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The effects of non-trade non-rent barriers on intra-Africa trade

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Abstract

This article evaluates the effects of non-trade non-rent barriers to intra-Africa trade. Specifically, the effects of improved productivity, improved capital inflows, share of employment in non-agricultural sectors, and ratio of rural population. We seek to investigate the impact of institutional strength measured by property rights, rule of law and control of corruption, different exchange rate regimes on the impact of the non-trade non-rent variables on intra-Africa trade. We use an extensive dataset of 25 countries, by picking the most diverse and high-income economies in each region, for the period 2000–2020 using annual data. The empirical analysis involves a linear panel analysis with a fixed effects estimator. The study provides evidence that level of labor productivity is a key factor in the growth of intra-Africa imports and exports, the share of employment in the wholesale and services sector also has a significantly positive impact, exchange rate regimes play a magnifying role, and strong institutions (regulatory quality, rule of law and low corruption) will enhance the benefits to be drawn for increased income flows.

KEYWORDS

exchange regime, exports, imports, intra-regional trade, trade

1 | INTRODUCTION

Africa has embarked on an ambitious, yet very timely project called the Africa Continental Free Trade Area (AfCFTA). This has been born out of the dismal intra-Africa trade numbers over the years, even though Africa has 11 Regional Trade Agreements (RTAs) in place, which is the highest number for a region (Emeka, 2020). The dream of AfCFTA is that it should increase African countries economic growth rates through increased intra-Africa trade by eliminating tariffs. Fofack et al. (2008) highlight that AfCFTA is estimated to increase intra-Africa trade by 24.07%. However, the latest key statistics (UNCTAD, 2019) suggest that regional trade in Africa accounts for only 2.9% of the world trade only ahead of Oceania which has 1.5%. Africa accounts for 16% of the world's population at 1.2 billion people. Europe and America have smaller population sizes than Africa but have higher shares of trade at 39% and 20%, respectively. Intra-Africa trade accounts for only 14.4% of its total trade compared with 61.7% for intra-Europe and 40.3% for intra-America. The largest intra-Africa traders are South Africa, Nigeria, and Namibia, with most trade taking place within Regional Economic Blocks or countries that border each other.

Africa seems to trade more with other regions than itself despite the benefits of increasing intraregional trade, yet theory and empirical knowledge say that RTAs should increase bilateral trade (Anderson & Yotov, 2016). Nonetheless, inter-regional trade within trade blocks where there is some sort of harmonization of trade tariffs has seen a modest increase in trade, these trade blocks are also built around people with similar languages and close cultural aspects which reduces the barriers caused by differences in culture. Emeka (2020) highlights that intra-Africa trade has increased from 11.4% share of total trade in 2000 to 15.4% share in 2016 but dropped after covid to 14.4%.

However, growth of trade with Asia is 15.2%, hence growing faster than intra- Africa growth and the share of total trade to Asia increased from 20.6% in 2000 to 35.8% in 2016. The shares to North America and Europe dropped from 14.1% to 7.4% and 48% to 37%, respectively, highlighting the shift from traditional colonial linkages of trade, as most trade routes where created based on the resource needs of the occupying country. The growth in labor productivity and private expenditure of the Asian economies might explain the jump in Africa trade with Asia, as their incomes increased their share of manufacturing to gross domestic product (GDP); shares also increased and hence the demand for raw materials which the African continent has in abundance.

But it is important to be careful when looking at intraregional trade growth rates to ensure that the increase is not just due to trade diversion instead of trade creation (Njinkeu & Fosso, 2006; Carrere, 2004). It is also important to look at African trade numbers carefully as the amount of cross border informal trade or sometimes called black market trade tends to be high.

A benefit of intratrade, is that it might reduce the perennial military conflicts on the continent (Emeka, 2020) this is a double-edged sword as political instability might actual be a hinderance to intra-Africa trade as the uncertainty with supply would lead most industries to look elsewhere for constant supply. Felix et al. (2015) add that intra-Africa trade would open domestic industries to competition therefore seeing a general improvement in competitiveness of local industries (Emeka, 2020). Other benefits that are behind the drive for regional integration is the ability to give African countries a better negotiating power when it comes to trade with other regions (Longo & Sekkat, 2001).

The economic growth witnessed on the continent has not spilled over to increased trade on the continent and the benefits that accrue with it.[1] It will be interesting to see the impact of the

disproportionate increase in income growth between the top percentile and bottom percentile and its effect on intraregional trade. The more the top percentile incomes increase faster as is in the continent there is a tendency to prefer imported goods from the west as a sign of affluence.

Traditional trade theory such as the Hecksher-Ohlin and Ricardian model state that factor endowments, comparative advantage and productivity differences are the main drivers of trade, proximity concentration trade-off theories state that trade is driven by economies of scale so is Foreign Direct Investment (FDI). General equilibrium models propose that trade is driven by relative factor costs and resource endowments (Mitze et al., 2010). The new trade theory, developed in the 1970s and 1980s, challenges some assumptions of traditional trade theories. It focuses on factors such as economies of scale, imperfect competition, and product differentiation. New trade theory suggests that countries may specialize in the production of certain goods due to increasing returns to scale and differences in product variety, even in the absence of factor endowment differences.

Africa has the population size, the proximity to each other, removal of tariffs through RTAs which are factors that trade theory has started are needed to increase trade, the question then is why does Africa not trade amongst itself more? The new trade theory does shade some light as one thing lacking in African context is product differentiation. Substantial trade in raw materials (Longo & Sekkat, 2001) and little value addition might be the hinderance to the growth of intra-Africa trade. The study will therefore test this by including the log of production in the equation as well as the level of employment in manufacturing, wholesale, and agriculture as indicators.

Many reasons have been proposed for low inter-Africa trade, ranging from inadequate infrastructure, economic policies, politics, tariffs, and poor communication on the continent (Longo & Sekkat, 2004). Longo and Sekkat (2001) identify trade policy, insufficient infrastructure, non-convertibility of currencies, ethics, cultural, linguistic diversity and high political stability. However, there is an issue with measuring some of these variables to be used successfully in an empirical test. Another major challenge to intra-Africa trade is that majority of exports from the continent are raw materials and imports are finished or semifinished goods. The average share of manufacturing to GDP ratio for the continent is 13%. This affects intra-Africa trade as the major import is finished goods due to a lack of manufacturing capacity.

Olper and Raimondi (2008) split the border cost element to tariff, non-tariff, non-policy barriers and substitutability. The distinction is important as non-rent barriers will be difficult to eliminate but their welfare impact would be greater. Anderson and Yotov (2016) support this claim when they studied the effects of FTAs in the 1990s on income of the manufacturing sector that the large volume effects were due to non-tariff cost reductions. Bergstrand et al. (2015) add to that same trend of thought and highlight that omission of variables that account for increase in trade other than tariff-based measures such as regional trade integration leads to overestimated tariff-based coefficients. Non-tariff obstacles to trade include corruption, institutional quality, and political stability (Njinkeu & Fosso, 2006).

From the review of the literature, the divergence between theoretical expectations and empirical findings in intra-Africa trade suggests the need to investigate the specific challenges or gaps in implementation that hinder the realization of the expected benefits. Despite the immense potential for regional economic integration, the fact that intra-Africa trade accounts for only 14.4% of the continent's total trade signifies an underutilization of the opportunities for economic cooperation within the region. Understanding the reasons behind this low share is essential for unlocking economic growth.

Sub-Saharan Africa's average GDP per capita $1701 is lower than what Europe was in 1970 $1879. One major factor in the growth of the European Union (EU) as a whole was the 1957 treaty of Rome that established European Economic Community, similar to an extent to what the African Union is trying through ACFTA. While the establishment of the common market has played a significant role in the economic success of the EU, it is important to note that the relationship between the common market and GDP per capita growth is multifaceted. Other factors, such as macroeconomic policies, institutional quality, and external economic conditions, also influenced economic performance.

In summary, studying intra-Africa trade is important for identifying challenges, understanding successful trade dynamics, and formulating policies that can unlock the full potential of economic cooperation within the continent. Addressing these issues could lead to increased intra-Africa trade, fostering economic development, and strengthening regional ties.

This article therefore seeks to contribute to studies on what affects intra-Africa trade by looking at whether non-tariff, non-rent factors such as macroeconomic stability, strength of institutions, demographic structures, remittances, and FDI have a significant impact on intraregional trade volumes. These factors are also key to growth of the manufacturing sector which would be a key ingredient to more trade in-between the Africa countries.

The study selects 25 countries by picking the top five most diverse economies in each region, that have also the highest GDPs from the period 2000–2020 using annual data (21-year entries). The list of countries is found in the Supporting Information S1: Table A.2. This selection ensures that we have data that support trade theories on GDP size, proximity, and diversity.

The article contributes to the trade literature by empirically examining the factors influencing intraregional trade in Africa and offers nuanced insights that resonate with traditional, modern, and new trade theories. The findings emphasize the multifaceted nature of trade determinants, ranging from traditional factors like comparative advantage to modern considerations of productivity and the role of institutions in shaping trade patterns.

It is in our belief that this is one of the first studies to look at gravity anomalies using a panel liner regression model by including major elements from the traditional trade theory. The study considers GDP, employment in different sectors, and the share of manufacturing in gross value added. These variables align with traditional trade theory, emphasizing comparative advantage based on factor endowments and sectoral specialization. The study also looks at the role urbanization plays in inter-regional trade.

The study highlights the key role of productivity in intra-Africa imports and exports. This aligns with modern trade theory, which emphasizes the importance of factors such as economies of scale and labor productivity in determining trade patterns. Thus, we break the labor factor into different sectors, and we include exchange rate regimes to analyze their effects of variables on exports and imports. This complexity aligns with new trade theory, which considers factors such as imperfect competition and the role of strategic trade policies.

Furthermore, we introduce institutional variables (corruption control index, regulatory quality, and rule of law) as multiplicative dummies. The findings emphasize the role of strong institutions in enhancing the benefits of increased income flows, aligning with new trade theory's focus on the role of institutions in shaping trade patterns.

The remainder of this article is structured as follows: Section 2 presents the dataset and the methodology, Section 3 discusses the results, and Section 4 concludes.

2 | DATA AND METHODOLOGY

The study will use a linear panel model that contains 25 African countries observed over 21 years. Linear panels follow the same construction as linear regressions, but they differ in that they have a double sub script. A linear Panel would therefore be specified as

$$y_{it} = \alpha_i + \beta' x_{it} + \mu_{it},$$

where x_{it} is a *kx1* vector of observed individual specific regressors on the ith cross-sectional unit at time t, μ_{it} is the error term, β' is a k-dimensional vector of unknown parameters and α_i is the unobservable individual specific effect. Badi (2013) breaks down the disturbance term, μ_{it} to two components as below:

$$\mu_{it} = \mu_i + \vartheta_{it},$$

where μ_i denotes the unobservable individual specific effect and ϑ_{it} the white noise. The variants in estimation of linear models revolve around the treatment of the constant term α_i (Asteriou & Hall, 2016). In pooled ordinary least square, the constant term is common for the whole panel, in the fixed effects (FEs) the constant term is group specific and for the random effects (REs) the constant term is treated as variable. For this study we will test for both FEs and REs using the Hausman (1978) test to choose between the two methods.

To determine the relationship between intra Africa trade and non-tariff barriers, we disaggregate Africa's total trade from country i to country j (y_{ijt}) data, into imports ($\ln Im_{ijt}$) and exports ($\ln Ex_{ijt}$) in logs, so we can see clearly, which of the two is impacted more by the non-trade non-rent variables. For the non-trade and non-rent variables (x_{it}) we use GDP measured at real values ($lngdp_{it}$),[2] employment in the agricultural sector (Ea_{it}), employment in the manufacturing sector (Em_{it}), employment in the service sector (Ew_{it}), share of manufacturing in gross value added ($\ln MSG_{it}$), to measure the level of economic development, productivity to measure growth in income ($\ln Prod_{it}$), foreign remittances ($\ln rem_{it}$), nominal exchange rates ($\ln fx_{it}$), and FDI inflows ($\ln fdi_{it}$) to measure the impact of knowledge and capital transfer, and the rural/urban population ratio (Ru_{it}) as a proxy for the informal sector. Finally, we use the following variables: corruption control index (Ci_{it}), regulatory quality (Rq_{it}), and rule of law (Rl_{it}), to measure the strength of institutions. All variables and data sources are listed in Supporting Information S1: Table A.1, while Supporting Information S1: Table A.2 lists the countries in our sample (see Supporting Information: Appendix).

Thus, to investigate the impact of non-tariff barriers to African trade we model the base export and import function with the following equations[3]:

$$\ln Ex_{ijt} = \beta_1 + \beta_2 \ln Prod_{it} + \beta_3 Ea_{it} + \beta_4 Em_{it} + \beta_5 Ew_{it} + \beta_6 Ru_{it} + \beta_7 Inc_{it} + \varepsilon_{ijt}, \quad (1)$$

$$\ln Im_{ijt} = \beta'_1 + \beta'_2 \ln Prod_{it} + \beta'_3 Ea_{it} + \beta'_4 Em_{it} + \beta'_5 Ew_{it} + \beta'_6 Ru_{it} + \beta'_7 Inc_{it} + \varepsilon'_{ijt}, \quad (2)$$

where ln denotes logged variables, Inc_{it} as the income variable after the principal component analysis, all other variables are defined as above, and ε_{ijt} is the error term. Additionally, we group the countries into the regions they belong to highlight the effect of the non-trade barriers to different regions of the continent, and we also group them based on the exchange rate regime

to see the impact of the monetary policy on the coefficients of the non-trade and non-rent variables.

Our methodology differs from the traditional international trade methodology which uses gravity analysis as espoused by Mitze et al. (2010). The change in methodology is driven by the fact that the construct of the gravity model requires data between countries, this is a major challenge in the African context. While gravity models are powerful tools for explaining bilateral trade patterns, the advantages of linear panel data analysis become prominent in situations where detailed bilateral data are lacking, and the focus is on understanding broader trends, dynamics, and determinants of intraregional trade within Africa.

Some of the advantages of linear panel data: Linear panel data analysis allows for the inclusion of FEs or REs, which can account for unobserved time-invariant factors at the individual country level. Panel data models can capture dynamic relationships by including lagged values of variables. This is useful for understanding how past trade patterns influence current trade flows, which is especially relevant for analyzing intra-regional trade dynamics. In situations where specific country-to-country trade data are limited, panel data analysis allows for the efficient use of available data by utilizing both cross-sectional and time-series dimensions. By including country FEs or REs, panel data models can be more robust to omitted variables or unobserved factors that may affect trade but are not explicitly included in the model.

3 | EMPIRICAL RESULTS

Before analyzing the impact of non-trade barriers, it is important to run several checks to ensure we do not get spurious results. The summary statistics of the data per region and for all Africa are found in Table 1. From the results we observe that the southern African region leads in inter African trade as it exports and imports the most from the continent as well as the largest ratio of employment in the manufacturing sector. However, this might be because the largest economy on the continent (South Africa) belongs also in that region. The East Africa region has the largest rural population, the lowest rule of law ranking and the lowest productivity rate finding which are also supported by the regions low manufacturing contribution to gross value added and the largest employment ratio in agriculture sector. The west African region leads in the lowest regulatory quality and highest corruption index.

The study employs a stationarity test to ensure that the variables are stationary and integrated at the same order. However, before we perform the stationarity test, we check for cross-sectional dependency in the models[4] by running the Pesaran (2004) cross-sectional Augmented Dickey Fuller test (CADF).[5] The results show that we can reject the null hypothesis of cross-sectional independence and therefore our panel(s) have cross sectional dependence.

Based on these results we will therefore use second generation unit root test to check for stationarity and for this study we will use the Pesaran (2003) t test for unit root all variables.[6] The results are reported in Supporting Information S1: Table A.6. We observe that most variables (with the exception of exports, imports, and productivity) are *I(1)* as expected. Thus, we proceed with estimating the impact of non-trade barriers on intra-Africa exports and imports with the following variables in difference $\Delta lhdi_{it}$, ΔEa_{it}, ΔEm_{it}, ΔEw_{it}, ΔRu_{it}, ΔInc_{it} shown in Tables 2 and 3 respectively.[7]

With regard to exports first, the results in Table 2 show that as productivity increases intra-Africa exports increase. This is mostly being driven by increased demand that comes from

TABLE 1 Summary statistics.

Summary statistics															
	ln Ex	***ln IM***	***ln HDI***	***Ea***	***Em***	***Ew***	***lnMSG***	***LnProd***	***ln Rem***	***ln FDI***	***ln GDP***	***Ru***	***R***	***Rl***	***Ci***
Full panel															
Mean	2.63	2.80	1.72	0.03	0.07	0.02	1.01	3.63	7.37	8.35	10.45	1.60	−0.36	−0.39	−0.41
Std. dev.	0.79	0.58	0.09	0.44	1.13	0.24	0.20	0.41	3.02	1.06	1.13	0.16	0.57	0.56	0.56
CV	0.30	0.21	0.05	14.6	16.1	13.34	0.20	0.11	0.41	0.13	0.11	0.10	−1.58	−1.42	−1.38
Panel A: North Africa															
Mean	2.41	2.41	1.82	0.06	0.00	0.00	1.10	4.04	9.37	9.26	11.45	1.41	−0.46	−0.31	−0.40
Std. dev.	0.55	0.49	0.04	0.73	0.05	0.07	0.25	0.11	0.66	0.38	0.36	0.10	0.40	0.34	0.27
CV	0.23	0.20	0.02	12.81	−56.25	−66.92	0.23	0.03	0.07	0.04	0.03	0.07	−0.86	−1.09	−0.68
Panel B: East Africa															
Mean	2.39	2.67	1.67	0.07	−0.04	0.00	0.86	3.32	7.58	8.50	10.70	1.80	−0.38	−0.61	−0.57
Std. dev.	0.87	0.44	0.07	0.47	0.17	0.14	0.12	0.20	2.53	0.68	0.42	0.06	0.42	0.29	0.47
CV	0.36	0.17	0.04	7.21	−4.49	34.11	0.14	0.06	0.33	0.08	0.04	0.03	−1.09	−0.47	−0.82
Panel C: West Africa															
Mean	2.62	2.68	1.67	0.00	0.07	0.04	1.00	3.42	8.26	8.40	10.56	1.57	−0.49	−0.57	−0.62
Std. dev.	0.87	0.52	0.08	0.17	0.43	0.38	0.19	0.23	1.99	0.75	0.65	0.10	0.32	0.42	0.42
CV	0.33	0.19	0.05	41.88	6.16	8.82	0.19	0.07	0.24	0.09	0.06	0.07	−0.64	−0.74	−0.68
Panel D: South Africa															
Mean	2.89	3.20	1.76	0.02	0.17	0.01	1.07	3.83	5.35	7.74	9.69	1.58	−0.16	−0.13	−0.09
Std. dev.	0.68	0.51	0.08	0.41	1.95	0.14	0.16	0.46	3.68	1.34	1.50	0.13	0.81	0.75	0.69
CV	0.23	0.16	0.05	20.38	11.23	12.88	0.15	0.12	0.69	0.17	0.16	0.08	−5.18	−5.80	−7.44

TABLE 1 (Continued)

Summary statistics															
	ln Ex	*ln IM*	*ln HDI*	*Ea*	*Em*	*Ew*	*lnMSG*	*LnProd*	*ln Rem*	*ln FDI*	*ln GDP*	*Ru*	*R*	*Rl*	*Ci*
Panel E: Fix exchange regime															
Mean	2.96	3.04	1.75	0.04	0.02	0.01	1.03	3.64	5.61	7.90	9.97	1.63	−0.20	−0.40	−0.50
Std. dev.	0.68	0.48	0.08	0.50	0.37	0.14	0.16	0.41	3.87	1.44	1.61	0.14	0.76	0.72	0.58
CV	0.23	0.16	0.04	13.90	16.87	11.87	0.16	0.11	0.69	0.18	0.16	0.09	−3.74	−1.81	−1.17
Panel F: Floating exchange regime															
Mean	0.93	1.70	1.66	−0.03	0.07	0.19	0.72	3.43	6.89	7.58	9.58	1.44	−0.45	−0.44	−0.57
Std. dev.	0.80	0.39	0.05	0.12	0.32	0.87	0.14	0.07	2.89	0.23	0.10	0.05	0.13	0.19	0.16
CV	0.86	0.23	0.03	−4.58	4.58	4.58	0.19	0.02	0.42	0.03	0.01	0.03	−0.29	−0.44	−0.28
Panel G: Managed exchange regime															
Mean	2.57	2.75	1.71	0.03	0.09	0.01	1.02	3.64	8.28	8.62	10.75	1.59	−0.43	−0.39	−0.35
Std. dev.	0.69	0.54	0.10	0.42	1.39	0.18	0.21	0.42	1.98	0.71	0.66	0.16	0.45	0.48	0.56
CV	0.27	0.20	0.06	13.77	14.78	17.54	0.20	0.11	0.24	0.08	0.06	0.10	−1.03	−1.23	−1.60

Note: CV is the coefficient of variation the higher the CV the higher the variation around the mean.

Abbreviation: CV, coefficient of variation.

TABLE 2 Panel regression estimation results for intraregional exports.

Variables	Africa (All)	North Africa	West Africa	East Africa	South Africa
LnProd	2.6314*	4.886*	1.3288*	2.8825*	2.2693*
	(14.77)	(8.68)	(3.37)	(12.37)	(7.58)
Ea	0.1137*	0.0216	0.6100*	0.1473*	0.03144
	(3.42)	(0.41)	(2.85)	(2.27)	(0.66)
Em	0.0083	−0.4279	0.1871*	−0.0771	0.0029
	(0.67)	(−0.97)	(2.18)	(−0.37)	(0.31)
Ew	0.1783*	−0.6791***	0.2794*	−0.3738***	−0.0057
	(3.00)	(−1.30)	(2.89)	(−1.65)	(−0.44)
Ru	−0.3102	183.9466*	24.2516	−45.397*	−11.451
	(0.97)	(3.87)	(0.39)	(−2.47)	(−1.02)
lnMSG	−0.2394	0.7967	−0.0683	−0.0729	−0.2994***
	(−0.93)	(0.61)	(−0.09)	(0.919)	(−1.38)
Inc	−0.0598*	0.0287	−0.1839*	0.0222	−0.0057
	(−1.97)	(0.17)	(−2.76)	(0.40)	(−0.17)
constant	−6.9050*	−16.651*	−1.7011	−7.294*	−5.821
	(−10.69)	(−7.37)	(−1.22)	(−9.48)	(−5.09)

Note: *, **, *** denote statistical significance for the 99, 95 and 90% levels respectively.

increased output leading to increased income, this aligns with traditional trade theory, emphasizing the role of comparative advantage based on factor endowments (Krugman et al., 2015). A Scatter diagram shows that as productivity increases so does exports. (Figure 1).

The results of the share of employment in agriculture are rather interesting, as one would expect that this would be an impediment to export trade. However, it speaks to the large rural population who are predominantly engaged in agriculture which is also one of the largest export items for most of the countries in the panel. The income variable has a negative impact on exports as remittances and FDI increase there is larger increase in imports than exports. The percentage of rural population in a country affects negatively trade volumes though the variable is not significant it has the expected sign.[8]

It is rather interesting to further focus on the regional effects re-estimating Equation (1) for the different African subregions. We see that the North African region is greatly affected by the rural population ratio and is highly significant. This makes economic sense as the region is the most industrialized and has the highest productivity. For the West and East African region distribution of employment in the different sectors has a negative impact on intraregional exports with an increase in wholesale and services and ratio of rural population have a positive impact. This aligns with modern trade theory, emphasizing the role of dynamic sectors in driving economic growth and trade. This also speaks the element raised by Carrere (2004). It is also important to look at African trade numbers carefully as the amount of cross border informal trade or sometimes called black market trade tends to be high. This is in line with the

TABLE 3 Panel regression estimation results for intraregional imports.

Variables	Africa (All)	North Africa	West Africa	East Africa	South Africa
LnProd	1.5575*	2.133*	0.9548*	1.6391*	1.8523*
	(11.03)	(3.51)	(3.98)	(8.84)	(6.65)
Ea	0.05578*	0.0793***	0.1799***	0.0008	0.0790**
	(2.11)	(1.38)	(1.38)	(0.02)	(1.78)
Em	0.01369***	−0.1027	0.1346*	−0.27791	0.1025
	(1.38)	(−0.22)	(2.70)	(−1.69)	(1.16)
Ew	0.1158**	0.2083	0.1343*	−0.62251	0.0493
	(2.58)	(0.37)	(2.29)	(−0.90)	(0.41)
Ru	22.8288*	349.633*	29.080	22.6611***	−10.345
	(2.44)	(6.81)	(0.77)	(1.55)	(−0.99)
lnMSG	−0.0714	0.0603	−0.2978	−0.8136	−0.0520
	(−0.35)	(0.04)	(−0.62)	(−0.14)	(−0.25)
Inc	−0.01984	−0.1495	−0.0887*	0.0174	0.0227
	(−0.83)	(−0.84)	(−2.19)	(0.39)	(0.73)
constant	−2.7312*	−4.899**	−0.3688	−2.6799*	−3.9073*
	(−5.33)	(−2.01)	(−0.44)	(−4.38)	(−3.67)

Note: *, **, *** denote statistical significance for the 99, 95 and 90% levels respectively.

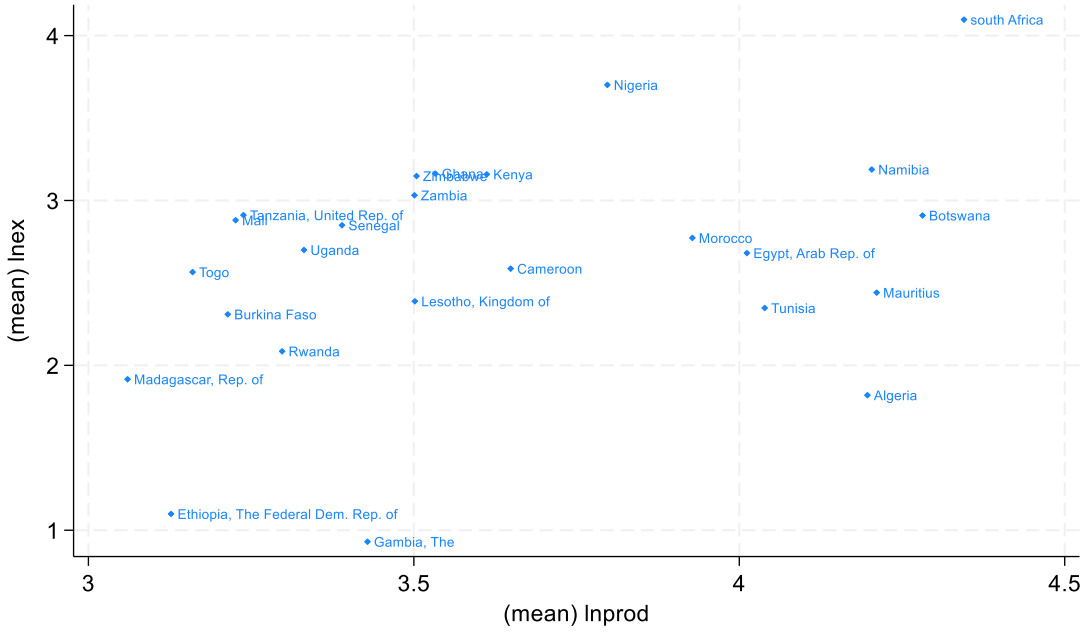

FIGURE 1 Productivity versus exports. [Color figure can be viewed at wileyonlinelibrary.com]

level of rural population and agriculture being the main export from the two regions. Like the other regions productivity has a positive and significant impact on inter-African export trade for the southern African region. The results also show that only the contribution of manufacturing has a negative impact though weakly significant.

Table 3 reports the results for the imports function. When it comes to imports all variables are significant other than manufacturing contribution to gross value added and the income variable on the effect on intra-Africa imports. The ratio of rural population has a positive impact on intra-African imports, and this follows logic where there is a higher rural population you would expect higher imports of manufactured goods. Productivity and distribution of employment in various sectors also have a positive impact on imports. If we investigate the same variables at regional level, we see productivity has a significant impact on imports with it being more pronounced in the north African region. Proportion of rural population is significant and positive in the full, north Africa and east Africa panels and the sign changes from negative in the export results to positive in the import function.

The positive coefficients for $\ln Prod$, Ea, Em, and Ew, align with both traditional and modern trade theories, emphasizing the importance of factor endowments, dynamic sectors, and economies of scale in driving intraregional imports. The positive coefficients for Ru in North Africa, West Africa, and East Africa suggest that the rural/urban population ratio positively influences intraregional imports, indicating the importance of urbanization effects. The lack of consistent significance for $\ln MSG$ and Inc underscores the complexity of trade determinants, and factors beyond traditional and modern theories may be at play.

As mentioned before, the study also investigates the impact of the quality of local institutions. We do this by creating a multiplicative dummy[9] which we multiply with the income variable. We therefore run three additional models like the baseline models (1) and (2) by adding the multiplicative dummies individually, as follows:

$$\ln ex_{it} = \beta_1 + \beta_2 \ln Prod_{it} + \beta_3 Ea_{it} + \beta_4 Em_{it} + \beta_5 Ew_{it} + \beta_6 Ru_{it} + \beta_7 Inc_{it} + \delta_1 Rq * Inc_{it} + \delta_2 Rl * Inc_{it} + \delta_3 Ci * Inc_{it} + u_{ijt}, \quad (3)$$

$$lnim_{it} = \beta'_1 + \beta'_2 \ln Prod_{it} + \beta'_3 Ea_{it} + \beta'_4 Em_{it} + \beta'_5 Ew_{it} + \beta'_6 Ru_{it} + \beta'_7 Inc_{it} + \delta'_1 Rq * Inc_{it} + \delta'_2 Rl * Inc_{it} + \delta'_3 Ci * Inc_{it} + u'_{ijt}. \quad (4)$$

Here $Rq * Inc_{it}$ is the interaction between regulatory quality and the income variable, $Rl * Inc_{it}$ is the interaction between regulatory quality and the income variable, and $Ci * Inc_{it}$ is the interaction between the corruption control index and the income variable.

The results in Table 4 report the exports equation effect and show clearly that all the interactive terms are significant at different levels. High regulatory quality enhances the effects of the income variable on inter-regional exports. A high corruption environment diminishes the effect of increased income on exports the same results as for rule of law.

Similarly, Table 5 report the results for the imports equation effect. Here we see that the only regulatory variable that plays a role is the rule of law. In fact, we find that high levels of rule of law diminish the effect of increased income on exports, since the interaction term with the dummy gives a negative coefficient of a higher magnitude (−0.088) than the positive income effect (0.011).

Finally, as a further robustness check, we want to see if the exchange regime has an impact on the coefficients of the independent variables. Thus, we re-estimate both the

TABLE 4 Panel regression estimation results for intraregional exports with multiplicative institutional dummies.

Variables	Africa exports (All)	Regulatory Quality	Rule of Law	Corruption Index
LnProd	2.6314*	2.619*	2.6680*	2.6166*
	(14.77)	(14.69)	(14.99)	(14.67)
Ea	0.1137*	0.1130*	0.1088*	0.1123*
	(3.42)	(3.40)	(3.28)	(3.37)
Em	0.0083	0.0084	0.0080	0.0082
	(0.67)	(0.68)	(0.65)	(0.66)
Ew	0.1783*	0.1780*	0.1801*	0.1794*
	(3.00)	(2.99)	(3.04)	(3.02)
Ru	−0.3102	−1.1583	0.00351	−1.5111
	(0.97)	(−0.10)	(0.00)	(−0.13)
lnMSG	−0.2394	−0.2415	−0.2503	−0.2466
	(−0.93)	(−0.84)	(−0.97)	(−0.96)
Inc	−0.0598*	−0.0791*	−0.0108	−0.01065
	(−1.97)	(−2.31)	(−0.29)	(−0.22)
Rq_{High}*Inc*		0.08809***		
		(1.22)		
Rl_{High}*Inc*			−0.1481**	
			(−2.32)	
Ci_{High}*Inc*				−0.0798***
				(−1.29)
Constant	−6.9050*	−6.8641*	−7.0385*	−6.8563*
	(−10.69)	(−10.62)	(−10.91)	(−10.61)

Note: *, **, *** denote statistical significance for the 99, 95 and 90% levels respectively.

exports and imports equations on different subgroups of countries based on their respective exchange rate regimes (we follow the international monetary fund classification as reported in Supporting Information S1: Table A.2). The results are reported in Tables 6 and 7 for exports and imports, respectively. We see that for the various exchange rate regimes productivity remains a significant factor for both imports and exports. It has a more positive impact on both exports and imports for the fixed exchange rate regime. Productivity, however, has a negative impact in countries that follow a managed regime. However, these results might be affected due to a small sample. Rural population has a stronger negative impact for the fixed regime. For countries that are classified by floating regimes, the share of employees in the manufacturing, and wholesale sector plays a positive significant role for both exports and imports.

TABLE 5 Panel regression estimation results for intraregional imports with multiplicative institutional dummies.

Variables	Africa exports (All)	Regulatory quality	Rule of law	Corruption index
LnProd	1.5575*	1.556*	1.5780*	1.5509*
	(11.03)	(11.08)	(11.25)	(11.04)
Ea	0.05578*	0.0561**	0.05328*	0.0556*
	(2.11)	(2.14)	(2.03)	(2.12)
Em	0.01369***	0.0137***	0.0136***	0.0137***
	(1.38)	(1.40)	(1.39)	(1.40)
Ew	0.1158**	0.1171**	0.1181*	0.1175*
	(2.58)	(2.50)	(2.53)	(2.51)
Ru	22.8288*	22.5689*	22.74*	22.14*
	(2.44)	(2.42)	(2.46)	(2.38)
lnMSG	−0.0714	−0.0625	−0.0688	−0.0651
	(−0.35)	(−0.31)	(−0.34)	(−0.32)
Inc	−0.01984	−0.07403	0.01144	−0.00080
	(−0.83)	(−0.64)	(0.40)	(−0.02)
Rq_{High}*Inc		−0.001		
		(−0.02)		
Rl_{High}*Inc			−0.088**	
			(−1.76)	
Ci_{High}*Inc				−0.0276
				(−0.57)
Constant	−2.7312*	−2.7254*	−2.804*	−2.7080*
	(−5.33)	(−5.36)	(−5.52)	(−5.32)

Note: *, **, *** denote statistical significance for the 99, 95 and 90% levels respectively.

The study runs further robustness tests to assess the reliability and stability of the results. We checked all models for heteroscedasticity, using the Breusch–Pagan test and for possible multicollinearity by examining the variance inflation factors (VIFs) for each variable. The results (Supporting Information S1: Table A.7 & A.8) show that the assumption of constant variance of errors holds, and there is no compelling statistical evidence to suggest that the variability of the errors changes systematically across observations. Based on the VIF values, there is no evidence of problematic multicollinearity in the model. The variables appear to be relatively independent of each other, and the estimates of the coefficients in the regression model are likely to be stable.

The study also runs sensitivity analysis to examine the impact of alternative specifications, we do this by using the individual income variable members (*lngdp*, *lnfdi* and *lnrem*), and

TABLE 6 Panel Regression estimation results for intraregional exports with different exchange rate regimes.

Variables	Africa- Exports (All)	Floating	Fixed	Managed
LnProd	2.6314*	2.622*	2.969*	−7.7900*
	(14.77)	(9.73)	(16.76)	(−2.24)
Ea	0.1137*	0.097*	0.0950*	−1.522
	(3.42)	(2.23)	(2.60)	(−0.92)
Em	0.0083	0.1810*	0.00211	
	(0.67)	(2.76)	(0.20)	
Ew	0.1783*	−0.2344***	−0.0505	
	(3.00)	(−1.39)	(−0.62)	
Ru	−0.3102	17.866	−20.582**	−191.8005
	(0.97)	(0.73)	(−1.93)	(−0.47)
lnMSG	−0.2394	−0.2736	0.0273	1.7105
	(−0.93)	(−1.12)	(0.07)	(0.52)
Inc	−0.0598*	0.0147	−0.01419	−0.309
	(−1.97)	(0.41)	(−0.38)	(−1.21)
Constant	−6.9050*	−6.5146*	−8.3402*	26.3508*
	(−10.69)	(−6.67)	(−12.92)	(2.52)

Note: *, **, *** denote statistical significance for the 99, 95 and 90% levels respectively.

assess whether changes in model specifications lead to significantly different results. Furthermore, instead of splitting the sample we used an exchange rate regime dummy that takes the value of 1 if the country follows a floating system and 0 otherwise. This dummy has been used as a multiplicative interactive dummy with the main variables in our regressions. The results and the main findings of our article were not significantly altered by these specifications, thus enhancing our conclusions.

4 | CONCLUSIONS

In conclusion, the study examined the impact of non-trade barriers on intra-Africa trade using various economic indicators and institutional variables. Key findings indicate that productivity is pivotal for fostering intraregional trade growth, reflecting improved standards of living and increased demand. However, the rural population's size negatively affects intraregional trade due to lower incomes and subsistence economies, particularly impacting imports.

Moreover, the share of employment in wholesale and services sectors positively influences imports, signaling the importance of enhancing labor productivity. Yet, its impact on exports varies, potentially influenced by the nature of wholesale industries. Exchange rate regimes magnify the effects of variables on trade, especially under fixed exchange rate systems, suggesting further investigation.

TABLE 7 Panel regression estimation results for intraregional imports with different exchange rate regimes.

Variables	Africa–Imports (All)	Floating	Fixed	Managed
LnProd	1.5575*	1.6163*	1.7607*	−5.0286*
	(11.03)	(6.92)	(10.52)	(−5.44)
Ea	0.05578*	0.0746**	0.0217	0.2121
	(2.11)	(1.97)	(0.63)	(0.48)
Em	0.01369***	0.1123**	0.0107	
	(1.38)	(1.98)	(1.06)	
Ew	0.1158**	−0.0056	0.00774	
	(2.58)	(0.969)	(0.10)	
Ru	22.8288*	−15.0455	21.3811**	129.519
	(2.44)	(−0.71)	(2.12)	(1.20)
lnMSG	−0.0714	−0.0561	0.1498	2.3413*
	(−0.35)	(−0.27)	(0.38)	(2.68)
Inc	−0.01984	0.03381	−0.0191	0.0473
	(−0.83)	(1.08)	(−0.55)	(0.69)
Constant	−2.7312*	−2.8609**	−3.5278*	19.9346*
	(−5.33)	(−3.37)	(−5.79)	(7.16)

Note: *, **, *** denote statistical significance for the 99, 95 and 90% levels respectively.

While increased capital flows like FDI and remittances theoretically influence intraregional trade, their significance in the study's results is limited. Conversely, strong institutions, including regulatory quality, rule of law, and low corruption, amplify the benefits of increased income flows.

To realize the goals of initiatives like the Africa Continental Free Trade Area (AfCFTA), addressing tariff barriers alone is insufficient. The continent must focus on bolstering institutional strength, alleviating rural poverty, and fostering stable macroeconomic growth to fully leverage trade and economic agreements. Urbanization of the rural economy could yield multiplier effects, particularly in enhancing labor productivity and promoting sustainable trade growth within Africa.

The findings of this study hold several important policy implications for policy-makers and stakeholders involved in promoting intra-Africa trade and regional integration. First, enhancing productivity across various sectors, particularly in agriculture and manufacturing, could stimulate intra-Africa trade by increasing output and demand. Investing in infrastructure, technology, and skills development to improve productivity levels could boost competitiveness and trade opportunities within the region. Additionally, policies aimed at reducing trade barriers and streamlining customs procedures can facilitate smoother trade transactions and enhance market access for African businesses.

Second, strengthening institutions related to regulatory quality, rule of law, and anti-corruption measures is crucial for creating an enabling environment for intra-Africa trade. Effective governance structures and transparent regulatory frameworks can mitigate trade barriers, reduce transaction costs, and foster trust among trading partners, thereby facilitating smoother trade relations. Policy-makers should prioritize institutional reforms aimed at enhancing transparency, accountability, and the rule of law to create a conducive business environment that attracts investment and promotes sustainable trade growth.

Third, addressing rural poverty and promoting rural development initiatives can have positive spillover effects on intra-Africa trade. Policies that support rural infrastructure development, access to finance, and agricultural modernization can enhance rural livelihoods, increase purchasing power, and stimulate demand for goods and services, ultimately contributing to intraregional trade growth. By investing in rural areas and empowering rural communities, policy-makers can unlock the economic potential of rural areas and harness them as engines of growth for intra-Africa trade.

Last, regional economic integration initiatives, such as the AfCFTA, should prioritize addressing non-tariff barriers, improving market access, and harmonizing trade regulations to promote intra-Africa trade. By fostering closer economic cooperation and coordination among African countries, regional integration can unlock the full potential of intraregional trade and contribute to sustainable development across the continent. Policy-makers should work collaboratively to implement the necessary reforms and policies that support the objectives of regional integration and create a conducive environment for intra-Africa trade to thrive.

While this study contributes valuable insights into the determinants of intra-Africa trade, it is important to acknowledge several limitations inherent in its methodology and scope. First, the reliance on available data poses a significant constraint, as data quality, completeness, and representativeness may vary across regions and time periods. This could introduce biases or inaccuracies in the analysis, potentially undermining the reliability and generalizability of the findings. Moreover, the linear panel model used in the analysis, while commonly employed in econometric studies, makes certain assumptions about the relationship between variables and the nature of panel data. These assumptions may not fully capture the complexity of intra-Africa trade dynamics, and alternative modeling approaches or sensitivity analyses could provide additional insights.

Second, the study's focus on non-trade barriers and institutional factors may overlook other important determinants of intra-Africa trade. Factors such as cultural differences, historical legacies, technological advancements, and global economic trends could also play significant roles in shaping trade patterns within the continent. By not accounting for these factors, the study's analysis may present an incomplete picture of the drivers of intra-Africa trade, limiting its applicability to real-world policy interventions and strategic decision-making. Thus, future research could benefit from a more comprehensive approach that considers a broader range of factors influencing intra-Africa trade dynamics.

Moving forward, future research endeavors in the field of intra-Africa trade could address several avenues to further enhance understanding and inform policy interventions. First, expanding the scope of analysis to include additional variables and factors could enrich the current understanding of intra-Africa trade dynamics. For instance, incorporating cultural, historical, and technological factors into the analysis may provide deeper insights into the underlying drivers of trade patterns within the continent. Additionally, exploring the impact of regional infrastructure development, such as transportation networks and digital connectivity,

on intra-Africa trade could offer valuable insights into the role of physical and digital connectivity in facilitating trade flows.

Furthermore, longitudinal studies tracking the evolution of intra-Africa trade over time could shed light on trends, patterns, and emerging challenges in the trade landscape. By examining trade dynamics across different time periods and economic contexts, researchers can identify structural changes, policy interventions, and external shocks that shape intra-Africa trade relationships. Additionally, comparative studies analyzing intra-Africa trade dynamics in relation to other regional trade blocs or economic groupings could provide valuable benchmarks and insights into the unique challenges and opportunities facing African countries in fostering regional economic integration.

Moreover, future research could explore the implications of intra-Africa trade for broader socioeconomic development goals, such as poverty reduction, employment generation, and sustainable growth. By examining the linkages between trade policies, economic performance, and social outcomes, researchers can inform evidence-based policy decisions aimed at maximizing the developmental impact of intra-Africa trade. Additionally, interdisciplinary approaches that integrate insights from economics, political science, sociology, and other fields could offer holistic perspectives on the multifaceted nature of intra-Africa trade and its implications for regional integration and development.

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DATA AVAILABILITY STATEMENT

The data that support the findings of this study are openly available in Google Drive at https://drive.google.com/drive/u/0/folders/1eVbZnaAngMmXc5Dex_bYMw5qVvtTjd4g.

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ENDNOTES

[1] Some benefits listed by Longo and Sekkat (2004) are more trade would attract more FDI, however, because of fragmentation of the African market it might be easier to be located in eastern Europe and have access to the whole continent because of EU trade agreements Anderson et al. (2019) who state that a reduction or zero FDI would lead to 7% lower trade for the 89 countries in their study. However, if we look at the results of selected African countries trade would drop by 39% for Egypt, 20% Ghana, 28% Kenya, 54% Nigeria, and 44% Zimbabwe.

[2] However, Africa GDP figures don't account for the huge informal sectors therefore not making them an accurate measure of income.

[3] A simple correlation analysis (see Supporting Information S1: Table A.3) showed that the variables of real gross domestic product, foreign direct investment, and remittances are correlated. We, therefore, perform a principal components analysis (see Supporting Information S1: Table A.4) and generate component 1 that accounts for 78% of the variation in those variables to represent the income variable with a kaiser-meyer-olkin score of 0.6071. Also, there was a high correlation between the human development index and the productivity measure. Therefore, we do not use those two variables together in a regression model to avoid problematic muliticollinearity. Results with the productivity variable are reported in this article.

[4] One of the main assumptions of in panel data models is cross sectionally independence this is normally so when the N is large.

[5] The CADF null hypothesis is cross sectional independence, and the alternative is cross-sectional dependence of ε_{it}. The test is a product moment correlation coefficient calculation of the disturbance terms. Results are in Supporting Information S1: Table A.5.

[6] The Pesaran test eliminates cross-sectional dependence by augmenting the Dicker Fuller test with the cross-sectional averages of lagged levels and first differences.

[7] We also run the sigmamore Hausman test to confirm the choice of selection of the Fixed Effects estimator as ideal for our panel data structure. The results suggest indeed that the FE estimator is ideal with a χ^2 of −7.11. Analytical results from those tests are available from authors upon request.

[8] Although, gravity models postulate that the size of the population has a positive effect assuming equal purchasing power, our result here suggests that the larger the rural population (and thus the smaller the urban) the lower the exports in the continent.

[9] The dummies used in the study are regulatory quality where if rating is <0 then categorized as low rule of law were if rating is <0 it is categorized as low and corruption index if rating is <0 then categorized as high.

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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