Does Inclusive Growth Matter for Regional Integration in Africa? An Empirical Assessment

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Abstract

Inclusive growth is an important channel through which African countries can foster higher regional integration especially through trade. This is because many African countries are characterized by exclusive growth, small and fragmented domestic markets that are landlocked and often prone to external shocks. Using an augmented gravity specification, this paper conducts an empirical investigation of the relationship between regional integration and inclusive growth in Africa. The adapted model is estimated using ordinary least squares, Pseudo Poisson maximum likelihood estimator and the Blundell-Bond system generalized method of moment estimator. The empirical results reveal that inclusive growth plays a vital role towards intra-regional trade in Africa. The findings also support the need to strengthen regional and national institutions as well as provision of infrastructure. The paper makes a case for consistent and integrated national and regional policies especially with respect to the pursuit of broad based growth.

Keywords: *regional integration, inclusive growth, gravity model, panel data, Africa.*

Introduction

Despite Africa's enormous market potentials for trade in different products, given its estimated population of over 1.11 billion as at 2013, the benefits from this positive trend is yet to be harnessed due to the exclusiveness of growth in the continent. African consumers are unable to enjoy the gains from regional markets primarily due to high poverty and income inequality occasioned by growth without the "trickle-down" effect. Comparatively, as observed in the 2012 Seminar by the Philippines Institute for Development, high economic growth and lower population growth reduced poverty but some areas still lag behind as East Asia continues to experience inequality and persistent poverty. Intra-regional trade has occupied the centre stage of sub-regional development policy with a view to improve the standard of living. Regional integration is an important avenue for African countries to foster broad-based growth (African Development Bank, 2014). In line with the classical trade theory, this would imply removal of trade restrictions. The link between trade and welfare can be traced to the growth channel (See, Dollar & Kraay, 2004). Observably, weak global growth occasioned by contemporaneous recessions prompts a shift from external to domestic and regional demand. Adequate income buffers that stabilize purchasing power should concomitantly match adverse shocks. In general, growth in most African countries has not been inclusive, as indicated by the relatively weak inclusive growth measures such as household per capita spending, job creation, and accessibility to basic infrastructure.

A striking feature of intra-regional trade in Africa is that the trend has been positive during the period of 2011-2015. Evidently, Arab Maghreb Union (AMU) and the Southern African Development Community (SADC) have dominated in this regard recording about USD3.3 and USD1.9 trillion in terms of imports compared with the USD869 billion, USD1.01 and USD1.1 trillion recorded accordingly by the Economic and Monetary Community of Central Africa (CEMAC), East African Community (EAC) and Economic Community of West African States (ECOWAS). The benefit of these positive trends may be difficult to harness due to inclusive growth drag in Africa. For instance, household final consumption spending is quite low with CEMAC recording USD2.5 billion in the 1991-1995 period to USD11.21 in 2011-2015 compared with the EAC's USD2.92 and USD19.99 billion during the same periods. Observably, AMU, SADC and ECOWAS dominate in this regard recording, accordingly, USD81.45, USD35.36 and USD27.83 during the period between 2011 and 2015. This obvious disconnect prompts this empirical pursuit.

Although inclusive growth remains a critical component of regional integration especially through income and consumption, it has not been given adequate attention in explaining intra-regional trade. Based on data from the World Bank's world development indicators, Africa lags behind other continents in terms of inclusive growth measures such as employment, poverty, access to basic infrastructure and inequality. This has prompted the analysis of intra-African trade using augmented gravity specifications in order to analyze the responsiveness of bilateral trade flows to income, distance, trade policy, bilateral investment treaties, FTAs, and other control variables (Ajakaiye & Ncube, 2010; Akpan, 2014; Carrere, 2004; Ebaidalla & Yahia, 2014; Golit & Adamu, 2014; Hatzenberg, 2011; Kayizza-Mugerwa et al., 2014; Ndulu, 2006; and Shuaibu, 2015). Evidently, these studies fail to account for inclusive growth, which is an important factor especially in the context of Africa since it affects regional demand and invariably, the volume of intra-regional trade. Further, very little attempt has been made to assess the interaction between inclusive growth and regional integration. This motivates this paper, in addition to the fact that the outcome of this research is expected to provide insight on regional and sub-regional trade and development policy formulation and implementation.

On the methodological front, we observe the existence of a trade flow that has a bilateral value equal to zero that may pose a selection problem. To overcome this challenge, we use alternative estimation techniques such as the Pseudo Poisson Maximum-likelihood estimator (PPML) following Silva and Tenreyro's (2006) approach. These models explain the volume of trade between countries through a Poisson distribution with a conditional mean that is exponentially related to our set of explanatory variables. In addition to the use of the fixed effect estimator, the panel causality test proposed by Dumitrescu and Hurlin (2012) that tests for Granger non-causality in heterogeneous panel data is used to check for possible reverse causation. To overcome selection bias associated with heterogeneity in gravity models, we account for unobserved time varying country-pair heterogeneity through the use of fixed effect in the spirit of Bergstrand, Larch and Yotov (2015). Moreover, Cheng and Wall (2004) opine that unless heterogeneity is accounted for correctly, gravity models can greatly overestimate the effects of

regional integration on the volume of trade.

Another important contribution of our paper is based on the empirical finding of a strong persistence in aggregate trade data (Bun and Klaassen, 2002; De Benedictis & Vicarelli, 2005; and Fidrmuc, 2009). They observed that countries engaged in trade with each other at time *t-1* also tend to trade at time *t (intensive margin)*. We explore these dynamics by applying the dynamic panel model that uses the Blundell-Bond system GMM estimator (De Benedictis & Vicarelli, 2005). Finally, we subject our model to a battery of robustness checks to ascertain the potency of our results to sub-samples (sub-regional groups) and alternative estimators. The findings provide insight towards regional integration policy formulation and implementation, especially within the context of inclusive growth that has continued to escape policy makers in Africa. The paper will be organized as follows. Section 2 provides evidence on regional integration in Africa. Sections 3 and 4 discuss the methodology and empirical outcomes, respectively. Section 5 concludes the paper and highlights some implications for policy.

Evidence on Regional Integration and Inclusive Growth in Africa

Regional integration has occupied the centre stage of the global trade system, and this is particularly important for Africa as it lags behind other continents in terms of sustained inclusive growth and development. There are several regional integration arrangements in Africa out of which eight are regional economic communities: the Arab Maghreb Union (AMU), the Community of Sahel-Saharan States (CEN-SAD), the Common Market for Eastern and Southern Africa (COMESA), the East African Community (EAC), the Economic Community of West African States (ECOWAS), the Economic Community of Central African States (ECCAS), the Inter-Governmental Authority on Development (IGAD), and the Southern African Development Community (SADC), and six are inter-governmental organizations: the Central African Monetary and Economic Community (CEMAC), the Economic Community of the Great Lakes States (CEPGL), the Indian Ocean Commission (IOC), the Mano River Union (MRU), the Southern African Customs Union (SACU) and the West African and Monetary Union (UEMOA). Their main objective is the pursuit of economic, social, political, technological and legal cooperation. Such arrangements are deepened through the formation of customs and monetary unions, common markets and a regional judiciary. They also seek to promote and liberalize inter- and intra-regional trade through harmonized tariffs.

A striking feature of intra-regional trade in Africa is that the trend has been positive during the review period across the sub-regional arrangements considered (See Table 1.). Evidently, AMU and SADC have dominated in this regard recording about USD3.3 and USD1.9 trillion in terms of imports compared with the USD869 billion, USD1.01 and USD1.1 trillion recorded accordingly by CEMAC, EAC and ECOWAS. This positive trend may be explained by the significant impact of regional trade agreements amongst member countries in the various sub-regional bodies, especially with respect to the harmonized common external tariffs. Concurrently, intra-African exports have also exhibited a remarkable upward trend that mirrored the behavioral pattern of intra-African imports.

Table 1

Intra-African Trade Performance

	AMU	CEMAC	EAC	ECOWAS	SADC
Period	Total Intra-Africa Imports (USD Billion)				
1991-1995	346.83	72.20	134.17	143.44	278.80
1996-2000	374.34	131.34	227.46	194.93	489.99
2001-2005	597.51	188.67	354.82	344.83	652.66
2006-2010	1439.18	487.99	718.44	750.03	1654.39
2011-2015	1967.37	869.26	1008.02	1077.53	3284.91
	Total Intra-Africa Exports (USD Billion)				
1991-1995	266.32	34.07	109.63	146.85	86.39
1996-2000	284.54	36.53	185.60	214.81	269.94
2001-2005	506.19	64.47	286.06	342.82	584.01
2006-2010	1404.70	299.45	554.46	759.89	1327.31
2011-2015	2272.04	498.24	810.39	1254.58	3074.75

Source: International Monetary Fund, Direction of Trade Statistics online

The inherent weaknesses of most African economies exacerbated the inclusive growth drag observed in Table 2. Household final consumption expenditure is quite low across the board with CEMAC recording USD2.5 billion in the 1991-1995 period and USD11.21 in 2011-2015. The EAC also recorded USD2.92 and USD19.99 billion during the same periods. Observably, AMU, SADC and ECOWAS dominate in this regard recording, accordingly, USD81.45, USD35.36 and USD27.83. These developments may be traced to the resource dependence and less conflict-prone countries in the sub-regions that recorded higher values. Although unemployment as a percentage of total labor force has declined across the sub-regional bodies during the review period, the most significant positive trends were recorded in AMU and ECOWAS while the EAC recorded the highest share with 9.12% and AMU, CEMAC and ECOWAS documented a 5% average compared with the relatively high value observed in the case of SADC.

Good governance and institutions have been identified as important drivers of intra-regional exports (Shuaibu, 2015). Notably, the relatively low level of intra-regional trade in Africa may be traced to the poor governance and weak institutions that have bedevilled the continent's overall development and sustained trade amongst African countries. For instance, all the sub-regions have recorded very weak regulatory quality, high corruption and political instability. Evidence from the World Bank World Development Indicators reveals that between 2013 and 2014, the ECOWAS sub-region recorded a positive trend in terms of political stability and this may have contributed to the improved intra-regional trade flows recorded at the time.

Table 2

Inclusive Growth Indicators

	AMU	CEMAC	EAC	ECOWAS	SADC
Period	Household final consumption expenditure (USD Billion)				
1991-1995	21.49	2.49	2.92	3.40	9.81
1996-2000	29.02	2.42	4.86	4.30	13.08
2001-2005	30.72	3.72	5.52	6.81	14.22
2006-2010	51.12	7.71	11.75	15.18	25.46
2011-2015	81.45	11.21	19.99	27.83	35.36
	Unemployment, total (% of total labour force)				
1991-1995	12.40	800.17	18.69	16.62	742.59
1996-2000	3.61	134.91	10.23	7.05	141.64
2001-2005	1.63	19.65	6.46	6.27	41.15
2006-2010	5.36	8.04	9.75	6.49	10.99
2011-2015	5.45	5.65	9.12	5.16	8.13
	Employment to population ratio, 15+, total (%) (national estimate)				
1991-1995	43.98	69.20	81.90	61.37	53.89
1996-2000	43.30	60.87	73.68	59.05	51.73
2001-2005	44.57	70.08	72.63	63.29	60.45
2006-2010	42.07	50.50	76.48	63.33	55.18
2011-2015	40.85	71.00	76.60	68.63	61.55

Source: World Bank, World Development Indicators online

The concept of inclusive growth also involves access of the greatest number to the requisite infrastructure. While *teledensity* and information and communication technology-related access have improved significantly in Africa (World Bank Group, 2018), improved access to sanitation facilities and improved water sources have been somewhat stagnant with minimal improvement during the review period. In addition to the high incidence of poverty and low income in the continent, this may also be explained by inadequate efforts by the government towards providing these facilities for the rapidly growing population and attendant pressure on existing facilities.

Methodology

Analytical Framework

Given the plethora of analytical expositions, the main focus in the literature is a precise estimation of the gravity equation. One important theoretical contribution in the gravity literature is related to the structural form of the equation and the implication of misspecification or omitted variable bias. In particular, the way trade costs and firm heterogeneity are incorporated in the gravity equation as populated by the contributions of Anderson and van Wincoop (2001, 2003) and Helpman, Melitz and Rubinstein (2008). The heterogeneity in firm behavior is mainly due to

fixed and variable costs that are market specific and higher for international trade than for domestic markets. Consequently, only the most productive firms are able to cover these costs and find it profitable to export. The profitability of exports varies by country destination and is higher for countries' higher demand, but lower costs of exporting.

Link between inclusive growth and trade.

The framework of this study draws from the trade-welfare transmission channel developed by McCulloch, Winters and Cirera (2001) which illustrates how trade policy changes affect households through increase in consumption, production and exports. We illustrate how trade liberalization can offer considerable opportunities to poor households but also increase their vulnerability in terms of its short- and medium-term adverse impacts. First, RTAs in form of freer trade can translate into larger market for consumers with increased product varieties. Regional integration can also lead to lower transaction costs (TC) and increased competition from foreign producers (DD), and therefore lower prices for consumers which in turn leads to an increase in household consumption (HC). An important feature of this channel is that it emphasizes the households' abilities to change income sources and consumption patterns in response to changes in relative prices.

$$RTA \rightarrow TC \downarrow\rightarrow DD \uparrow\rightarrow HC$$

Second, RTAs can reduce trade costs for imported inputs used in the production process. This translates to lower production costs (PC) that can in turn increase firm competitiveness (SS) in local and international markets (EX). Increased competitiveness spurs business expansion, job creation and higher household income. Trade liberalization can also change the composition of goods produced by local firms. In a seminal paper, Aghion et al. (2005) argue that firms with different capabilities tend to respond differently to increased competition. More competition can result in re-allocation of resources from less productive to more productive export-oriented firms (Melitz & Ottaviano, 2008). It can also lead to higher within-firm productivity through efficiency gains as firms become exposed to more sophisticated intermediates and technology that increase technical efficiency and capacity to expand production.

$$RTA \rightarrow PC \downarrow\rightarrow SS \uparrow\rightarrow EX \uparrow$$

Finally, with increased competition due to RTAs, firms tend to focus more on products that have comparative advantage and export more of these products (Bernard, Redding & Schott, 2007). This is particularly crucial for producers in developing countries that face significant technological constraints in terms of access to adequate imported inputs. Alternatively, increased household welfare leads to increased productivity and higher output which can lead to increased output of exports. Increased household welfare also implies increased propensity to import a variety of goods from abroad.

Empirical Model

The framework used in this study draws from the theoretical gravity model proposed by Bergstrand (1989) for the following reasons. First, it is widely accepted in the literature. Second,

it incorporates the modelling of multilateral trade resistance which accounts for omitted variable bias in the estimated gravity coefficients (Baldwin & Taglioni, 2006).

In its traditional form, the gravity model predicts that bilateral trade flows (exports or imports) between countries is determined by national incomes of the exporting and importing countries and the geographical distance between them. The income (GDP) of the exporting country indicates the supply capacity whereas the importing country's GDP indicates the total demand. The geographic distance between the countries is used to measure transport costs. The multiplicative gravity equation is given by:

$$EX_{ij,t} = \alpha_0 GDP_{it}^{\alpha_1} GDP_{jt}^{\alpha_2} dist_{ij}^{\alpha_3} \quad (1)$$

Further extensions have justified the inclusion of additional control variables in the gravity model such as exchange rate risk variables including volatility and currency union (Bergstrand, 1985; Frankel & Rose, 2005; & Rose, 2000), geographical factors such as common border, landlocked, island and remoteness (Feenstra, Romalis & Schott, 2002; Frankel and Rose, 2002; Silva and Tenreyro, 2006; & Soloaga and Winters, 2001;), membership of RTAs (Baier and Bergstrand, 2007, 2009; & Frankel & Rose, 2002). Including these additional factors in equation (1) and taking the natural logarithm yields a log linear gravity model given as:

$$\begin{aligned} ln(EX_{ij,t}) = \alpha_0 + \alpha_1 ln(GDP_{it}) + \alpha_2 ln(GDP_{jt}) + \alpha_3 ln(dist_{ij}) + \alpha_4 ln(POP_{it}) + \\ \alpha_5 ln(POP_{jt}) + \alpha_6 ln(lang_{ij}) + \alpha_7 ln(col_{ij}) + \alpha_8 land_{ij} + \alpha_9 border_{ij} + \alpha_{10} RTA_{ij} + \\ \alpha_{11} ICG_{it} + \alpha_{12} ICG_{jt} + \beta_{13} INFR_{ij} + \alpha_{14} INST_{ij} + \varepsilon_{ij,t} \end{aligned} \quad (2)$$

Where $EX_{ij,t}$ is the value of exports between country *i* and country *j* at year *t*, GDP_{it} and GDP_{jt} are respectively the national incomes for country *i* and *j* in year *t* and $distance_{ij}$ is the geographical distance between the major cities of countries *i* and country *j*. POP_{it} and POP_{jt} are the population in country *i* and *j in* year *t*. GDP and population are the proxy for the supply and demand capacities of the two trading countries respectively. RTA_{ij} is a binary variable assuming the value 1 if *i* and *j* have a regional trade agreement (specifically, ECOWAS, SADC, EAC, CEMAC, AMU) and 0 otherwise, $lock_{ij}$ is a binary variable which assumes the value of 1 if country *i* and country *j* are both landlocked countries, $lang_{ij}$ is a binary variable that takes the value 1 if *i* and *j* share a common official language and 0. Otherwise, $border_{ij}$ is a binary variable assuming the value 1 if *i* and *j* share a common land border and 0 otherwise, col_{ij} is a binary variable that takes the value of 1 if country *i* and country *j* share the same colonial history, INF_{ij} is a measure of quality of infrastructure, $INST_{ij}$ is a measure of the quality of institutions. α_0 is a constant of proportionality.

An important aspect and thus contribution of this study is to show that inclusive growth can foster regional integration through increased intra-regional trade flows between countries (Bernard, Redding & Schott, 2007). This is particularly important in the context of African countries where inclusive growth remains at the forefront of regional and national development pursuit. Therefore, we use household final consumption expenditure to account for the effect of inclusive growth for country *i* (ICG_i) and for country *j* (ICG_j). Alternative measures of inclusive

growth used for robustness checks include percentage share of the population that have access to improved sanitation and water source.

Finally, $\varepsilon_{ij,t}$ is the two-way error component term $\varepsilon_{ij,t} = \gamma_i + \theta_t + \mu_{ij,t}$ where γ_i is the unobserved individual country-specific (exporter and importer) effects, and these are accounted for through exporter (δ_i) and importer (δ_j) fixed effects – the multilateral resistant term. θ_t is unobserved time effect, and $\mu_{ij,t}$ is the remaining part of the stochastic disturbance term. All of these fixed effects correct the biases from estimating panel data (Baldwin & Tagloni, 2006)

Apriori, the key coefficients of interest α_{11} and α_{12} are expected to be positive as higher inclusive growth facilitates higher exports and stimulates higher imports. α_1 and α_4 are expected to be positive as a high level of income and population in the exporting country denote a high level of production ceteris paribus, which increases the exports of goods. The coefficients on α_2 and α_5 are also expected to be positive as a high income level in importing countries stimulates higher imports. The distance coefficient α_3 is however expected to be negative as it is a proxy of all trade cost. Finally, the coefficients on *lang, col, land and RTA* are all expected to be positive while the coefficient on *border* is expected to be negative.

Estimation Strategy

The estimation procedures carried out in this study are in two phases. The first stage entails conducting baseline regressions using ordinary least square (OLS) regression. In this type of regression, the individual-specific effect is a random variable that is correlated with the explanatory variables. Therefore, we allow individual errors in different time periods to be correlated (Hill, Griffiths & Lim, 2012). Secondly, the Pseudo Poisson Maximum Likelihood (PPML) estimator is utilized. This method is appropriate because in the presence of heteroscedasticity, the PPML estimator performs better since OLS is not efficient (Silva & Tenreyro, 2006). The logarithmic linearization of an empirical model in the presence of heteroscedasticity leads to inconsistent estimates because the expected value of the logarithm of a random variable depends on higher-order moments of its distribution (Silva & Tenreyro, 2006).

There are two important methodological concerns associated with selection bias in gravity models. The first concern is related to the bias that arises from multilateral resistance. Anderson and van Wincoop (2003), who extended on Anderson (1979), showed that the flow of bilateral trade is influenced by trade impediments that exist at the bilateral level (bilateral resistance) and by the relative weight of these obstacles with respect to all other countries (the multilateral resistance). To account for this bias, we control for time varying and time-invariant unobserved country characteristics that are common to both countries. Rose and van Wincoop (2001) and Baier and Bergstrand (2007) applied similar approaches to account for multilateral resistance terms.

The second source of methodological concern is related to selection bias associated with the presence of heterogeneous firms operating internationally. Contrary to what is implied by models of monopolistic competition *à la* Krugman (1979), not all existing firms operate on international markets. Contradicting results find that only a few firms serve foreign markets (Bernard, Redding & Schott, 2007; & Mayer & Ottaviano, 2008) and not all exporting firms export

to all foreign markets, as they are generally active in a subset of countries. The critical resulting implication of firm heterogeneity for modelling the gravity equation is that the matrix of bilateral trade flows is not full since many cells have a zero entry, more frequently at the aggregate level.

The existence of trade flows that have a bilateral value equal to zero may signal a selection problem. If the zero entries are the result of the firm choice of not selling specific goods to specific markets (or its inability to do so), the standard OLS estimation of the gravity equation would be inappropriate as it would produce biased results (Helpman, Melitz & Rubenstein, 2008). This is primarily due to two reasons. First, it is not possible to raise a number to any power and end up with zero, the log of zero is undefined, and zero-trade flows cannot be treated with logarithmic specifications. Second, the zeroes are non-randomly distributed as they indicate the absence of trade, hence suggesting that barriers to trade are prohibitive to allow a particular trade relationship to take place at a given level of demand and supply.

Therefore, we also use the PPML, where the dependent variable is expressed in levels instead of logarithms as suggested by Silva and Tenreyro (2006). Poisson models were originally applicable for count data, but as pointed out by Wooldridge (2002), they are also applicable when using non-negative continuous dependent variables. These models explain the volume of trade between countries through a Poisson distribution with a conditional mean that is exponentially related to the set of explanatory variables. Other studies in the literature use the Tobit model to deal with the zero valued trade flows (Andersen & Marcoiller, 2002; Rose, 2004). However, this method has some shortcoming as it involves artificial censoring of small trade values which is subject to measurement errors and biased results (Rose, 2000; & Silva & Tenreyro, 2011). We tested the results against different measures of inclusive growth.

Data Description

The variables used for estimation are taken from different sources. The dependent variable, i.e. the bilateral trade (export) flow between countries, is from the IMF, Direction of Trade Statistics covering 49 African countries between 1990 and 2015 counting about 45,923 data points. Exporters and importers' nominal GDP, and GDP per capita income, population and real exchange rate are taken from World Development Indicators (WDI) database. Bilateral distance, area and other dummy variables (contiguity, official language, common colonizer, and whether the countries are landlocked or not) are derived from CEPII database. Detailed variable description and data source can be found in Table 3.

Table 3

Description of Variables used in Estimation

SN	Variable	Symbol	Description	Source
1	Regional Integration	RI	Intra-African Exports (million USD)	International Monetary Fund Direction Of Trade Statistics

Table 3 (continued)

2	Improved sanitation facilities (% of population with access)	ICG1	Improved sanitation facilities (% of population with access)	World Bank World Development Indicators
3	Improved water source (% of population with access)	ICG2	Access to an improved water source refers to the percentage of the population using an improved drinking water source.	World Bank World Development Indicators
4	Household final consumption expenditure, etc. (current US$)	ICG3	Household final consumption expenditure (formerly private consumption) is the market value of all goods and services purchased by households.	World Bank World Development Indicators
5	GDP at market prices (current US$)	GDP	GDP at purchaser's prices is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products.	World Bank World Development Indicators
6	Official exchange rate (LCU per US$, period average)	ER	Official exchange rate refers to the exchange rate determined by national authorities or to the rate determined in the legally sanctioned exchange market.	World Bank World Development Indicators
7	Control of Corruption (estimate)	INSTQ1	Control of corruption measures the extent to which public power is exercised for private gain, including petty and grand forms of corruption, as well as "capture" of the state by elites and private interests.	World Bank Institute.

Table 3 (continued)

8	Political Stability/No Violence (estimate)	POLSTAB	Political stability and absence of violence measures the perceptions of the likelihood that the government will be destabilized or overthrown by unconstitutional or violent means, including domestic violence or terrorism.	World Bank Institute.
9	Regulatory Quality (estimate)	GOVN	Regulatory quality measures the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development.	World Bank Institute.
10	Population, total	POP	Total population is based on the de facto definition of population, which counts all residents regardless of legal status or citizenship.	United Nations Population Division. 2009. World Population Prospects: The 2008 Revision
11	Mobile and fixed-line telephone subscribers (per 100 people)	INFRA4	Mobile and fixed-line subscribers are total telephone subscribers (fixed-line plus mobile).	International Telecommunication Union, World Telecommunication/ICT Development Report And Database, And World Bank Estimates.
12	Distance	dist	Geographical distance between country of origin and destination	Mayer And Zignago (2006) Index
13	Distance	distcap	Simple distance (most populated cities, km)	Mayer And Zignago (2006) Index
14	Weighted distance	distw	Weighted distance (population-wt, km)	Mayer And Zignago (2006) Index

Table 3 (continued)

15	Weighted distance, CES	distwces	Weighted distance (pop-wt, km) CES	Mayer And Zignago (2006) Index
16	Landlocked	landlocked	If both countries are landlocked	Head, K., T. Mayer And J. Ries, 2010
17	Country code	iso	Country code for origin and destination country	Head, K., T. Mayer And J. Ries, 2010
18	Border dummy	border		Head, K., T. Mayer And J. Ries, 2010
19	Common language	comlang_off	Common official language	Head, K., T. Mayer And J. Ries, 2010
20	Common colonial relationship	Colony	Colonial relationship	Head, K., T. Mayer And J. Ries, 2010
21	Common coloniser	Comcol	Common colonizer post 1945	Head, K., T. Mayer And J. Ries, 2010
22	Dummy if currently in colonial relationship	curcol	If currently in colonial relationship	Head, K., T. Mayer And J. Ries, 2010
23		col45	Colonial relationship post 1945	Head, K., T. Mayer And J. Ries, 2010
24	Similar country	smctry	If countries were or are the same country	Head, K., T. Mayer And J. Ries, 2010

Empirical Results and Discussion

The results of the basic regressions are presented in Table 4. Since the number of time series observations (years) are relatively smaller than the number of cross-sectional observations (countries), we do not need to worry about time series estimation procedures such as stationarity, spurious regression and cointegration of the variables. The basic OLS results are presented in the first three columns and the last three present the results for the PPML. The coefficients of inclusive growth are positive and significant, as expected, in all the regressions, suggesting that inclusive growth exerts a positive impact on export flows within Africa. As expected, economic size (GDP) positively influences exports and imports while population only influences exports. For all models, the coefficients on the income elasticities of exporters' and importers' GDP are far below the theoretical value of 1. However, both GDP and population coefficients are not significant in the regressions where inclusive growth is measured by household final consumption expenditure. Distance negatively affects trade flows, suggesting that trade decreases with greater distance

between country-pairs due to increasing trade costs. The landlocked dummy is also significant and negative for both exporting and importing countries, implying that countries are also likely to trade less with other countries due to higher trade costs.

The results also show that countries that share the same border and language are likely to trade more than countries that do not share the same border and speak different languages. The presence of telecommunication infrastructure and effective institutions that control corrupt practices especially along the borders of exporting and importing countries are likely to increase trade between country-pairs. In line with *a priori*, the regional trade agreements between country-pairs have a positive effect on trade and the potency of the impact is higher for SADC and EAC relative to ECOWAS. However, no effect was observed for CEMAC and AMU sub-regions. These results are robust to the exclusion of zero trade flows as suggested in the literature.

Table 4

Regression results for regional integration and inclusive growth

The dependent variable is	(1)	(2)	(3)	(4)	(5)	(6)
Intra-African Exports (million USD)	OLS	OLS	OLS	PPML	PPML	PPML
ICG1 (exporter)	0.707***			0.056***		
	(0.125)			(0.010)		
ICG1 (importer)	0.223*			0.017*		
	(0.125)			(0.010)		
ICG2 (exporter)		1.638***			0.128***	
		(0.308)			(0.026)	
ICG2 (importer)		1.053***			0.083***	
		(0.259)			(0.021)	
ICG3 (exporter)			1.270***			0.092***
			(0.266)			(0.021)
ICG3 (importer)			0.361*			0.027*
			(0.253)			(0.020)
GDP (exporter)	0.368***	0.539***	-0.192	0.031***	0.044***	-0.009
	(0.108)	(0.092)	(0.226)	(0.008)	(0.007)	(0.018)
GDP (importer)	0.564***	0.542***	0.397	0.045***	0.043***	0.032
	(0.100)	(0.088)	(0.217)	(0.008)	(0.007)	(0.017)
Population (exporter)	0.572***	0.446***	-0.040	0.043***	0.033***	-0.003
	(0.113)	(0.107)	(0.104)	(0.009)	(0.009)	(0.008)
Population (importer)	0.097	0.143	-0.045	0.008	0.011	-0.004

Table 4 (continued)

	(0.099)	(0.093)	(0.100)	(0.008)	(0.007)	(0.008)
Distance	-1.567***	-1.494***	-1.484***	-0.123***	-0.117***	-0.115***
	(0.135)	(0.134)	(0.140)	(0.011)	(0.011)	(0.011)
Official common language	0.926***	0.816***	0.900***	0.076***	0.068***	0.074***
	(0.140)	(0.141)	(0.154)	(0.011)	(0.011)	(0.012)
Border	0.874***	1.037***	0.887***	0.057***	0.070***	0.058***
	(0.274)	(0.273)	(0.275)	(0.020)	(0.020)	(0.020)
Landlocked (exporter)	-1.192***	-1.189***	-0.955***	-0.096***	-0.096***	-0.078***
	(0.167)	(0.165)	(0.181)	(0.014)	(0.014)	(0.015)
Landlocked (importer)	-0.818***	-0.810***	-0.771***	-0.064***	-0.064***	-0.060***
	(0.165)	(0.169)	(0.178)	(0.013)	(0.014)	(0.014)
INSTQ1 (exporter)	0.744***	0.683***	0.703***	0.059***	0.054***	0.055***
	(0.111)	(0.110)	(0.114)	(0.009)	(0.009)	(0.009)
INSTQ1 (importer)	0.203*	0.243**	0.222*	0.016*	0.018**	0.018**
	(0.105)	(0.109)	(0.115)	(0.008)	(0.009)	(0.009)
INFRA4 (exporter)	0.008***	0.007***	0.005**	0.001***	0.000***	0.000**
	(0.002)	(0.002)	(0.002)	(0.000)	(0.000)	(0.000)
INFRA4 (importer)	-0.005***	-0.009***	-0.008***	-0.000***	-0.001***	-0.001***
	(0.002)	(0.002)	(0.002)	(0.000)	(0.000)	(0.000)
SADC	1.178***	1.377***	1.272***	0.095***	0.109***	0.098***
	(0.282)	(0.270)	(0.294)	(0.020)	(0.019)	(0.021)
EAC	1.304**	1.534***	1.799***	0.109**	0.125***	0.144***
	(0.625)	(0.571)	(0.611)	(0.047)	(0.043)	(0.045)
ECOWAS	0.738***	0.445*	0.509*	0.065***	0.041**	0.046**
	(0.256)	(0.261)	(0.266)	(0.020)	(0.021)	(0.020)
CEMAC	0.194	0.278	0.180	0.026	0.033	0.024
	(0.488)	(0.490)	(0.493)	(0.038)	(0.038)	(0.038)
AMU	-0.164	0.151	0.280	-0.046	-0.024	-0.009
	(0.423)	(0.394)	(0.407)	(0.030)	(0.031)	(0.028)
Constant	-11.185***	-21.820***	-16.369***	0.620***	-0.208	0.283*
	(1.985)	(2.452)	(2.168)	(0.155)	(0.197)	(0.165)

Table 4 (continued)

year*exporter FE	Yes	Yes	Yes	Yes	Yes	Yes
year*importer FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	13,803	13,596	12,281	13,803	13,596	12,281
Adj. R-squared	0.45	0.45	0.44			

Source: Authors Calculation using STATA 13

Notes: The dependent variable is the log of export flows (in Million USD) and is computed at the country-pair and year level. Columns 1 present the key results where inclusive growth is measured by improved sanitation facilities (% of population with access). Columns 2 and 3 present the results where inclusive growth is measured by improved water source (% of population with access) and Household final consumption expenditure (current US$) respectively. All regressions are estimated with year*importer and year*exporter fixed effects. Robust standard errors in parenthesis below the estimated coefficients are clustered at country-pair level. *** p<0.01, ** p<0.05, * p<0.1

Further Analysis: Dynamic Gravity Equation

As a preliminary test to the system GMM estimation, common and individual coefficient panel causality tests were carried out to check for possible reverse causation. These tests make different assumptions about homogeneity of the coefficients across the cross sections. On one hand, the common coefficient test treats the panel as homogenous in the standard Granger causality sense and does not allow the data from one cross section to interact with lagged values of the data from the next cross section. However, this does not account for heterogeneities across countries. Dumitrescu and Hurlin (2012) propose an alternative assumption that allows all coefficients to vary across cross sections. We present evidence of reverse causation between regional integration (RI) and two measures of inclusive growth (ICG1 and ICG3) but observed a one-way causal association in the case between RI and ICG2. This finding is reinforced by the panel Granger causality test that assumes homogeneity in the cross sections. These estimation results are not presented in this paper but are available upon request.

Thus, we explored dynamic interaction in the gravity model for two reasons. First, due to the behavior of export which is assumed to be autoregressive (Costantini & Melitz, 2008); and second due to strong persistence found in the aggregate trade data (Bun & Klaassen, 2002; De Benedicts & Vicarelli, 2005; & Fidrmuc, 2009). We explored these dynamics by applying the dynamic panel estimation model that uses the Blundell-Bond system GMM estimator (De Benedicts & Vicarelli, 2005). Finally, the validity of the instruments was tested using the Sargan/Hansen test of over-identifying restrictions, which considers the sample analogy of the moment conditions used in the estimation process.

The results of the GMM estimator are presented in Table 5. The Sargan/Hansen tests of over identifying restrictions are satisfactory, as is the Arellano–Bond test for AR (2) errors. We find very significant evidence that intra-African trade flows are autoregressive, which is consistent with

Costantini and Melitz (2008). Most importantly, inclusive growth is found to be a significant determinant of intra-African trade flows. The GMM estimates in column 1, for example, suggest that a percentage point increase in improved sanitation facilities increases trade flows for the exporting country by 1.30 and 0.48 percentage points for the importing country. The results are stronger when inclusive growth is measured by improved water source, recording 2.13 and 1.39 percentage points for the exporting and importing countries, respectively.

Table 5

Regression results for the dynamics of regional integration and inclusive growth

The dependent variable is Intra-African Exports (million USD)	(1) GMM	(2) GMM	(3) GMM
lag(Intra-African Exports)	-0.136***	-0.143***	-0.067**
	(0.031)	(0.031)	(0.035)
ICG1 (exporter)	1.303***		
	(0.267)		
ICG1 (importer)	0.477**		
	(0.228)		
ICG2 (exporter)		2.130***	
		(0.626)	
ICG2 (importer)		1.390**	
		(0.571)	
ICG3 (exporter)			1.418***
			(0.527)
ICG3 (importer)			0.136*
			(0.540)
Distance	-1.528***	-1.424***	-1.126***
	(0.217)	(0.228)	(0.220)
GDP (exporter)	0.647***	0.570***	-0.243
	(0.173)	(0.192)	(0.474)
GDP (importer)	0.386*	0.321	0.585
	(0.201)	(0.214)	(0.493)
Population (exporter)	0.343*	0.490**	-0.124
	(0.178)	(0.207)	(0.193)
Population (importer)	0.434**	0.522**	0.385*
	(0.191)	(0.219)	(0.200)
Official common language	0.658***	0.683***	0.739***
	(0.224)	(0.229)	(0.228)
Border	0.859**	1.037**	0.926**
	(0.417)	(0.405)	(0.401)

Table 5 (continued)

Landlocked (exporter)	-1.173***	-1.433***	-1.134***
	(0.280)	(0.278)	(0.286)
Landlocked (importer)	-0.930***	-1.010***	-0.975***
	(0.287)	(0.289)	(0.289)
INSTQ1 (exporter)	0.344**	0.475***	0.346**
	(0.140)	(0.142)	(0.134)
INSTQ1 (importer)	0.277*	0.349**	0.302**
	(0.148)	(0.147)	(0.142)
INFRA4 (exporter)	-0.000	0.004	0.002
	(0.004)	(0.004)	(0.004)
INFRA4 (importer)	-0.002	-0.006	-0.006
	(0.004)	(0.004)	(0.004)
SADC	2.180***	2.609***	2.428***
	(0.410)	(0.394)	(0.405)
EAC	1.603*	1.757**	2.505***
	(0.882)	(0.797)	(0.752)
CEMAC	-0.546	-0.443	-0.044
	(0.868)	(0.879)	(0.777)
ECOWAS	1.505***	0.757**	0.734**
	(0.407)	(0.383)	(0.369)
AMU	-0.128	0.516	0.601
	(0.461)	(0.453)	(0.440)
Constant	-16.190***	-25.890***	-18.515***
	(3.510)	(4.198)	(3.609)
year*exporter FE	Yes	Yes	Yes
year*importer FE	Yes	Yes	Yes
Arellano-Bond test for AR(2)	-1.41 (pr>z = 0.116)	-1.08 (pr>z = 0.148)	-1.22 (pr>z = 0.221)
Sargan Test	7191 (pr>χ^2 = 0.000)	7067(pr>χ^2 = 0.000)	6583 (pr>χ^2 = 0.000)
Number of observations	7,011	7,043	6,329
Number of groups	576	576	551

Source: Authors Calculation using STATA 13

Notes: The dependent variable is the log of export flows (in Million USD) and is computed at the country-pair and year level. Columns 1 present the key results where inclusive growth is measured by improved sanitation facilities (% of population with access). Columns 2 and 3 present the results where inclusive growth is measured by improved water source (% of population with access) and Household final consumption expenditure (current US$) respectively. All regressions are estimated with year*importer and year*exporter fixed effects. Robust standard errors in

parenthesis below the estimated coefficients are clustered at country-pair level. *** p<0.01, ** p<0.05, * p<0.1

Conclusion and Policy Implications

The need to increase the volume trade amongst African countries cannot be downplayed given the enormous market potential of the region. However, Africa's growth has at best been exclusive as the benefits of aggregate growth have not benefited the larger majority. This has been exacerbated by the high incidence of poverty and inequality recorded in African countries. Instructively, we argue that inclusive growth can play a very crucial role towards boosting intra-African trade given the fact that it visibly improves welfare and household income, thereby expanding their spending space. In the absence of broad based growth that improves the purchasing power and welfare of households, the quest for higher intra-African imports and exports remains a mirage.

Therefore, this paper sought to ascertain whether inclusive growth matters for increased intra-African trade. Predicated on a gravity specification that accounts for alternative measures of inclusive growth, the model was estimated using static and dynamic panel data analysis techniques. From the empirical analysis conducted in this paper, some key findings emerge. It was observed that the traditional gravity model variables (GDP, population, bilateral distance, common border, common official language, and landlockedness) are found to be important determinants of bilateral trade flow in Africa. Besides these factors, improved infrastructure and better institutional framework also influence multilateral trade flow within the continent. As measured by GDP of exporting and importing countries, production capacity and demand potential also positively affect trade between countries. Geographic distance and landlockedness are found to be detrimental to intra-regional trade. Another important finding is that landlocked countries incur higher per unit cost of export and import and therefore, such countries tend to trade less compared to those countries with access to international waters. Cultural ties between the trading partners was found to be trade creating.

The empirical findings show mixed results related to the contribution of regional economic communities (RECs) on intra-regional trade in Africa. The result from the traditional gravity model shows that three of the RTAs (SADC, EAC and ECOWAS) have created trade among the members. On the other hand, CEMAC and AMU have not contributed to the promotion of trade between member countries. The quantitative evidence presented in this paper provides insights regarding the link between regional trade integration and inclusive growth. Specifically, the need to tackle important binding constraints such as poor infrastructure, weak institutions and the exclusiveness of growth with a view on boosting intra-African trade remains critical for the region. The importance of these issues has been underscored by the African Development Bank's (AfDB) long term regional integration policy and strategy plan.

Our findings do not make a case for the formulation and implementation of new policies; rather, it makes a case for implementing the existing regional trade and inclusive growth policies. This would particularly require strengthening institutional capacities and higher sub-regional

socio-economic cooperation. This means that at the sub-regional level, there is a need to ensure that inclusive regional integration policies are pursued by member countries. This is because the sub-regional bodies can serve as a potent medium for developing infrastructure, and increase financial integration as well as leverage trade, investment and value chains. This will no doubt reduce the cost of trade and increase trade facilitation through the removal of trade restriction. This can be done by strengthening and harmonizing regional trade arrangements such as the common external tariff as well as other multilateral protocols related to free movement of persons, goods and services.

Another important policy implication from our findings is related to Africa's weak infrastructure which negatively affected its competitiveness, productivity, and share of global and intra-regional trade. This makes a case for a regional approach towards infrastructure development especially in the ICT, power and water sectors, amongst others. On the other hand, regional infrastructure should be made accessible and affordable. For instance, regulated pricing and subsidy may be considered to help protect vulnerable groups and households from being excluded. At the same time, local content-based development should be considered.

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