is measured on scores ranging from 0 to 100, with higher scores indicating better quality institutions (Miller et al., 2019).

3.2 Theoretical Framework and Model Specification

The theoretical framework adopted in this study is grounded in the new trade theory and new institutional economics. North (1990) provides the institutional foundations: institutions reduce transaction costs and uncertainty, thereby lowering trade costs and facilitating bilateral exchange. Levchenko (2007) and Nunn (2007) demonstrate formally that institutional quality constitutes a source of comparative advantage, with well-institutionalized countries specializing in and exporting complex goods that require contract enforcement. This theoretical rationale directly motivates the inclusion of institutional quality variables in the gravity framework. Building on these theoretical foundations, we adopt Anderson and Van Wincoop's (2003) structural gravity model which incorporates trade costs to derive the following structural relationship:

$$X_{ij} = \frac{Y_i E_j}{Y}\left(\frac{\tau_{ij}}{\pi_i \rho_j}\right)^{1-\sigma} \quad (4)$$

$$\pi_i^{1-\sigma} = \sum\left(\frac{\tau_{ij}}{\rho_j}\right)^{1-\sigma}\frac{E_j}{Y} \quad (5)$$

$$\rho_j^{1-\sigma} = \sum\left(\frac{\tau_{ij}}{\pi_i}\right)^{1-\sigma}\frac{Y_i}{Y} \quad (6)$$

Where;

$X_{ij} =$ Nominal value of bilateral trade from country i to country j

$Y =$ World GDP,

$Y_i =$ Nominal GDP of country i (exporter),

$E_j =$ expenditure of country j (Partner),
$\pi_i =$ outward Multilateral Resistance term,
$\rho_j =$ Inward Multilateral Resistance term,
$\tau_{ij} =$ Trade cost (trade barriers).

Sigma (σ), the elasticity of substitution of CES utility function is expected to be greater than 1. Otherwise, the trade cost effect on bilateral trade cannot be negative. Taking the logs of the structural gravity equation in (1), the following specification is obtained:

$$logX_{ij} = logY_i + logE_j - logY + (1-\sigma)\left[log\tau_{ij} - log\pi_i - log\rho_j\right] \quad (7)$$

Consequently, including t, to capture the period, and adopting the Poisson Pseudo-Maximum Likelihood with High Dimensional Fixed Effect (PPMLHDFE) estimation technique, the model is econometrically specified as follows:

$$X_{ijt} = \gamma_i + \mu_j + \beta_1 logY_{it} + \beta_2 logE_{jt} + \beta_3 log\tau_{ijt} + \mu_{ijt} \quad (8)$$

Following Hummels (2001) and Feenstra (2016), we used the exporter and importer fixed effects (γ_i and μ_j) to account for MRTs (π_i and ρ_j). However, Yotov et al. (2016) noted that Y, Y_i, E and $(1-\sigma)\left(log\pi_i - log\rho_j\right)$ are captured by Multilateral Resistance Terms (MRT). That is, the GDPs are imbedded the MRTs (π_i and ρ_j) properly accounted for by the exporter-time and importer-time fixed effects (γ_i and μ_j. Therefore, following Larch, *et al* (2019), we specify the empirical model as follows;

$$X_{ij,t} = exp\left(\tau_{ij,t}\theta + IQ_{i,t}\varphi + \gamma_i + \mu_j\right) + \varepsilon_{ij,t} \quad (9)$$

$$i = 1, 2 \ldots\ldots 37; j = 1, 2, \ldots\ldots 124; t =, 2000, 2004, \ldots\ldots 2019$$

We further specified the trade barriers, τ_{ij} (the trade cost) to include physical distance and geographical contiguity, cultural distance (e.g. common official language), colonial link, and commercial association (regional trade agreement). Accordingly, τ_{ij} is further specified as follows:

$$\tau_{ij,t} = \gamma logDist_{ij} + \delta Colink_{ij} + \vartheta lang_{ij} + \varphi rta_{ij} \quad (10)$$

$IQ_{i,t}$ represents a vector of the indicators of institutional quality of country i at t.

We adopt the structural gravity model due to having empirical success with aggregate and disaggregated data (Feenstra, *et al*, 2001; Head & Mayer, 2014), sectoral gravity for goods trade (Anderson & Yotov, 2010), sectoral gravity for service trade (Anderson et al., Yotov, 2015; Nordås, 2018) as well as sectoral gravity for manufacturing, agriculture, mining, sectors (Aichele et al., 2014). In addition, the Structural Gravity Model has been theoretically examined and proved satisfactory (Feenstra, 2015).

3.3 Method of Estimation

The empirical estimations of this study rely on the PPMLHDFE technique. The PPML technique deals with the problem of zero trade flows and provides consistent and unbiased estimates in the presence of

Heteroscedasticity and Multicollinearity (Silva & Tenyero, 2010). With the recent improvement, the PPMLHDFE estimator becomes even more desirable because it enables the concurrent inclusion of multidimensional fixed effects and country-specific attributes such as institutional quality. Thus, it properly accounts for MRTs and solves the problems of zero trade flows, heteroscedasticity, and controls for heterogeneity and endogeneity (Silva & Tenreyro, 2010; Larch et al., 2019; Correia et al., 2019).

The desirable properties make the PPML estimator popular for the estimation of structural gravity models in multiple studies (Siliverstovs & Schumacher, 2009; Silva & Tenyero, 2010; Westerlund & Wilhelmsson, 2011; Silva & Tenyero, 2015; Alvarez et al., 2018; Beverelli et al., 2018). Therefore, the PPMLHDFE estimator is suitable for all estimations in this study for the following reasons: First, the fact that there are zero trade flows in the data. Many Sub-Saharan African countries do not trade with some of the trading partners. Second, panel data is prone to the problem of heteroscedasticity, and the inclusion of institutional factors in the model could prevent proper control for MRTs in previous estimators (OLS, PPML, etc). These problems are sufficiently addressed by the PPMLHDFE technique.

4. Results and Discussion

4.1 Relationship between Institutional Quality and Bilateral Trade Flows

The relationship between the average level of institutional quality and bilateral trade flows has been examined and the result is displayed in Figure 1. It shows the relationship between bilateral trade and the quality of economic and political institutions. It indicates a positive relationship between average bilateral trade (log of average bilateral trade) and the average quality of economic and political institutions. For instance, Burundi, Eritrea, Comoros, Sao Tome and Principe, Zimbabwe, et cetera, with lower values of institutional indicators, have lower bilateral trade.

Conversely, countries such as Mauritius, Botswana, Namibia, Eswatini (formerly Swaziland), and South Africa, with higher values of institutional quality, have higher average bilateral trade. That is, on average, the quality of both political and economic institutions is positively related to aggregate bilateral trade. Meanwhile, the relationship is stronger for economic institutions (16 %) than for political institutions (1.7%). This implies a direct relationship between economic institutions and bilateral trade. Improvement in the business environment, property rights, and contract enforcement, fewer trade restrictions, price stability et cetera, will directly affect the trade flows, while improvement in the political-institutional environment is likely to affect trade flows via some intermediate variables. However, the graphical analysis does not indicate the association of each of the components of institutional quality with trade flows. This is done with the PPML estimates of the structural gravity model.

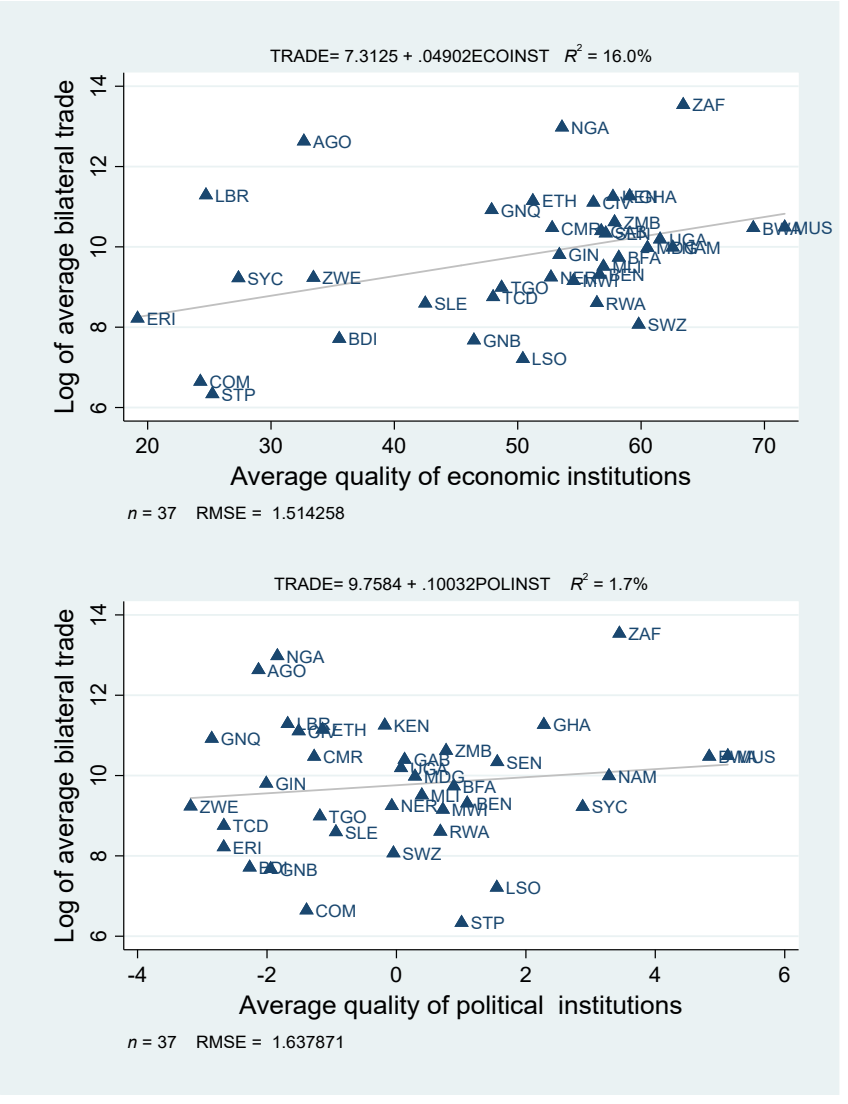

Figure 1: Relationship between Institutional Quality and Aggregate Trade Flows
Source: Author's Computation.

Table 2: PPMLHDFE Estimates of the Baseline Structural Gravity Model

	Dependent variables		
	(1)	(2)	(3)
Independent variables	Exports	Imports	Total trade
Distance(log)	-0.000147***	-5.46e-05***	-9.54e-05***
	(1.02e-05)	(5.61e-06)	(5.32e-06)
Common official language	0.594***	0.917***	0.643***
	(0.0418)	(0.0364)	(0.0315)
Colonial link	0.360***	0.694***	0.533***
	(0.0445)	(0.0399)	(0.0372)
Common colonizer after 1945	0.198***	0.522***	0.466***
	(0.0520)	(0.0324)	(0.0349)
Free-trade agreement dummy (RTA)	0.962***	0.0783***	0.485***
	(0.0416)	(0.0188)	(0.0241)
Constant	0.684***	-0.405***	0.641***
	(0.0800)	(0.0467)	(0.0437)
Observations	384,319	392,496	393,125
Exporter time fixed effects	Yes	Yes	Yes
Importer time fixed effects	Yes	Yes	Yes
Wald statistics	1260.47	2311.80	2766.50
Probability of Wald statistics	[0.0000]	[0.0000]	[0.0000]
Pseudo R-square	0.6832	0.6239	0.6852

Note: Robust standard errors in parentheses *** and [ ] denote 1%, level of significance, and P-values respectively.
Source: Author's Computation.

4.2 Baseline Structural Gravity Models

Table 2 contains the result of the baseline structural gravity model. The estimates captured only the standard gravity variables, geographical distance (simple distance), colonial tie (common colonizer after 1945, colonial link), cultural distance (common official language), and commercial link (Free-trade agreement) determinants of bilateral trade flows (exports, imports, and aggregate bilateral trade). Multilateral resistance terms captured by the exporter-time fixed effects and importer-time fixed effects are included in the model. The estimates for exports, imports, and total bilateral trade are presented in columns 1, 2, and 3 respectively. The results indicate that colonial relationships, common official language, and free trade agreements have a significant positive impact on bilateral trade flows. This implies that countries that have a colonial relationship, cultural affinity in terms of common official language, or/and engage in free trade agreements more commonly trade among themselves than with other countries.

On the other hand, geographical distance hampers trade flow among the countries. These findings are robust to imports, exports, and total bilateral trade and thus conform to the theoretical and empirical findings of previous studies regarding the basic gravity variables (Linder, 1961; Tinbergen, 1962; Linneman, 1966; Anderson, 1979; Brodzicki, 2009; Angkinard & Chiu, 2011; Gil-pareja et al., 2017; Alvarez et al., 2018). This confirms that the study included a solid representative sample. However, other factors such as institutional quality discussed in the subsequent sections might be responsible for the recent rise in the trade between Asian Tigers and Africa

Table 3: PPMLHDFE Estimates of Political Institutions and Bilateral Trade

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
	Dependent Variable: Bilateral Export						Dependent Variable: Bilateral import						Dependent Variable: Bilateral total trade					
Independent Variable: Distance(lng)	1.19e-05** (5.87e-06)	6.55e-07 (6.31e-06)	1.33e-05*** (3.32e-06)	-8.47e-07 (8.49e-06)	8.80e-06 (8.06e-06)	1.39e-06 (8.41e-06)	7.45e-06** (3.54e-06)	-9.09e-06** (3.87e-06)	2.09e-05*** (3.31e-06)	-7.06e-06* (3.81e-06)	5.76e-06 (3.59e-06)	-2.28e-05 (3.59e-06)	9.84e-06** (4.07e-06)	-3.39e-06 (4.36e-06)	1.81e-05*** (3.77e-06)	-2.85e-06 (4.39e-06)	7.96e-06* (4.12e-06)	4.69e-08 (4.20e-06)
Common official language	0.342*** (0.0320)	0.344*** (0.0331)	0.338*** (0.0312)	0.354*** (0.0328)	0.347*** (0.0323)	0.358*** (0.0328)	-0.0315 (0.0325)	-0.0662** (0.0322)	-0.0252 (0.0323)	-0.0198 (0.0318)	-0.0141 (0.0327)	0.0201 (0.0319)	0.166*** (0.0374)	0.145*** (0.0378)	0.161*** (0.0367)	0.175*** (0.0370)	0.165*** (0.0374)	0.199*** (0.0370)
Colonial link	2.041*** (0.0850)	1.960*** (0.0846)	2.075*** (0.0811)	1.946*** (0.0845)	2.013*** (0.0850)	1.954*** (0.0854)	2.349*** (0.0440)	2.337*** (0.0451)	2.410*** (0.0453)	2.304*** (0.0446)	2.331*** (0.0440)	2.282*** (0.0447)	2.173*** (0.0489)	2.132*** (0.0486)	2.234*** (0.0470)	2.111*** (0.0478)	2.161*** (0.0480)	2.103*** (0.0454)
Common colonizer after 1945	0.0365	-0.0318	0.0197	-0.0311	0.0293	-0.0274	-0.516***	-0.649***	-0.423***	-	-	-	-0.202***	-	-0.169***	-	-0.218***	-
										0.618***	0.555***	0.590***		0.301***		0.283***		0.276***
Free-trade agreement (RTA)	(0.0900) 1.362*** (0.0543)	(0.0935) 1.187*** (0.0623)	(0.0874) 1.404*** (0.0559)	(0.0920) 1.182*** (0.0581)	(0.0908) 1.317*** (0.0548)	(0.0912) 1.210*** (0.0557)	(0.0359) 0.847*** (0.0368)	(0.0356) 0.365*** (0.0383)	(0.0354) 0.876*** (0.0358)	(0.0356) 0.458*** (0.0373)	(0.0361) 0.615*** (0.0371)	(0.0356) 0.503*** (0.0368)	(0.0643) 1.022*** (0.0411)	(0.0665) 0.788*** (0.0413)	(0.0652) 1.148*** (0.0401)	(0.0658) 0.836*** (0.0439)	(0.0652) 0.991*** (0.0415)	(0.0644) 0.872*** (0.0408)
Control of corruption	-0.470*** (0.0443)						0.388*** (0.0226)						-0.0214 (0.0314)					
Government effectiveness		0.144*** (0.0407)						0.945*** (0.0252)						0.557*** (0.0312)				
Political stability			-0.555*** (0.0279)						-0.280*** (0.0130)						-0.418*** (0.0184)			
Regulatory quality				0.228*** (0.0374)						0.969*** (0.0267)						0.595*** (0.0313)		
Rule of law					- 0.302*** (0.0369)						0.462*** (0.0210)						0.0792*** (0.0284)	
Voice and accountability						0.108*** (0.0301)						0.817*** (0.0243)						0.443*** (0.0264)
Constant	-4.337***	- 3.790***	-4.388***	- 3.742***	- 4.192***	- 3.848***	-3.481***	-2.966***	-3.065***	- 3.057***	- 3.381***	- 3.200***	-3.157***	- 2.650***	-3.473***	- 2.688***	-3.072***	- 2.856***
	(0.0512)	(0.0330)	(0.0384)	(0.0485)	(0.0473)	(0.0422)	(0.0285)	(0.0321)	(0.0251)	(0.0306)	(0.0293)	(0.0258)	(0.0340)	(0.0353)	(0.0260)	(0.0333)	(0.0334)	(0.0286)
Observations	393,125	393,125	393,125	393,125	393,125	393,125	393,125	393,125	393,125	393,125	393,125	393,125	393,125	393,125	393,125	393,125	393,125	393,125
Exporter time fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Importer time fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Wald statistics	7140	6466.65	6730.63	6094.79	6961.28	6490.78	8353.05	10149.17	7667.03	10035.41	8704.42	10106.97	7955.00	8846.88	8853.41	9047.08	7955.91	8487.28
Probability of Wald statistics	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Pseudo R-square	0.0714	0.0646	0.0848	0.0659	0.0674	0.0644	0.0575	0.0895	0.0568	0.0888	0.0401	0.0834	0.0617	0.0754	0.0751	0.0771	0.0619	0.0727

Note: Robust standard errors in parentheses ***, **, and * denote 1%, 5%, and 10% level of significance respectively
Source: Author's Computation.

4.3 Effects of Political (Governance) Institutions on Bilateral Trade

Table 3 contains the estimates of the PPMLHDFE estimates of the structural gravity model augmented with the indicators of the quality of political institutions. The results show that most of the components of political institutions are positively related to bilateral trade flows. Hence, good political institutions promote trade. The striking exceptions are control of corruption, rule of law, and political stability which have significant negative effects on the trade. While control of corruption and rule of law have a significant negative impact on export, political stability is negatively related to bilateral export, import, and total trade.

Based on the theoretical predictions of North (1990), Levchenko (2007), and Anderson and Van Wincoop (2003), the a priori expectation is that better governance and stronger institutional quality should reduce trade costs and promote bilateral trade flows. Accordingly, positive coefficients are expected for government effectiveness, regulatory quality, voice and accountability, rule of law, and control of corruption. Negative coefficients are expected for political instability (political violence and armed conflict), as violence disrupts productive capacity and trade. For economic institutions, all components, property rights, government integrity, government spending, business freedom, monetary freedom, investment freedom, and financial freedom, are expected to carry positive signs, consistent with the argument that stronger economic institutions lower transaction costs and improve the business environment for trade. The PPMLHDFE estimator employed here does not rely on eigenvalue-based diagnostics; rather, model fit is assessed using Wald statistics (which test the joint significance of all regressors), pseudo R-squared values, and consistency of results across the three dependent variable specifications (exports, imports, and total trade).

This is an indication that the success of anti-corruption policies and a strong legal system that ensures strict adherence to rule of law create export trade frictions in the continent. It confirms the theory that corruption lubricates the fabrics of trade and allows the speedy completion of contracts and transactions. The more corruption is reduced in administration and companies, the slower the process of export trade becomes. This does not necessarily mean that rule of law is bad for African economies. Rather, it implies the exploitation of the continent by her trading partners due to a weak judicial system and loopholes in the enforcement of contracts. For example, Grauwe et al., (2012) found that China imports more often from African countries with weak institutions than from those with stronger institutions.

Another remarkable finding is the statistically significant inverse effect of political stability on bilateral trade. The plausible explanation of the seemingly counterintuitive finding is that political violence and armed conflicts destroy productive capacity and hinder the inflow of foreign direct investment in Africa. Consequently, the African countries rely on imports for domestic consumption. Equally, political crisis necessitates higher government procurement of military equipment to fight and forestall tranquility. Thus, more natural resources are exported to raise funds. Hence, conflict in the continent promotes bilateral trade.

Succinctly, the quality of political (governance) institutions significantly determines the flow of bilateral trade in Sub-Sahara Africa.

Table 4: PPMLHDFE Estimates of Economic Institutions and Bilateral Trade

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)
		Dependent Variable: Bilateral Export						Dependent Variable: Bilateral import							Dependent Variable: Bilateral trade						
Independent Variables																					
Distance (log)	2.81e-06	4.94e-06	-5.42e-06	4.02e-06	-1.10e-06	3.70e-06	-1.73e-06	6.22e-06*	1.77e-05***	-2.84e-06	1.56e-05***	-1.52e-06	1.36e-05***	7.26e-06**	4.67e-06	1.14e-05***	-3.86e-06	9.88e-06**	-1.22e-06	8.71e-06**	2.85e-06
	(6.35e-06)	(6.04e-06)	(6.77e-06)	(6.14e-06)	(6.44e-06)	(6.23e-06)	(6.32e-06)	(3.60e-06)	(3.38e-06)	(3.80e-06)	(3.43e-06)	(3.75e-06)	(3.50e-06)	(3.57e-06)	(4.23e-06)	(4.00e-06)	(4.49e-06)	(4.06e-06)	(4.35e-06)	(4.13e-06)	(4.18e-06)
Common official language	0.349***	0.344***	0.348***	0.351***	0.348***	0.348***	0.357***	-0.0240	-0.00331	-0.0307	-0.0214	-0.0385	-0.00197	-0.0201	0.169***	0.160***	0.163***	0.169***	0.161***	0.169***	0.173***
	(0.0528)	(0.0522)	(0.0532)	(0.0524)	(0.0531)	(0.0527)	(0.0530)	(0.0328)	(0.0324)	(0.0319)	(0.0323)	(0.0324)	(0.0326)	(0.0325)	(0.0376)	(0.0370)	(0.0374)	(0.0370)	(0.0377)	(0.0373)	(0.0374)
Colonial link	1.972***	1.989***	1.969***	1.984***	1.969***	1.973***	1.969***	2.377***	2.408***	2.366***	2.388***	2.381***	2.379***	2.383***	2.165***	2.194***	2.162***	2.180***	2.166***	2.170***	2.169***
	(0.0660)	(0.0652)	(0.0652)	(0.0653)	(0.0657)	(0.0662)	(0.0656)	(0.0449)	(0.0438)	(0.0446)	(0.0439)	(0.0448)	(0.0443)	(0.0443)	(0.0495)	(0.0487)	(0.0485)	(0.0488)	(0.0491)	(0.0493)	(0.0489)
Common colonizer after 1945	-0.00181	0.00745	-0.00451	0.0222	-0.00417	-0.00109	-0.00677	-0.551***	-0.414***	-0.545***	-0.419***	-0.586***	-0.470***	-0.560***	-0.251***	-0.175***	-0.263***	-0.170***	-0.280***	-0.210***	-0.285***
	(0.0917)	(0.0908)	(0.0911)	(0.0911)	(0.0925)	(0.0898)	(0.0932)	(0.0359)	(0.0354)	(0.0348)	(0.0352)	(0.0356)	(0.0350)	(0.0355)	(0.0647)	(0.0631)	(0.0638)	(0.0632)	(0.0650)	(0.0628)	(0.0649)
Free-trade agreement (RTA)	1.226***	1.243***	1.093***	1.242***	1.153***	1.244***	1.089***	0.598***	0.786***	0.474***	0.778***	0.457***	0.731***	0.548***	0.920***	1.018***	0.793***	1.014***	0.811***	0.993***	0.824***
	(0.0574)	(0.0547)	(0.0574)	(0.0552)	(0.0608)	(0.0551)	(0.0599)	(0.0372)	(0.0360)	(0.0371)	(0.0361)	(0.0377)	(0.0361)	(0.0363)	(0.0416)	(0.0388)	(0.0413)	(0.0391)	(0.0434)	(0.0393)	(0.0418)
Property rights	0.00162*							0.0172***							0.00935***						
	(0.000977)							(0.00593)							(0.00744)						
Government spending		0.00334***							0.00765***							0.00546***					
		(0.0005							(0.0003							(0.0003					

	04)							18)							44)							
Business freedom			0.0176***							0.0370***							0.0268***					
			(0.00121)							(0.00117)							(0.00109)					
Monetary freedom				0.00917***							0.0115***							0.0103***				
				(0.00076)							(0.00048)							(0.00046)				
Government integrity					0.00965***							0.0331***							0.0215***			
					(0.00130)							(0.00073)							(0.00079)			
Investment freedom						-0.00401							0.00748***							0.00347***		
						(0.00718)							(0.00492)							(0.00524)		
Financial freedom							0.0178***							0.0260***								0.0219***
							(0.00852)							(0.00785)								(0.00710)
Constant	-3.966***	-4.166***	-4.747***	-4.555***	-4.133***	-3.907***	-4.602***	-4.238***	-4.317**	-5.574***	-4.548***	-4.539***	-4.057***	-4.768***	-3.395***	-3.539***	-4.424***	-3.851***	-3.629***	-3.278***	-3.983***
	(0.0414)	(0.0496)	(0.0648)	(0.0568)	(0.0452)	(0.0432)	(0.0502)	(0.0303)	(0.0321)	(0.0664)	(0.0416)	(0.0334)	(0.0312)	(0.0414)	(0.0324)	(0.0345)	(0.0606)	(0.0403)	(0.0358)	(0.0323)	(0.0404)
Observations	393,125	393,125	393,125	393,125	393,125	393,125	393,125	393,125	393,125	393,125	393,125	393,125	393,125	393,125	393,125	393,125	393,125	393,125	393,125	393,125	393,125
Exporter time fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Importer time fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Wald statistics	6465.16	5867.24	6253.89	5932.42	6269.80	6318.74	6318.91	9344.00	8363.68	9608.82	8196.96	10710.02	7828.25	9158.84	8045.90	7859.11	8825.03	8006.45	8622.29	7889.17	9258.20

Probability of Wald statistics	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Pseudo R-square	0.0639	0.0645	0.0718	0.0672	0.0657	0.0638	0.0732	0.0605	0.0550	0.0825	0.0567	0.0752	0.0534	0.0720	0.0646	0.0638	0.0809	0.0664	0.0724	0.0621	0.0776		

Note: Robust standard errors in parentheses ***, **, and * denote 1%, 5%, and 10% level of significance respectively
Source: Author's Computation.

4.4 Effects of Economic Institutions on Bilateral Trade

To evaluate the effect of economic institutions on bilateral trade flows, the structural gravity model includes seven (7) components of economic institutions. The estimates are shown in table 4. Exporter-time fixed and importer-time fixed effects are also included to control for outward and inward multilateral resistance terms, respectively. The results indicate that all components of economic institutions have a significant positive effect on exports, imports, and overall bilateral trade. The only exception is the nexus between investment freedom and bilateral export, which is negative but statistically insignificant.

Thus, the results imply that the stronger the economic institutions in African countries, the more they participate in global trade. For instance, the protection of property rights and less risk of expropriation encourages the acquisition of physical properties and investment in the production of goods and services. This will enhance bilateral trade flows between Africa and the rest of the world. Similarly, investment freedom attracts foreign direct investment to bridge the infrastructure deficit in Africa. Therefore, bilateral trade flows (imports, exports, and total trade) are positively affected when firms and individuals freely invest resources in domestic and international economic activities.

Moreover, government spending, business freedom, monetary freedom, government integrity, and financial freedom positively influence exports, imports, and aggregate trade. This suggests that public trust in government officials, transparency in policymaking, and the absence of corruption enable infrastructural development to encourage bilateral trade. In addition, mutual public trust among national governments boosts engagement in bilateral trade. The result further infers that banking efficiency and a banking sector that is free from government interference lessens the cost of borrowing and ensures easy access to credit. This encourages domestic investment and enhances trade flows. Similarly, a conducive business environment attracts foreign investment and increases domestic production.

The magnitudes of the coefficients show that Business freedom has more impact than other components of economic institutions on imports, and total trade while government integrity has the highest impact on total trade. The effect of the economic institutions is greater on imports than exports and aggregate trade (see table 4). In short, the findings robustly show that the quality of economic institutions has significant heterogeneous effects on bilateral trade flows in Africa.

4.5 Discussion of Findings

The findings of this study broadly align with and extend the existing empirical literature on the institutions-trade nexus. With respect to the first objective, the results confirm that political (governance) institutional quality exerts heterogeneous effects on bilateral trade flows in Sub-Saharan Africa. Specifically, government effectiveness, regulatory quality, and voice and accountability are found to promote bilateral trade. This is consistent with the findings of Zeynalov (2016) and Soeng and Cuyvers (2017), who similarly document that strong governance institutions, particularly regulatory quality and government effectiveness, foster trade performance. The positive effect of voice

and accountability aligns with the broader argument that political freedoms and democratic accountability reduce uncertainty and lower transaction costs in trade (Angkinand & Chiu, 2011).

In contrast, control of corruption and rule of law are associated with lower exports but higher imports. This counterintuitive finding is consistent with the argument advanced by De Grauwe et al. (2012), who found that China tends to import more from African countries with weaker institutions. It also resonates with Dutt and Traca (2010), who document that corruption can act as a lubricant that facilitates trade by greasing administrative bottlenecks. The finding that political instability positively associates with bilateral trade flows echoes the argument that political crises compel higher government procurement of military equipment and intensify import dependency for domestic consumption, a finding that underscores the paradox of conflict-driven trade (Karam & Zaki, 2018).

Regarding the second objective, the results confirm that all components of economic institutional quality positively and significantly promote bilateral trade in Sub-Saharan Africa. These findings are consistent with Souva et al. (2008) and Kučarčuková et al. (2012), who argue that market-protecting economic institutions, including property rights, banking laws, and business freedom, are among the most robust drivers of international trade. The strong positive effect of financial freedom and investment freedom corroborates the findings of Méon and Sekkat (2008) and Osabuohien et al. (2018), who document that reducing institutional barriers to investment and financial flows significantly enhances trade competitiveness. Collectively, these findings reinforce the conclusion that institutional quality is not a monolithic determinant of trade; rather, different institutional dimensions interact with trade through distinct channels, thereby necessitating a disaggregated, component-level analysis as adopted in this study.

5. Conclusion and Policy Recommendations

This study examines the effect of institutional quality on bilateral trade flows in Africa, estimating Augmented Structural Gravity Models using the PPMLHDFE estimator developed by Larch et al. (2019). The baseline results confirm that colonial ties, common official language, and regional trade agreements significantly promote bilateral trade, while geographical distance inhibits it—findings consistent with the broader gravity literature. These results validate the representativeness of the sample and provide a solid foundation for the augmented specifications.

The study finds that good economic institutions, in the form of protected property rights, government integrity, government spending, investment, and economic freedom concerning business, monetary, and financial activities positively influence bilateral trade flows in Africa.

The study further evinces that government effectiveness, regulatory quality, freedom of speech, and accountability promote bilateral trade flows. This is an indication that the effectiveness and efficiency of public policies as well as

the credibility of government increase development and encourage trade to bridge the infrastructural deficit. Construction of roads, bridges, railways, airports, hospitals, et cetera, translates to more trade activity in capital goods and heavy construction equipment. The findings further indicate that strict adherence to rule of law and control of corruption are undesirable for bilateral trade flows as the policies intimidate trading partners who exploit the African nations by taking advantage of weak institutions. Furthermore, political instability is shown to be a catalyst for bilateral imports. It is expected that political terror and social unrest will hinder trade. However, this phenomenon necessitates the procurement of more military equipment for combating war. It equally disrupts domestic production and makes the countries largely depend on imports for domestic consumption.

In conclusion, drawn directly from the empirical analysis, this study demonstrates that political and economic institutions are fundamental but heterogeneous determinants of bilateral trade in Africa. The general conclusion from the broader literature—that institutions uniformly and positively affect bilateral trade—is not confirmed in this study. Instead, the findings reveal that different institutional dimensions have divergent effects: while government effectiveness, regulatory quality, and voice and accountability promote trade, strict adherence to rule of law and control of corruption are associated with lower exports, reflecting the exploitation of institutional weaknesses by trading partners. Political instability, counterintuitively, is found to stimulate bilateral trade by increasing import dependence for domestic consumption and military procurement. The quality of economic institutions robustly promotes bilateral trade across all components. These findings have direct policy implications for institutional design in Africa, as elaborated in the recommendations below. Based directly on the empirical findings, this study provides specific institutional quality-promoting policy recommendations for the improvement of bilateral trade.

First, deriving from the finding that regional trade agreements significantly promote bilateral trade, African countries should engage in deep trade agreements to benefit from the spillover effects of good institutions across borders. A deep trade agreement implies an agreement that covers not only tariffs but also considers additional policy areas including the institutional framework of the member countries.

In addition to tariff reduction, deep trade agreements should include policy measures covering investment policies, competitive strategies, judicial framework, and protection of property rights. The agreements could also target specific components of institutional factors such as contract enforcement, rule of law, labour laws, as well as the removal of administrative bottlenecks in customs processes by enforcing the use of electronic systems and harmonization of customs procedures. These can increase contract enforceability and provide even property rights protection. Consequently, the deep trade agreements will improve the quality of both political and economic institutions in Africa and thus facilitate

bilateral trade in the continent. Hence, the African Continental Free Trade Agreement and all other FTAs should be in the form of deep trade agreements.

Second, consistent with the finding that control of corruption and government integrity significantly affect bilateral trade, African countries need to adopt, strengthen, and regionalize anti-corruption measures. The finding that stricter anti-corruption enforcement reduces exports in the short run, likely due to the disruption of trade facilitation mechanisms embedded in informal networks, suggests that anti-corruption reforms must be accompanied by institutional capacity building to provide legitimate and efficient alternatives. Trade ties with the continent should be conditioned on trading partners' commitment to support the fight against corruption.

Third, consistent with the finding that all economic institutional components, particularly financial freedom, business freedom, and government integrity, significantly promote bilateral trade, the governments of African countries should avoid interference with the operations of financial institutions and markets. Strengthening financial and monetary freedom will in turn enhance bilateral trade by reducing the cost of credit and encouraging domestic and foreign investment. Fourth, derived from the heterogeneous effects identified in this study, policymakers should factor in the heterogeneity and asymmetries of the impact of institutions when designing policies aimed at maximizing the benefits of the institutions–bilateral trade nexus. A one-size-fits-all approach to institutional reform is unlikely to be effective. Rather, policymakers should concentrate on improving each specific component of institutional quality identified in this study as significant, including regulatory quality, government effectiveness, voice and accountability, and all dimensions of economic freedom.

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