EE
E u r o E c o n o m i c a
Issue 1(42)/2023 *ISSN: 1582-8859*

EuroEconomica

Does Intra-African Migration Matter for Intra-African Trade?

Ebenezer A. Olubiyi[1], Sunday M. A. Posu[2], Timilehin P. Ogunnusi[3]

Abstract: The highly populated African countries are expected to aid trade both from demand and supply sides. However, while intra-African migration is large compared to other continents, the same cannot be said of intra-African trade. Does this mean migration substitutes trade in Africa? Yet there are regional community blocs (RECs) that have engaged in various trade relations in a bid to encouraging trade among members. What implication will migration has on this trade arrangement? This study seeks to find answers to these questions by estimating a panel negative binomial regression of the effect of intra-African migration on intra-African trade with special focus on the RECs. A 6-period data covering 1980, 1990, 2000, 2010, 2013 and 2017 was utilised in the context of modified gravity model. The result confirms the substitutability of trade for migration in Africa. However, in ECOWAS and EAC, migration enhances trade. Migration facilitates exports in COMESA but inhibits imports. No significant effect is observed in the case of ECCAS even though a potential inhibiting effect is observed. The result also establishes trade creation among ECOWAS and ECCAS while trade diversion was observed in EAC and COMESA. Economic implication and recommendations are offered based on these results.

Keywords: Trade-creation; Trade-diversion; surplus-labour; gravity model; negative binomial regression

JEL Classification: K32; F14; F21; C1

1. Introduction

The relationship between trade and migration is still unclear, either from the theoretical or empirical point of view. Starting from the factor intensity theory, the relationship tends to be substitutes. A relatively labour-endowed nation will either export goods that are labour-intensive in production process or allow the excess labour to migrate to the labour-scarce but capital-surplus countries in order to produce the labour-intensive commodities. Utilising this theory, many empirical works show that trade and migration are actually substitutes (Olubiyi & Ogunusi, 2020; Casabianca, Turco & Maggioni, 2021).

However, migrants might play a vital role in increasing access to relevant information and socio-cultural challenges between the origin and the destination countries (Gould, 1994). The global links among the countries, culminating the advent of the World Trade Organisation in 1995, intensify this outcome through trade, investment and capital mobility which was possible as a result of the joint operation of

[1] Department of Economics, Federal University of Agriculture, Abeokuta, Nigeria, Corresponding author: olubiyiea@funaab.edu.ng
[2] Department of Economics, Federal University of Agriculture, Abeokuta, Nigeria, E-mail: posusma@funaab.edu.ng.
[3] Department of Economic Policy and Quantitative Methods, Faculty of Economics and Social Sciences, University of Potsdam, Germany, E-mail: timilehin,ogunnusi@uni-potsdam.de.

international labour movement (Lufuke, 2017). There is also the familiarisation effect of migration that acts as a motivator for trade. In this case, immigrants from one country that have information about trade opportunities in another country, when they travel to other countries different from those that they have information about, can provide such information that will facilitate trade between their present countries of residence and countries that they are familiar with. Hence, immigrants could facilitate trade among countries due to proximity, high ethnic networks, and information regarding institutions, such as corruption, and weak governance.

The substitutability or otherwise of trade for migration has not enjoyed robust empirical test in the case of Africa. The focus on Africa is of great interest because of its relatively large, which can serve as a source of input in production and as agents of consumption. As a source of input, it is expected that more output can be produced and exported. As a source of consumption, demand for products from other countries should also increase. Therefore, it is expected that since the region is blessed with large and increasing population, the within region trade should also increase. Specifically, the population of Africa rose from 1.36 billion in 2020 to 1.43 billion in 2022 (World Bank, 2022). This huge and growing population should influence trade in the continent. However, while African trade has exhibited steady increase in the world trade, intra-African trade is the least of all intra-regional trades in the world, posting average of 17% during the period 2015–2022. Even if unrecorded trade flows within Africa are accounted for, intra-African trade was in the average of 20 percent (UNCTAD, 2019; Mold, 2022). This is in contrast to within Europe, North America, and ASEAN (Asia) trade that hovered around 70 percent, 51 percent and 40 percent, respectively.

While intra-African trade is small, a large percentage of Africans reside in Africa (Tafirenyika, 2014; Ratha, Mohapatra, Ozden, Plaza, Shaw and Shimeles, 2011). In particular, according to McAuliffe and Triandafylillou (2021), over 21 million Africans were living in other African countries of non-origin in 2020. This was a significant increase from 2015 when around 18 million African migrants are in Africa. Further, received evidence indicates that intra-Africa migration was around 88 percent between 2010 and 2022 and that Africans migrate more within Africa than outside. With the huge population and migration flow within Africa, the question that comes to mind is: 'Is the low trade an aftermath of large migration?' Or would intra-African trade have been smaller if migration was not this large?

These questions become imperative owing to the new regional trade agreement, African Continental Free Trade Area (AfCTA) where the authorities in Africa aim at scaling up intra-African trade by removing policy barriers that hinders trade within the region. But what role will intra-African migration play in this process? To address this issue closely and carefully, the study benefits from some existing intra-regional blocs such as ECOWAS, COMESA, ECCAS and EAC. These Regional Economic Communities (RECs) operate a flexible and less restrictive movement of people (migration) among member countries. The implication of migration on trade for these RECs can serve as a lesson for the AfCTA. The study also seeks to find out whether the formation of RECs in Africa leads to trade diversion or trade creation.

1.1. Contribution of this Study to the Existing Knowledge

The contribution of this study to the existing knowledge is the area of theory and methodology. Most of the papers assessing the effect of migration on trade are not grounded on a theoretical foundation. The

implication of this is that it will be difficult to pin-down the result to a particular theoretical relevance. This study discusses the theoretical basis upon which the models are built and investigated. In the area of methodology, the focus of this study is to examine the influence of migration in trade flows within regions and sub-regions. There is no doubt about the extensive works on the influence of migration on trade but little is known at regional and sub-regional levels. Migrants settle unevenly within regions and even concentrate in certain countries in a region or in a given sub-region of the same continent. For example, migrants from Africa are mostly concentrated in Nigeria, a sub-region of ECOWAS. Regional and sub-regional analysis is crucial to this dynamic. Consequently, it is important to assess the true contributions of migrants to trade within the region they migrate to. Although a similar work was done for the OECD (OECD, 2022), evidence in Africa is missing. This is the first study that will fill this gap. The evidence will provide important information on public debate and policy design in Africa. The sub-regionals considered are trade and migration within EAC, ECCAS, COMESA and ECOWAS. The study accounts for the effect of each sub-regional trade on a particular trade flow. This is done to capture trade creation or trade diversion phenomenon.

Another contribution is the application of Panel Negative Binomial Regression as against the commonly used OLS, because of the presence of zero trade and/or zero migration between country pairs. Lastly, the study incorporates year fixed effect to account for the presence of business cycle and changes in openness across all countries. All these are missing in received evidence on the assessment of intra-African trade, serious gaps which this study fills.

The following results are obtained from the analysis:

- Increase in intra-African migration reduces intra-African export but increases intra-African imports;
- Increase in bilateral migration among ECOWAS, EAC and COMESA enhances exports in the respective region but it is more pronounced in COMESA, followed by EAC and then ECOWAS. In ECCAS, no significant effect was observed;
- Migration within the region positively affects imports only in ECOWAS sub-region. No significant effect was found in the import models of other sub-region, but potential negative effects were observed;
- The formation of ECOWAS and ECCAS regional blocs lead to export creation while EAC and COMESA regional blocs lead to export diversion;
- Import diversion exists in EAC and COMESA while import creation holds in ECCAS;
- No evidence of import creation nor diversion was found in ECOWAS

2. Literature Review

Starting from the theory of productivity differentials through factor endowment differentials to factor specificity, migration and trade are substitutes. Under the assumptions of perfectly competitive markets, and full employment, countries only need to increase production and export goods for which they have comparative advantage. In this case, there is no need for migration to take place. However, in practice, markets are not perfectly competitive. Neither do countries operate at full employment capacity. Further, there is no evidence of perfect factor mobility, particularly in the case of developing countries and specifically Africa. Consequently, transaction costs and/or migration costs are not zero.

Theories that propose trade liberalisation to make countries more open and, in a way, reduce market imperfections, modify the direction of migration-trade nexus. In this case, the relationship could be substitute, complement or none existence. The new trade theory builds on this liberalisation proposition by explaining how technological differentials in the face of trade liberalisation could cause trade and migration to be complements. According to the theory, increase in technological breakthrough in one country could motivate people from another country to migrate to such country. The immigration process affects trade in two ways. First, immigrants can provide information about the weak governance, corruption, level of insecurity, contract enforcement in their home country. The information could serve as trade opportunity in the country of origin, thereby reducing transaction costs. Second, the immigrants could have preference for their home products. In either case, immigration is trade enhancing.

The empirical evidence are also diverse, albeit skews towards complementarity. Owing to limited space, only a few works that have theoretical underpinning are reviewed. Fagiolo & Mastrorillo (2014) explored the structure of world migration networks and bilateral trade between 1960 and 2000. The gravity model employed suggested that trade was not directly influenced by migration per se, but by migration networks that make trade information easily accessible with little or no costs.

Felbermayr & Toubal (2012) investigated the channels through which migrants affect trade within OECD countries by utilising the modified gravity model. The result suggests that trade within OECD is positively affected by migration. Lewer & Berg (2012) did a study on a panel of 16 OECD members for the period 1991-2000. The study utilised 3 stage least square (3SLS). The result of the fixed effect showed that immigration facilitated trade through foreign direct investment, and trade networks between the host and home countries. Ghoneim & El-Deken (2012) investigated whether network or product preference stimulates migration-trade nexus or not. Employing gravity equation for a panel of European Union and Arab countries spanning 2001 to 2010, the result suggested that preference and network effects can be used to explain why migration positively increased trade, with the former being more pronounced.

Ehrhart, *et al* (2012) investigated the influence of Africa in Diasporas on African trade. Obtaining data on exports for 52 African countries to 143 trading partners across the world between 1980 and 2010, the result revealed that weak institutions act as a major motivation for positive effect of migration on exports of differentiated products. It was not only that. Proximity and ethnicity were important factors that triggered the trade effects of migration.

Another issue surrounding the positive effect of migration on trade is whether it will persist for a long time or be similar across space (region). Gimma & Yu (2002) investigated the matter by focusing on commonwealth and non-commonwealth migrants in the United Kingdom between 1981 and 1993. The gravity model indicates that exports and imports are positively affected by non-commonwealth immigrants. In the case of commonwealth immigrants, the effect on imports was negative while the effect on export was not significant. Ramon-Munoz (2009) focused on Southern European immigration and olive oil imports from America during 1875-1930 and discovered that the positive trade effect of migration reduced over time.

Metulini *et al* (2018) investigated the role of market familiarisation effect in the relationship between trade and migration. Familiarisation, according to the study, occurred when trade increased because of migration from country *z* to countries *j* and *k*, on the one hand, and migration from country *j* to country

k on the other hand. The study estimated a spatial autoregressive gravity model using bilateral trade and migration dataset between 1960 and 2000 for 232 countries. The results confirmed familiarisation effect as a major channel through which immigration facilitates trade. Ghani, Cameron, Cochrane and Roskruge (2019) obtained data on migration flows for 248 countries over 1990 and 2010 period and estimated a seemingly unrelated gravity model. The result suggested that increase in migration led to significant increase in trade.

A more recent work focused on the role of immigration in changing the product mix and its implication for trade. Casabianca, Turco and Maggioni (2021) found in Italy that immigration changed product mix such that more inflow of immigrants to Italy caused reduction in imports of low capital intensively intermediate goods. A study of OECD (2022) assessed the impact of migration on trade flow at the regional level covering trade flows between 21 EU and the world in 2013. Result from the least square estimate showed that migration complemented trade in the EU region. Parsons and Vezina (2018) submitted that Vietnamese immigrants in the US were catalyst to exports of the US to Vietnam.

The summary of the empirical review is that migration could serve as substitute or complement for trade. It also shows that the substitutability or complementarity depends on the product type and the location. However, most of the studies focused on intra-EU trade and migration or intra-American trade and migration, leaving no evidence for intra-African trade and migration. This study seeks to fill this gap.

3. Theoretical Framework and Methodology

Gravity theory is employed in this study because it captures the features of drivers of trade excluded in other theories. The basic gravity theory accounts for the supply and demand sides factors driving trade. From the supply side, per capita income of the reporting country is the candidates. From the demand side, per capita income of the partners and trade cost, which is captured by distance, are the candidates (Timbergen, 1962; Egger and Pfaffermayr, 2003). The per capita income of the exporter determines the overall level of development. So, it is assumed to be the main supply factor for exports. The demand factor is the per capita income of the partner countries. It indicates the size and extent of consumption. The basic gravity model is shown in equation 1

$$T_{ij} = \left(PCI_i^{\beta_1} * PCI_j^{\beta_2}\right)^{-D_{i,j}^{\beta 5}} \quad (1)$$

where T_{ij} is trade flows from country *i* to *j* (exports from *i* to *j* or imports of *i* from *j*), PCI_i PCI_j is the per capita income of the reporting and partner countries respectively. $D_{i,j}$ is the geographic distance between any pair of countries. Following Gould (1994) it is easy to incorporate migration in equation 1. Migration enters the gravity model both as a supply and demand factor[1]. From the supply side, emigration may dwarf exports because it will reduce the available manpower needed for specialisation and exports. But immigrants coming from the trading partner can offset this manpower loss. If immigrants are more productive than emigrants, then export will tend to rise. Further, if immigrants also provide vital information (production technique) that could increase export from the country of residence to the third country, then migration will facilitate export. From the demand side, immigrants

[1] Migrants are not considered as part of population because population, here, refers to people residing in their country of mother tongue.

tend to develop preference for their home goods. This encourages demand and, hence, exports. The immigrants can also provide information that will encourage the consumption of goods coming from their home country or a third country where they have lived before. In any of the cases, immigrants tend to facilitate imports. While immigrants can develop preference for their home goods, they can provide information about the preferences of consumers in the country of origin which will be useful for exporting in their country of residence. Consequently, the direction of effect is unclear. The effect of migration on trade can be positive or negative. If exports respond positively to migration, it could mean that immigrants are more productive than emigrants or immigrants are able to provide important information that can facilitate demand. If imports respond positively to migration, then it could mean that emigrants are more productive than immigrants or immigrants develop preference for home products.

Other factors affecting trade in the gravity model include (common) culture, (common) official language, contiguity, colonial ties, and real exchange rate (Gould, 1994; Baier & Begstrand, 2007). Equation 2 presents the extended gravity model after including migration and other gravity variables:

$$T_{ij} = \left(PCI_i^{\beta_{11}} * PCI_j^{\beta_2} * MIG_{i,j}^{\beta_3} * RECH_i^{\beta_4} RECH_j^{\beta_5} * G_{i,j}^{\gamma_z}\right)^{-DIST_{i,j}^{\psi}} \quad (2)$$

One of the objectives of this paper is to account for the influence of regional blocs on trade. Thus, incorporating the regional blocs in a panel version of equation 2 produces equation 3

$$T_{ij,t} = \left(PCI_{it}^{\beta_{11}} * PCI_{jt}^{\beta_2} * MIG_{ij,t}^{\beta_3} * RECH_{it}^{\beta_4} RECH_{,jt}^{\beta_5} * G_{ij,t}^{\gamma_z} * R_t^{\zeta_l}\right)^{-DIST_{i,j}^{\psi}} \quad (3)$$

MIG is emigration flow from country *i* to country *j*, RECH is the bilateral real exchange rate of country *i* in terms of country *j's* currency. *G* captures other gravity variables. These variables enter the gravity model as dummies, taking on 1, if, for instance, Nigeria and a partner country speak the same official language, but 0, if otherwise. Letter R represents dummy variable, taking on 1, if both partners belong to a particular RECs, but 0, if otherwise. The regional blocs recognised in this study are ECOWAS, COMESA, ECA and ECCAS.

There are at least 3 estimation issues in equation 3. First is the issue of logarithmic transformation. Traditionally, equation 3 is log-linearised and estimated using either ordinary least square (OLS) or any other least square methods. However, this approach is tenable when the variance of the error terms is constant across observations and country pairs. Otherwise, log-linearising equation 2 alongside its error term will change the property of the error term, thereby leading to inefficient and inconsistent estimation (Egger & Pfaffermayr, 2003).

The second issue has to do with the nature of the data in the gravity setting. In equation 3, there is usually the possibility of having bilateral zero, omitted trade or migration values. The traditional approach was to ignore the zeroes and/or omitted variables and then proceed to estimating the linear model. Some other approaches are also introduced, such as assuming a negligible positive values or using Heckman selection criteria. None of these approaches best captures the implication of zeroes and unreported values. So, there is possibility of having spurious regression. The third issue has to do with specific characteristics that affect trade but not captured by the data. Such characteristics include changes in business cycle and trade openness across all countries (time effect), time invariant changes in propensity to export (exporter effect), time invariant changes in propensity to import (importer effect), and time

invariant bilateral factors that could trigger a deviation from a country's *normal* trade propensity (country pair effect).

The first two issues are usually handled by utilising Poisson Pseudo Maximum Likelihood (PPML) such as Negative Binomial Pseudo Maximum Likelihood (NBPML). According to Santos and Tenreyro (2006), the NBPML technique captures the source of zeroes country-by-country by separating country pairs with trade/migration flow from those with non-zero trade/migration flows. NBPML could deal with the bias caused by the logarithmic form of the gravity equation in case of heteroskedasticity in the error term. Besides, it accounts for possible zero or unreported bilateral trade behaviour. It also could account for model misspecification (Gourieroux, Monfort, & Trognon, 1984). Further, NBPML regression serves as an improvement as it loosens the restrictive assumption that the variance is equal to the mean. These benefits make NBPML to be more efficient and reliable than any other estimation method of gravity equation.

A foremost goal of NBPML regression is to model data in which the value of the variance exceeds the mean, or the observed variance exceeds the expected mean; a well-fitted NBPML model has a dispersion statistic approximating 1.0 and an Akaike Information Criterion (AIC) and Baysian Information Criterion (/BIC) and log-likelihood statistic less than alternative count models. The number of predicted counts is approximately the same as the number of observed counts across the distribution of *y*. The last issue can be dealt with by specifying a 4-way fixed effect panel gravity model. The estimable gravity equation after incorporating the various fixed effects is provided in equations 4 and 5

$$EX_{ij,t} = \beta_1 PCI_{i,t} + \beta_2 PCI_{j,t} + \beta_3 MIG_{ij,t} + \beta_4 RECH_{i,t} + \beta_5 RECH_{j,t} + \gamma_z \sum_{q=1}^{z} G_{i,j}^{z} + \psi_1 DIST_{i,j} + \zeta_l \sum_{h=1}^{l} R_t^l + \lambda_t + \pi_i + \pi_j + \upsilon_{i,j} + \varepsilon_{ij,t} \quad (4)$$

$$IM_{ij,t} = \xi_1 PCI_{i,t} + \xi_2 PCI_{j,t} + \xi_3 MIG_{ij,t} + \xi_4 RECH_{i,t} + \xi_5 RECH_{j,t} + \gamma_z \sum_{q=1}^{z} G_{ij,t}^{z} + DIST_{i,j} + \xi_l \sum_{h=1}^{l} R_t^l + a_t + b_i + c_j + d_{i,j} + \mu_{ij,t} \quad (5)$$

Equations 4 and 5 are separate NBPML model for exports (EX) and imports (IM), respectively. The equations are specified in a way as to avoid improper transformation of an omitted or unreported observation that is inevitable in the set of data that are employed in this study, on the one hand, and to avoid the presence of heteroskedasticity on the other hand. The last five terms on the right-hand sides of equations 4 and 5 depict year, reporter, partner, country pair effects, and the error terms, respectively. Further, equations 4 and 5 are estimated for intra-African trade and trade within each regional bloc.

Following the gravity theory, per capita income of the reporter and the partner in equation 4 can be negative or positive. Exchange rate, which is defined as the quantity of *i's* currency per unit of trading partner's currency in real term, can also be negative or positive. Distance is a cost to trade and so, it is expected to be negative. Common official language or contiguity is expected to enhance trade (both exports and imports).

3.1. Sources of Data and Definition of Variables

Based on the available data on migration, data for the variables are obtained for 1980, 1990, 2000, 2010, 2013 and 2017. Trade (export and imports) for a pair of 50 African countries[1] and per capita income of each country are measured in million USD, distance is in kilometre, migrants' stock is measured in thousands. Data on bilateral trade are extracted from the World Integrated Trade Solution (WITS). Data on bilateral migration are obtained from the Global Bilateral Migration Database. Data on per capita income, bilateral nominal exchange rate, and price levels are obtained from the World Development Indicators.[2] All these data are published by the World Bank. The gravity variables are extracted from CEPII (Centre d'Etudes Prospectives etd'Informations Internationales).

4. Results and Discussions

The descriptive statistics for the full sample (Africa) is presented in Table 1. The average bilateral export is $14,736.5 million while the maximum value posted $4,600,000 million. The zero minimum value indicates that there are some countries that either do not export or have no record of exports. This case is also true of bilateral imports. The exception is that the values are more than that of exports. There are also occasions where official bilateral migration is zero. This might be due to a case of no official migration taking place or the values are not reported. Meanwhile, the average bilateral migration within Africa was 5,345.6 thousand while the maximum was 1,455,427 thousand. The exporters' gross domestic product has a greater average value than the importers. Further, the maximum distance between a paired country in Africa is 9,772.1 kilometres, with the minimum value of 162.2 kilometres and an average value of 3,519.6 kilometres.

Table 1. Descriptive Statistics (Full Sample)

Variable	*obs*	*mean*	*Std.Dev.*	*Min*	*Max*
exports	11,100	14736.54	149810.40	0	4600000
imports	11,100	13448.86	147254	0	4800000
gdp_reporter	10,325	26121.21	69684.15	118.4283	430096.1
gdp_partner	10,386	24941.42	68790.86	118.4283	460496.1
migration	11,100	5345.57	40119.47	0	1455427
population_reporter	11,057	15.54	25.313190	.0644	108.26
population_partner	10,925	13.79	23.23	.0644	195.87
RECH_reporter	3,827	112.92	121.53	37.50	2113.19
RECH_partner	3,738	139.02	231.91	52.20	2283.14
Contiguity	11,100	.07	.26	0	1
common official language	11,100	.45	.49	0	1
colonial ties	11,100	.29	.45	0	1
Distance	11,100	3519.59	1947.49	162.18	9772.05

Table 2 shows the descriptive statistics of the selected sub-regions. The average exports, gdp_reporter, and migration within ECOWAS are the highest as it posted more than 8,830 thousand. Bilateral imports

[1] The countries are listed in the appendix

[2] Bilateral real exchange rate is computed using the fomula $NR_{i,jt} * \frac{P_i}{P_j}$ where $NR_{i,j} = \frac{C_i}{\$} / \frac{C_j}{\$} = \frac{C_i}{C_j}$. NR is the nominal bilateral exchange rate, P is price level, C is currency, and i and j are countries.

were highest in EAC, while gdp_partner is highest in COMESA and average distance between any two countries in a region is highest in COMESA.

Table 2. Descriptive Statistics by regional blocs

	ECOWAS					EAC				
Variable	obs	Mean	Std.Dev.	Min	Max	Obs	mean	Std.Dev.	Min	Max
exports	3,612	12173.23	121943	0	4400000	1,290	8168.78	43883.95	0	657258
imports	3,612	8061.411	77365.2	0	2900000	1,290	9860.58	59887.54	0	818392
gdp_reporter	3,569	27815.09	80712.3	193.15	481116.8	1,204	17291.7	16568.86	1152.54	58116.2
gdp_partner	3,375	24895.51	68514.1	118.42	460496.1	1,207	25143.6	69590.25	118.4283	460496
bilateral migration	3,612	8830.21	59162.6	0	1455427	1,290	5350.25	26743.15	0	531218
population_exporter	3,612	18.35	35.49	0.3015	195.87	1,290	23.58	15.88	4.126538	56.31
population_importer	3,598	13.63	22.75	0.0644	195.87	1,285	13.51	23.237	0.0644	195.87
REER_reporter	1,548	142.1	118.52	70.75	766.82	516	299.94	569.76	94.87749	2043.11
REER_partner	1,210	153.24	234.5	52.2	2183.19	433	148.84	213.93	52.20164	2182.95
contiguity	3,612	0.08	0.28	0	1	1,290	0.09	0.29	0	1
common off.Lang	3,612	0.42	0.49	0	1	1,290	0.54	0.49	0	1
colonial ties	3,612	0.318	0.46	0	1	1,290	0.24	0.43	0	1
Distance	3,612	3540.09	2181.14	188.3	9772.05	1,290	3089.27	1586.48	162.1818	7138.46
	COMESA					ECCAS				
exports	3,876	5429.953	53110.2	0	2000000	1,806	5957.95	69747.55	0	1800000
imports	3,876	9121.086	108789	0	3600000	1,806	8556.47	69897.56	0	1300000
gdp_reporter	3,574	13223.99	16795.8	268.779	79411.02	1,677	16394.3	24646.87	118.42	103786
gdp_partner	3,627	25241.95	69502.8	118.428	460496.1	1,690	25163.4	69520.45	118.42	460496
bilateral migration	3,876	3629.465	26781.9	0	858993	1,806	2615.23	14778.73	0	285641
population_exporter	3,833	16.479	20.74	0.0644	109.22	1,806	7.34	7.73	0.09	30.8
population_importer	3,729	13.961	23.62	0.0644	195.87	1,799	13.89	23.35	0.06	195.87
REER_reporter	989	207.198	423.88	52.2016	2013.13	1,032	126.83	39.78	87.01	223.64
REER_partner	1,312	151.971	227.05	52.2016	2183.19	599	153.96	236.48	52.2	2183.19
contiguity	3,876	0.06	0.23	0	1	1,806	0.05	0.23	0	1
common off.Lang	3,876	0.524	0.49	0	1	1,806	0.38	0.48	0	1
colonial ties	3,876	0.312	0.46	0	1	1,806	0.22	0.42	0	1
Distance	3,876	3679.689	1914.21	162.182	9772.05	1,806	2766.38	1213.7	162.1818	6277.54

It must be noted that the main focus of this paper is to examine the influence of intra-African migration on intra-African trade while controlling for the effect of regional blocs. The justification for employing Panel Negative Binomial Regression (PNBR) further evidenced by the presence of zeros and over-dispersion of some series in Tables 1 and 2. The PNBR was performed for both fixed and random effects. The Hausman test suggests that the fixed effect perform better than the random effect. The result of the models specified in section 3 is provided in Tables 3, 4 and 5. Table 3 is the result of intra-African trade consisting of six (6) models. Model 1 is the estimation result of basic gravity including migration and real exchange rate. Models 2 and 3 capture regional bloc dummies and the year effect, respectively. Models 4 to 6 are the imports counterpart.

Result of model 1 indicates that reporters' per capita income, common official language, distance, real exchange rates of both reporters and partners and migration have significant impact on bilateral exports in Africa. Of all these variables, only common official language has positive effect. This suggests that common official language among African countries facilitates bilateral exports. Further, the magnitude of response is notable. Per capita income of reporter (exporters) reduces exports. This appears to be counterintuitive although it is not implausible. Increase in per capita income, which is a measure of development may act as a diversion of export to non-African countries.

Table 3: Panel Negative Binomial Regression Results for Model 1 to Model 6

Variable/Model	1	2	3	4	5	6
capi_exporter	-0.00452*	-0.007*	-0.004*	-0.006**	-0.004**	0.001**
	(-1.96)	(-1.80)	(-1.98)	(-2.84)	(-2.44)	(2.63)
capi_importer	0.001	0.001	0.001	1.002	0.003	0.003**
	(0.65)	(0.69)	(0.61)	(0.00)	(0.18)	(2.13)
Migration	-0.01*	-0.001*	-0.002*	0.001*	0.002*	0.002*
	(-1.73)	(-1.88)	(-1.74)	(1.91)	(1.84)	(1.77)
contiguity	0.295	0.223	0.276	0.101	0.131	0.134
	(1.33)	(0.99)	(1.16)	(0.47)	(0.61)	(0.65)
comlang_off	0.312*	0.283*	0.422**	0.122*	0.101*	0.593***
	(1.94)	(1.69)	(2.41)	(1.83)	(1.77)	(4.25)
colony	0.026	0.051	-0.100	-0.019	0.004	-0.142
	(0.17)	(0.32)	(-0.60)	(-0.13)	(0.03)	(-1.03)
distance	-0.002*	-0.006*	-0.007*	-0.003**	-0.059**	-0.029***
	(-1.87)	(-1.89)	(-1.68)	(-2.06)	(-2.54)	(-5.99)
exch_reporter	-0.002**	-0.001*	-0.002***	-0.005***	-0.005***	-0.008*
	(-2.24)	(-1.75)	(2.85)	(4.42)	(4.49)	(1.96)
exch_partner	-0.007***	-0.007***	-0.001	-0.007***	-0.007***	-0.004*
	(-5.77)	(-6.00)	(0.16)	(-6.47)	(-6.40)	(-1.97)
execowas		-0.430*	-0.581**		-0.223	0.0462
		(-1.74)	(-2.17)		(-1.12)	(0.27)
exeac		-0.250	-0.209		0.420*	0.361*
		(-1.07)	(-0.90)		(1.83)	(1.74)
excomesa		-0.0531	-0.322		0.183	0.598***
		(-0.20)	(-1.11)		(0.78)	(2.94)
execcas		-0.474**	-0.796***		-0.334*	-0.639***
		(-2.22)	(-3.50)		(-1.93)	(-4.00)
Year effect			yes			yes
_cons	-1.339***	-0.879**	-1.645***	-0.528*	-0.420	-1.939***
	(-6.33)	(-2.50)	(-4.37)	(-2.55)	(-1.37)	(-6.94)
N	934	934	934	1043	1043	1206
Ll	-3627.757	-3622.65	-3518.05	-3891.25	-3879.96	-5677.55
Chi2	65.47	76.63	215.33	98.51	122.18	337.64
SIC	0.211	0..209	0.116	0.417	0.395	0.106

Model 1= Modified Basic Gravity mode: Intra SSA exports and migration; Model 2= Controlling for Regional trade bloc effects for Model 1; Model 3= Controlling for Year effects for Model 2; Model 4= Modified Basic Gravity model: Intra SSA imports and migration; Model 5= Controlling for Regional trade bloc effects for Model 4; Model 6= Controlling for Year effects for Model 5

****,**,* means significant at 1*, 5% and 10% respectively; values in parentheses are the t-statistic*

Distance is export exhibiting but with mild effect. This result conforms with the *a priori* expectation while the mild effect could be due to the advent of technology that has reduced the cost of distance. Real exchange rate of reporter drags exports possibly because higher relative price in the exporting countries than in the partners. Increase in relative price reduces competitiveness of export in the partner countries. Therefore, even if nominal exchange rate depreciates in the reporting countries, relative price is so high that it dampens exports.

Coming to the variable of interest, migration, it is interesting to observe that bilateral migration substitutes for exports. As shown, increase in migration leads to decrease in exports (Table 3). What this implies is that there are some African countries where migrants are useful in producing what would have been otherwise exported from their country of birth. Another possible reason is that some African countries lost manpower to produce exportables owing to migration of their productive workers. This result contrasts with OECD (2022) that found the effect of migration on trade (either export or imports) to be unambiguously positive. Casabianca *et al* (2021) also refuted the claim. It was argued earlier that if the productivity of the emigrants is high or if the size is large, then the real sector of the source country will be adversely affected. Further, this result suggests that rather than develop preference for goods produced in the home countries, migrants chose to make do with/learn how to consume the goods produced in the host country. However, trade restrictions in some African countries may also contribute to the inhibiting effect of migrants on exports. If it is easier for migration to take place than trade, then proliferation of people into the destination country may adversely affect exports.

When regional blocs are incorporated, all variables except partners' per capita income, contiguity, EAC, and COMESA RECs are significant. The magnitude of effect for reporters' per capita income rose from 0.005 to 0.007. Also, the magnitude of distance rose from 0.002 to 0.006. However, the magnitude of migration fell from 0.01 to 0.001. The reduction in magnitude in this regard lends credence to possible trade restriction through trade policy, which contributes to the inhibiting impact of migration on trade. Considering the influence of RECs, the impact of migration on trade fell markedly. This implies that in some country pairs where one or both do not belong to a regional trade bloc, there tends to be element of trade restriction that could suppress the complementarity effect of migration on exports.

The inclusion of regional blocs is to find out whether the formation of these blocs creates or diverts trade from the high-cost country to low-cost country. Before explaining the concept and result of trade creation and trade diversion, it is important to note that the relevant model is when the year effect is considered. The SIC indicates that there is the presence of year effect in the export model. Following the formation of RECs, if there is trade (export) creation, then it means reporting countries export more to country members because it is cost effective to do that; otherwise, there will be export diversion. Thus, a negative sign for any REC's dummy suggests that exports take place more between country members than between member and the rest of Africa, implying trade creation. There is an evidence of trade creation among ECOWAS and ECCAS (Table 3, model 3). As it can be read off, there is possibility of 0.5% export creation among ECOWAS and about 0.8% probability of export creation among ECCAS.

How imports fared well in the face of migration. Other drivers of imports in Africa are presented in models 4 to 6 of Table 3. The result of the SIC indicates that year effect is important in the import model in Africa. Consequently, models 4 and 6 are discussed. Like the case of exports, imports respond significantly to reporters' per capita income, migration, common official language, distance, and real exchange rates. Per capita income reduces imports just as distance and reporters' real exchange rate do. The negative effect of reporters' per capita income on bilateral import can be explained from the diversion point of view. In this regard, instead of importing from African countries, following increase in per capita income, some African countries chose to import from other continents. It can also be the case that countries tend to produce on import substituting products as per capita income increases. The latter reason therefore suggests that some African countries catch up with others, as their per capita grow. Official language facilitates bilateral imports among African countries, albeit more pronounced

for exports. Reporters' real exchange rate is a clog in the wheels of import. Depreciation of reporters' exchange rate relative to partners' makes imports to be more expensive. Increase in the relative price of partner countries makes their products to be less competitive. Either or both factors will cause imports to reduce. Consequently, it can be conjectured that most products traded within Africa are normal goods.

The result indicates that EAC and COMESA members find it less costly to import from African non-member countries than from members. But ECCAS members find it less costly to import` from members. Hence ECCAS tends to create trade (export and import) among members. There is no evidence of welfare effect of imports from ECOWAS as there is no import creation or diversion.

Migration positively and significantly affects intra-African imports. In this regard, increase in migration leads to increase in imports. From the economic point of view, immigrants are instrumental to providing vital information that will engender production of goods needed in the source countries. It can also be the case that immigrants bring with them relevant technology that will foster production of goods badly needed in their home countries. Also, the positive effect can be explained from the third-party's point of view. That is, immigrants provide information about a country they have lived jn before or are well informed about their economic activity. Providing this information in the country of destination is expected to foster inflow of goods to that third country. Again, the immigrants may not provide information that will engender increase in production but information about the economic condition of the home country such as governance situation, insecurity, and political terrain among others. Such information could help in creating market outlet for goods from the country of residence.

Owing to aggregation problem and the role regional blocs play in trade, it is imperative to examine drivers of trade in each REC. Table 4 presents the case of bilateral exports among the regional blocs. Models 7 and 8 show the result of intra ECOWAS exports, while models 9 and 10 represent the case of EAC. Models 11 and 12 capture COMESA and models 13 and 14 elucidate on ECCAS. The year effect in each case is relevant as shown by the values of the SIC.

Exports among ECOWAS countries are significantly affected by per capita income of both reporters and partners, migration, contiguity, common official language, distance and reporters' real exchange rate. Per capita income positively affects exports, suggesting that ECOWAS members expand markets among country members for their exports following increase in income. As the per capita income of partner also increases, it motivates members to increase exports due to, perhaps, demand effect. A cursory look at the result indicates that the per capita income of partners is more export friendly than those of reporters. This indicates the demand side effect is stronger than the supply side effect in ECOWAS. Exports are also facilitated by country members that share the same border and/or speak similar official language. Meanwhile, the result clearly suggests that contiguity affects exports more than common official language. This could be the case because the proximity could have precipitated language barrier and most importantly when it is relatively easy to get interpreters. Or since they share the same border, members around the border will, through social interactions, learn some basics of communication among themselves.

Table 4. Panel Negative Binomial Results of the Drivers of Intra-African Trade (Exports)

	Model 7	Model 8	Model 9	Model 10	Model 11	Model 12	Model 13	Model 14
capi_reporter	0.0013 (0.92)	0.0040*** (2.54)	0.0023*** (2.54)	0.0022** (2.11)	0.007*** (3.71)	0.0070*** (3.55)	-0.0015*** (-3.93)	-0.0015*** (-3.92)
capi_partner	0.0068** (2.28)	0.0092*** (2.99)	0.0067 (1.35)	0.0081 (1.55)	0.0046 (1.41)	0.0054 (1.34)	0.00802 (0.22)	0.00138 (0.37)
Migration	0.0012*** (4.85)	0.0022*** (4.89)	0.0024*** (2.87)	0.0025*** (2.92)	0.0090* (1.66)	0.0014*** (2.62)	-0.0018 (-0.57)	-0.0070 (-0.82)
Contiguity	-0.0988 (-0.31)	0.665* (1.87)	0 (.)	0 (.)	0.112 (0.23)	0.681 (1.27)	0.543 (1.29)	0.690 (1.58)
comlang_off	0.322* (1.72)	0.484** (2.36)	-0.231 (-0.61)	-0.360 (-0.91)	-0.0911 (-0.33)	-0.0532 (-0.19)	0.883*** (3.11)	0.906*** (3.16)
Colony			0.580 (1.25)	0.914* (1.81)	0.829*** (2.80)	0.927*** (3.08)	-0.175 (-0.50)	-0.145 (-0.41)
Distance	-0.0013** (-2.30)	-0.0016*** (-2.38)	-0.0011 (-1.13)	-0.0025** (-1.97)	-0.0106 (-1.49)	-0.0013* (-1.81)	-0.0057*** (-4.04)	-0.0053*** (-3.92)
exch_reporter	-0.0012 (-1.40)	0.002** (1.97)	-0.032*** (-2.83)	-0.0036** (-2.09)	0.0032* (1.81)	0.0133*** (3.83)	-0.0170*** (-3.58)	-0.0048*** (-4.65)
exch_partner	-0.0073*** (-3.98)	0.00152 (1.26)	-0.0066 (-1.19)	0.0108 (1.36)	-0.0070*** (-3.30)	-0.0023* (-1.91)	-0.0011 (-0.51)	0.00101 (0.54)
Year_effect		yes		yes		yes		yes
_cons	-1.641*** (-5.07)	-3.258*** (-7.98)	1.226 (0.84)	-2.592 (-1.10)	-2.347*** (-5.43)	-3.825*** (-6.93)	0.337 (0.53)	-1.293 (-1.26)
N	381	381	152	152	304	304	328	328
Ll	-1562.576	-1483.70	-483.113	-470.819	-1361.879	-1336.600	-997.523	-995.282
chi2	71.64	182.56	48.13	42.17	48.26	81.63	70.07	77.90
SIC	0.225	0.119	0.271	0.153	0.118	0.036	0.117	0.049

Model 7= Modified Basic Gravity model: Intra ECOWAS exports and migration; Model 8= Controlling for Year effects for Model 7; Model 9= Modified Basic Gravity model: Intra EAC exports and migration; Model 10= Controlling for Year effects for Model 9; Model 11= Modified Basic Gravity model: intra COMESA exports and migration; Model 12= Controlling for Year effects for Model 11;Model 13= Modified Basic Gravity model: intra ECCAS exports and migration; Model 14= Controlling for Year effects for Model 13

****,**,* means significant at 1*, 5% and 10% respectively; values in parentheses are the t-statistic*

It is easy for English speaking ECOWAS members to export more among themselves than to other countries with different official language. Consequently, English speaking ECOWAS members sharing the same border should export more than when sharing border with French speaking members.

Depreciation of reporters' currency relative to partner's currency enhances export in ECOWAS. The positive effect suggests that relative price is not so high as to overweigh the competitiveness of exports brought about by depreciation. It follows therefore that any ECOWAS country whose currency depreciates in relative term stands the chance of exporting more. Distance is still a drag to exports even though the magnitude of effect is mild.

Unlike the result obtained from the intra-African trade, migration complements exports in ECOWAS. This could mean that ECOWAS migrants in ECOWAS countries either develop preferences for products

from their home countries or they provide information about things produced in their home countries but are not available in the country of residence.

Table 5. Panel Negative Binomial Results of the Drivers of intra-African Trade (Imports)

	Model 15	Model 16	Model 17	Model 18	Model 19	Model 20	Model 21	Model 22
capi_reporter	0.0035*** (3.21)	0.0028** (2.05)	0.0011 (1.17)	0.0024** (2.19)	0.0011*** (4.28)	0.0046*** (3.19)	-0.0016*** (-4.98)	-0.0016*** (-5.06)
capi_partner	0.0072*** (3.08)	0.0031* (1.96)	0.0034 (0.67)	0.0025 (0.46)	0.0036 (0.09)	0.0011 (0.29)	0.0040 (1.23)	0.0039 (1.12)
Mig	0.0086*** (4.51)	0.0011*** (4.48)	0.0010 (1.30)	0.0012* (1.85)	-0.0007 (-1.06)	-0.0039 (-0.07)	-0.0024 (-0.82)	-0.0031 (-0.98)
Contig	-0.0918 (-0.32)	-0.0122 (-0.04)	0.0002 (0.327)	0.003 (0.730)	-0.247 (-0.45)	-0.209 (-0.36)	0.443 (1.20)	0.467 (1.19)
comlang_off	0.378*** (2.60)	0.239** (2.32)	-0.457 (-1.33)	-0.506 (-1.32)	-0.104 (-0.35)	-0.155 (-0.48)	0.425* (1.79)	0.348* (1.82)
Colony			0.810 (1.58)	0.572 (1.03)	-0.0190 (-0.06)	0.191 (0.54)	0.0846 (0.27)	0.0357 (0.11)
Distance	-0.0026*** (-5.63)	-0.0015*** (-2.70)	-0.0021* (-1.84)	-0.0025** (-2.15)	-0.0083 (-1.01)	-0.0014* (-1.71)	-0.0014 (-1.24)	-0.0013 (-1.00)
exch_reporter	-0.0015 (-1.53)	-0.0014 (-1.44)	-0.0363*** (-4.54)	-0.0119*** (-4.92)	-0.00361* (-1.87)	0.0097** (2.53)	-0.0105*** (-2.74)	-0.0062* (-1.96)
exch_importer	-0.0067*** (-3.96)	-0.0006** (.58)	-0.0109** (-2.50)	-0.0014** (-2.22)	-0.012*** (-5.16)	-0.0017** (-2.76)	-0.0074*** (-2.83)	-0.0055* (-1.69)
year_effect		Yes		Yes		Yes		Yes
_cons	-1.657*** (-5.67)	-2.546*** (-7.19)	4.044*** (3.33)	-2.061 (-1.01)	-0.176 (-0.37)	-2.163*** (-3.67)	0.0118 (0.02)	-1.992** (-2.07)
N	492	492	152	152	292	292	328	328
Ll	-2430.798	-1583.985	-703.785	-686.493	-982.536	-917.471	-1342.912	-1334.332
Chi2	143.04	151.89	60.44	31.07	60.45	102.89	62.58	76.04
SIC	-1.391	-1.910	-0.741	-1.572	-0.372	-0.520	-1.116	-1.820

Model 15= Modified Basic Gravity mode: Intra ECOWAS imports and migration; Model 16= Controlling for Year effects for Model ; 5; Model 17= Modified Basic Gravity model: intra EAC imports and migration; Model 18= Controlling for Year effects for Model 17; Model 19= Modified Basic Gravity model: intra COMESA imports and migration; Model 20= Controlling for Year effects for Model 19; Model 21= Modified Basic Gravity model: intra ECCAS imports and migration; Model 22= Controlling for Year effects for Model 21

****,**,* means significant at 1*, 5% and 10% respectively; values in parentheses are the t-statistic*

From the supply side, emigrants might be instrumental in providing vital information to the home country on how they can exploit market opportunities in their country of residence. What will facilitate this arrangement will be trade liberalisation. Thus, it can be conjectured that what made migration to complement export in ECOWAS is the relatively relaxed trade restrictions among members.

Exports among EAC are significantly affected by reporters' per capita income, migration, colonial ties, and reporters' real exchange rate. The response of bilateral exports in EAC to per capita income is positive but mild. There is a 0.0022 unit of export response to a unit change in per capita income. Nevertheless, per capita income facilitates exports among country members. Like per capita income, colonial ties positively influence exports in EAC. However, real depreciation reduces exports. The

inhibiting effect could be due to increase in relative price or depreciation or both. Distance has negative, albeit, negligible effect on exports in this region, posting 0.003 unit decrease for an additional one-kilometre. The mild effect should be the aftermath of technology that has played important role in reducing trade cost attached to distance.

Bilateral migration in EAC facilitates bilateral exports, suggesting that the EAC members must have been instrumental in enabling exports to increase in that region. The influence may be from the demand side where migrants provide information about what can be exported by the country of origin or whether the migrants develop preference for the home country products.

Further, it could be that the movement of workers within EAC does not reduce exporting to country members, indicating that underemployment exists in some EAC countries. Therefore, the movement of some workers in the labour abundant EAC to the labour scarce country members contribute to the complementarity of migration and exports. Meanwhile, although the response of export to migration in this region is mild, posting 0.0025 unit increase in export for every 1 more migrant, the effect is notable. Specifically, the increase in export to the tune of 2.5 units for a 1000 increase in migration might not be negligible. In fact, if the unofficial migration could be accounted for, the response will be higher.

Exports within COMESA has similar result with the EAC in terms of significance of the variables. Only to add that partners' real exchange rate also plays crucial role. In this regard, export responds negatively, suggesting that when the partners' real exchange rate depreciates, exports become less competitive. There is no evidence of distance affecting exports among COMESA, even though a negative effect is observed. The effect of migration on bilateral exports in COMESA is significant, positive and notable. Export will increase by 9 units for 1000 more of migrants in the region. Again, the influence of migration can be traced to information provision and of course preference biased towards home countries' products. In ECCAS, reporters' per capita income, distance and reporters' real exchange rate retard exports while common official language engenders exports. The adverse effect in the case of per capita income suggests that improved level of development encourages exports to other countries in the region or even outsider Africa. In this region, migration plays no significant role in intra-ECCAS exports.

Turning to imports, ECOWAS's reporters' and partners' per capita income, migration and common official language have positive and significant effect while distance and partners' real exchange rate have negative effect. Migration has the least positive effect while common official language has the highest effect. The demand and supply side in the gravity model, with respect to per capita income, exists in ECOWAS. More development in the region will facilitate imports in this region. Migration complements import, suggesting that migrants are instrumental to providing information about economic activity in the source countries to the destination countries. This information helps to produce goods that are needed in the source countries. It could also be that the information about the third country in the region that could facilitate imports is also provided by the migrants.

In EAC and COMESA, per capita income of reporter also has positive and significant effect. The response of imports to per capita income of reporters is higher in COMESA than EAC, thus like in ECOWAS, level of development still has important enhancing role to play in imports. The situation is different in ECCAS where reporters' per capita income drags imports.

The negative effect suggests that more level of development paves way for production of what would have otherwise been imported from other country members or leads to diversion of imports from country

members to nonmembers in Africa of even outside Africa. Other driving force of imports in EAC and COMESA are distance and real exchange rates. Distance reduces imports more from EAC (-0.0025) than COMESA (-0.0014). The negative effect of reporters' real exchange rate on imports suggests that of reporters' currency relative to partner is so high that it makes imports more expensive and consequently, fewer imports are demanded. Partners' relative price is also higher than reporters' and this reduces import demand further. Thus, depreciation of reporters' exchange rate and high relative price of partners dwarfs imports in EAC and COMESA. While official language does not play any role in bilateral imports in EAC and COMESA, it plays a significant role in ECCAS. The effect is positive and notable. Also like in the case of the other RECs, the real exchange rate of reporters and partners reduce imports in ECCAS.

The effects of bilateral migration on EAC, COMESA and ECCAS do not significantly affect bilateral imports of the respective region. Besides, it is only in EAC that a positive sign is noted. This implies that migration plays no role in imports in these regions. It also shows clearly that migration is not instrumental in providing relevant information or the information is not enough as to influence imports. Meanwhile, the negative sign, in the case of COMESA and ECCAS suggests that migration may substitute imports in this region. That is, what is imported may be produced locally if the migrants are able to supply information about the production technology of what can be imported.

5. Conclusion and Policy Implications

This study assesses intra-African trade effects of migration employing panel negative binomial regression for periodic data in the context of gravity theory. Apart from investigating the welfare effect of intra-African trade, the study further examines intra-regional trade-migration relationship, focusing on ECOWAS, EAC, COMESA and ECCAS. The result suggests that intra-African migration and exports are substitute. Meaning that increase in migration reduces intra-African export. This result that is contrast to the findings of OECD (2022) but in line with Casabianca et al (2021). Conversely, intra-African migration positively affects imports. This positive effect is borne out of ability to provide information about market opportunities in the country of birth which is accessed by the country of destination. This result is in line with OECD (2022).

In the case of the selected regions, a different pattern of relationship exists between trade and migration. Trade is positively affected by migration in the regions that have migration, significantly explaining either their bilateral exports or bilateral imports. Also, while migration positively influences bilateral exports in ECOWAS, EAC, and COMESA, only bilateral imports of ECOWAS are significantly explained by migration. Comparing the effect of migration across the regions, the result suggests that the positive effect is highest in COMESA, followed by EAC, then ECOWAS. Thus, contrary to a claim that effect of migration on trade is unambiguously positive, this study concludes this statement is not true for all region and at least in the case of intra-African and intra-African migration but that the effect of migration on trade is diverse across region in Africa.

Some policy implications and recommendations can be offered based on these results. For the whole Africa, caution must be exercised in encouraging migration. Rather, encouraging migration should be regional-specific. That is, only regional blocs where migration facilitates trade should embark on migration liberalisation while regions where migration is detrimental to trade should moderate it. Since

migration facilitates imports, it must be the case that there are some regions in which migration helps provide information that are useful for producing and exporting to country of birth or the third country, which may not be a member of a particular regional bloc. This further re-invigorates the fact that migration liberalisation should be regional-specific. Not only will moderating migration encourage importation from other African countries but also expands markets and consumption space of the people, and consequently enhance their welfare. However, the encouragement of migration tends to inhibit exports due perhaps to heterogenous human productivity of migrants or lack of preference for home products in the country of destination. It could also be a case of movement of labour from labour-surplus to labour scarce. In any of the cases, the economy will have a net gain arising from reduction in unemployment when migration is moderated.

At the regional level, ECOWAS, EAC and COMESA will enjoy more exports if they encourage migration among member countries. However, since imports are not responding to migration from EAC and COMESA, the authorities in these regions should even liberalise migration further. Migration in ECCAS region has no seeming effect on trade, even though it shows negative effect. The region should therefore focus more on trade rather than migration. This will even pay off since Africa is embarking of the free trade area. Thus, the sub-region should step up the free trade area to enlarge markets for their exports.

Based on the welfare effect of forming regional blocs, it is only in ECCAS that there is evidence of trade (export and import) creation. Export creation was observed in ECOWAS while import diversion was noticed in EAC and COMESA. Hence, efforts to increase export base in ECOWAS and ECCAS should be put in place while COMESA should revisit the trade agreement to unravel reasons for import diversion.

References

Casabianca, E.; Turco A. & D. Maggioni (2021). Do migrants affect the local production mix? An analysis of the effects and underlying mechanisms. *Journal of Economic Geography*, 22(4), pp. 755-777.

Egger, P. & M. Pfaffermyr (2003). The proper panel econometric specification of the gravity equation: a tree way model with bilateral interaction effects. *Empirical Economics* 28(3), pp. 571-580.

Ehrhart, H.; Le Goff, M.; Rocher, E. & Jan Singh, R. (2012). Does Migration Foster Export? An African Perspective. *CEPII working papers* .

Fagiolo, G. & Mastrorillo, M. (2014). Does Human Migration Affect International Trade? A Complex-Network Perspective. *pLos ONE*, 9 (5).

Felbermayr, G. J. & Toubal, F. (2012). Revisiting the Trade-Migration Nexus: Evidence from New OECD Data. *World Development, 40* (5), pp. 928-937.

Ghani, R.; Cameron, M.; Cochrane, W. & Roskruge, M. (2019). *A gravity model estimation of the bilateral relationship between international trade and migration*. University of Wakato Working Paper no. 2/19, Hamilton, New Zealand.

Ghoneim, A. F. & El-Deken, H. (2012). *Testing the Relationship between Trade and Migration flows: Case Study of Egypt with European Union and Arab Countries*.

Girma, S. & Yu, Z. (2002). The Link between Immigration and Trade: Evidence from the United Kingdom. *Review of World Economics, 138* (1), pp. 115-130.

Gould, D. M. (1994). Immigration Links to the Home Country: Empirical implications for U.S. Bilateral Trade Flows. *The Review of Economics and Statistics, 76* (2), pp. 302-316.

Gourieroux, C.; Monfort, A. & Trognon, A. (1984). Pseudo Maximum Likelihood Methods: Applications to Poisson Models. *Econometrica, 52*, pp. 701-720.

Lewer, J. J. & Berg, H. V. (2012). Does Immigration Stimulate International Trade? Measuring the Channels of Influence. *The International Trade Journal*, 23 (2), pp. 187-230.

Lufuke, M. (2017). The Nexus between Cross-Border Migration and International Trade: Evidence from Tanzania. *African Journal of Economics Review, 5* (3).

Metulini, R.; Sgtignoli, P.; Schiavo, S. & Riccaboni, M. (2018). The network of migration and international trade. Economia Politica: *Journal of Analytical and Institutional Economics*, 35(3), pp. 763-787.

Mold, A. (2022). The significance of intra-African trade: getting the narratives right. *Brooking Working Paper no 44*. African Growth Initiative, Brookings.

OECD (2022). *The contribution of migration to regional development*, OECD Regional Book Studies, OECD, Paris

Olubiyi, E. & T. Ogunnusi (2020). Does Emigration substitute or compliment trade between Nigeria and the rest of Africa? *LASU Journal of Economics*, 2(2), pp. 32-55.

Persons, C. & Vezina, P. (2018). Migration network and trade: the Vietnamese boat people as a national experience. *Economic Journal*, 128(612), F210-F234

Ramon-Munoz, R. (2009). Migration and Trade: The Case of Southern-European Immogration and Olive oil imports in the Americas. *Graduate Institute of International and Development Studies, Geneva*, pp. 1875-1930.

Ratha, D.; Mohapatra, S.; Ozden, C.; PlaZa, S.; Shaw, W. & Shimeles, A. (2011). Leveraging Migration for Africa: Remittances, Skills, and Investments. *World Bank.*

Santos, S. & S. Tenreyro (2006). The log of gravity. *The Review of Economics and Statistics*, 88(4), pp. 641-658.

Scott L. & J. Bergstrand (2007). Do free trade agreements actually increase members' international trade? *Journal of International Economics*, 71(1), p. 7295.

Tafirenyika, M. (2014). Intra-Africa trade:Going beyond political commitments. *Africa Renewal*, p. 5.

Timbergen, J. (1962). Shaping the World Economy, New York, The Twentieth Century Fund, UNCTAD/WTO. *World Tariff Profiles 2009, Geneva. UNCTAD* .

UNCTAD (2019). *Economic Development in Africa Report 2019: Made in Africa: Rules of origin for enhanced intra-African trade*. Retrieved from United Nations Conference on Trade and Development: unctad.org/en/pages/PressRelease.aspx?OriginalVersionD=520

World Bank (2022). *World Development Indicators*. World Bank, Washington DC.

Appendix

List of countries

Angola	Benin	Botswana	Burkina Faso	Burundi
Cameroon	Cape Verde	Central African Republic	Chad	Comoros
Congo (Brazaville)	Congo (D. R.)	Cote d'Ivoire	Djibouti	Equatorial-Guinea
Eritrea	Ethiopia	Gabon	The Gambia	Ghana
Guinea	Guinea-Bissau	Ivory Coast	Kenya	Lesotho
Liberia	Madagascar	Malawi	Mali	Mauritania
Mauritius	Mozambique	Namibia	Niger	Nigeria
Eswatini	Rwanda	Sao Tome and Principe	Senegal	Seychelles
Sierra-Leone	Somalia	South Africa	South Sudan	Sudan
Tanzania	Togo	Uganda	Zambia	Zimbabwe

ECOWAS	**EAC**	**ECCAS**	**COMESA**
Benin	Burundi	Angola	Burundi
Burkina Faso	Kenya	Burundi	Comoros
Cape Verde	Rwanda	Cameroon	Democratic Republic of Congo
Cote d'Ivoire	South Africa	Central African Republic	Djibouti
The Gambia	Tanzania	Chad	Eritrea
Ghana	Uganda	Democratic Republic of Congo	Eswatini
Guinea		Equatorial Guinea	Kenya
Guinea-Bissau		Gabon	Madagascar
Liberia		Republic of Congo	Malawi
Mali		Rwanda	Mauritius
Niger		Sao Tome and Principe	Seychelles
Nigeria			Somalia
Senegal			Sudan
Sierra Leone			Zambia
Togo			Zimbabwe