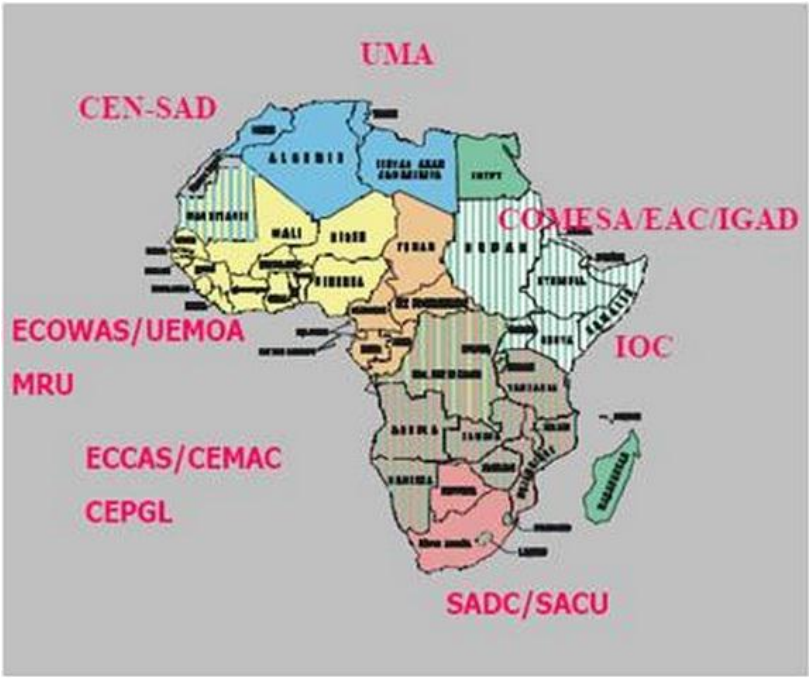
Regional Integration and Trade in Africa:

Augmented Gravity Model Approach



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Abstract

Despite the existence of many regional economic communities (RECs) in Africa, intra-regional trade remains staggeringly low compared to other trading blocs in Europe, Asia and Latin America. Hence this study tries to uncover the main factors behind the low level of intra-regional trade and the role of RECs in promoting intra-regional trade by taking four RECs in Africa (COMESA, ECOWAS, IGAD and SADC) and applying the intuitive and theoretical gravity model of Anderson-van Wincoop in panel data framework. The traditional gravity model variables (GDP, population, distance, border, language, and colonial links) and bilateral real exchange rate, difference in preference among trading partners are found to be important factors for bilateral trade flows. But the impact of the RECs on bilateral trade is found to be mixed; SADC and ECOWAS have led to expansion of intra trade among members; COMESA has implausibly negative coefficient suggesting that it has not expanded trade among the member states whereas IGAD has an insignificant positive coefficient implying that it has not contributed to the expansion of intra-regional trade.

JEL Classifications: F150, F130

Key Words: Africa, Intra-regional trade, Economic Integration, Augmented Gravity, RECs.

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1. Introduction

Most of African countries especially that of the Sub-Saharan are fragmented in terms of economic, population and area size; besides that the continent is a marginal player in the global market. The combined gross domestic product (GDP) of Sub-Saharan Africa was USD 343.4 billion in 2000 which was less than the GDP of Netherlands (USD 385 billion). In terms of population, there were around 20 countries with a population of 6 million or less in 2010. Whereas its exports in 2000 were USD 116 billion which was roughly equal to that of Switzerland[2]. The global share of merchandise export of Sub-Saharan Africa in 2000 was 1.5 percent which increased only to 2.3 percent in 2010 compared to that of South Eastern Asia of around 6.8 percent in 2010[3]. Such small and fragmented domestic markets do not support large number of firms. So policy makers, leaders and other stakeholders in Africa have long called for viable and strong regional integration arrangements to reap the benefits of economies of scale and expand intra-regional trade, accelerate industrialization and promote growth. Consequently many regional economic communities have sprung up in the continent particularly since the 1960s when most African countries got their independence.

Indeed the history of regional integration in Africa goes back to early 20th century when four Southern African states (Botswana, Lesotho, South Africa and Swaziland) formed the South African Customs Union (SACU) in 1910. And in 1917 the two East African states i.e. Kenya and Uganda formed Custom Union; later in 1927 Tanzania (then Tanganyika) joined the custom union. Since then different regional integration arrangements have been formed especially after the post-independence eras.

In 1975 fifteen West African states met in Lagos, Nigeria to sign the ECOWAS Treaty which created the Economic Community of West African States. Six years later in 1981 the Preferential Trade Area for

[2] WDI, 2012
[3] UNCTAD*stat*, 2012

Eastern and Southern Africa was established which became a Common Market in 1993 and renamed as Common Market for Eastern and Southern Africa (COMESA). The Southern Africa states (excluding the apartheid South Africa which joined in 1994) at the same time formed the Southern African Development Coordination Conference (SADCC) in 1980 which later became the Southern African Development Community (SADC) in 1992. In 1986 six Eastern African states (Djibouti, Ethiopia, Kenya, Somalia, Sudan and Uganda) formed an intergovernmental body for development and drought control in the sub-region called Intergovernmental Authority on Drought and Development (IGADD). In 1993 Eritrea became the seventh member state. In 1995 the Heads of States decided to expand the mandates and made a declaration to revitalize IGADD; and it was renamed as Inter-Governmental Authority on Development (IGAD). Of these RECs, COMESA, ECOWAS and SADC have already formed a free trade area (FTA) while IGAD is on the way to set up the free trade area.

Currently there are around 14 regional economic communities (RECs) in Africa of which eight of them are recognized by the African Union Commission as pillars of the African Economic Community (AEC)[4]. Now every country in the continent is member of at least one regional economic grouping. Out of all the African states 25 of them belong to two RECs, 17 are member of three RECs, and 6 countries are members of four regional economic communities. This reflects the fact that there is problem of overlapping membership in Africa which some argue hinders further integration process in the continent.

Despite the existence of many regional economic communities in the continent, intra-bloc trade in most RECs in Africa remains unsatisfactory compared to other trading blocs in developing Asia. Intra-regional trade in Africa constitutes only a small fraction of the

[4] These trading blocs are CEN-SAD (The Community of Sahel-Saharan States), COMESA, EAC (East African Community) , ECCAS (Economic Community of Central Africa States), ECOWAS, IGAD,SADC and UMA (Arab Maghreb Union)

region's global exports. In 2000 intra-African export was 8.5 percent of Africa's global export which increased to 10.8 percent in 2010. Yet despite the low percent global trade, intra-Africa trade grew on average by 15 percent annually in value terms in 2000-10. The relatively low intra-Africa as percent of its global trade was mainly because of the slow implementation of regional integration arrangements which were supposed to eliminate tariff and non-tariff barriers to trade[5].

Given the emphasis placed on regional integration as key strategy for development and high level of interest and commitment by many African leaders, intra-regional trade remains low. Hence this study tries to examine the main determinants of intra-regional trade in Africa. It also investigates the impact of regional economic communities taking four selected RECs (namely COMESA, ECOWAS, IGAD and SADC) on regional trade in the continent. It also examines the impact of multilateral trade resistance on regional trade.

The paper is organized as follows. Section II presents overview of the composition and structure of Africa's trade. Section III reviews the theoretical and empirical literature on regional economic integration. Section IV introduces the gravity model and estimation technique employed in the study and describes the data sources. The last section presents the empirical results and the conclusion of the study.

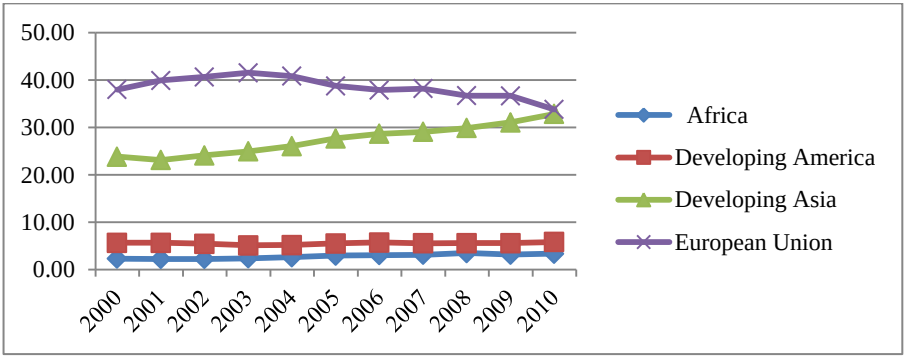
2. OVERVIEW OF THE COMPOSITION AND STRUCTURE OF AFRICA'S TRADE

The global share of merchandise exports of the African continent is low compared to that of the developing Asia and developing America. As can be inferred from figure (1) below, the share of developing Asia is much higher than that of Africa and Latin America with a share of around 33 percent in 2010; Africa's share was 3.3 percent while that

[5] UN ECA, 2010

of developing America was 6 percent. Among the African RECs, CEN-SAD, SADC and UMA have relatively larger share.

Figure (1) Global Share of Merchandise Exports by Region (2000-10)



Source: UNCTAD*stat*

Having been the marginal player in international market for long, the African continent as a whole has experienced rapid growth in exports since 2000 mainly because of commodity and fuel price booms. But its exports composition is still mainly dominated by primary commodities with fuel being the major export item constituting around 59 percent of the global merchandise exports of the continent in 2010. Manufactured exports in general, on the other hand, made up only 17 percent of the global merchandise exports; whereas all food items made up 9 percent in 2010 (table 1).

Table (1) Africa's Merchandise Exports by commodities as percentage (2001-2010)

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
All food items	11.4	12.2	11.4	9.4	7.8	7.1	7.1	6.6	10.2	8.8
Agricultural raw materials	3.7	3.6	3.8	3.2	2.5	2.2	2.1	1.8	2.2	2.1
Fuels	49.7	47.4	49.6	54.2	61.1	63.2	63	64.9	57.6	58.6
Manufactured Goods	22.8	24.5	23.9	21.9	17.9	16.2	16.2	15.8	18.4	17

Source: UNCTAD*stat*

Given the continent's structural constraints such as weak export and import similarities, undiversified export items mainly concentrated on few agricultural items and weak physical infrastructural links between

borders, African countries are oriented towards Western industrial countries especially towards European Union for their imports and exports. For the past decade European Union and United States had dominated as Africa's import partner and export destination; but nowadays China in particular and BRICS in general have emerged to be important trading partner for the continent.

Table (2) Import Partners for Selected African RECs- Average (2000-2010)

	EU	Mid East	RoA	USA	Japan	China	India	Russia	Brazil	S Africa	Turkey
COMESA	25.9	12.1	11.8	5.9	2.8	8.3	4.3	1.6	1.5	5.6	2.4
ECOWAS	33.5	1.9	14.3	6.6	3.7	13	3.1	0.6	2.5	2	0.7
IGAD	14.9	19.1	8.3	3.5	3.3	11	7.1	0.6	0.7	2.7	1.3
SADC	32.9	9.3	11.8	7.4	4.9	9.8	3.3	0.4	2.3	5.7	0.5
UMA	56.7	6.5	3.4	4.6	2.1	6.3	1.1	2.4	1.8	0.4	3.3

Source: Compiled from IMF, DOTS

Table 2 (above) shows that most African RECs trade much with European Union than they trade with the rest of Africa. Around 26 percent of global imports of COMESA in 2000-10, for example, came from the European Union. European Union was the main import partner for ECOWAS, SADC and UMA too. Though it imported around 15 percent of the total from EU, IGAD's main import partner is the Middle East; around 19 percent of the sub-region's import came from the Middle East in 2000-10. COMESA imported around 8 percent of its import from China, ECOWAS 13 percent and IGAD 10.5 percent in 2000-10. Relatively ECOWAS imported much from the rest of Africa followed equally by COMESA and SADC.

Table (3) Export Destinations for selected African RECs (2000-2010)

	EU	Mid East	RoA	USA	Japan	China	India	Russia	Brazil	S. Africa	Turkey
COMESA	50.7	6.4	9.4	5.3	2.1	9.4	2.3	0.3	0.5	1.6	2.1
ECOWAS	27.3	0.2	13	33	1.4	1.2	8	0.3	5.7	2	0.6
IGAD	15.6	9.4	18.8	2.4	8.1	31.1	2.1	0.3	0	0.4	0.3
SADC	27.3	1.6	12.7	16	5.5	14	2.8	0.2	0.9	2.3	0.4
UMA	65.9	2.2	2.6	12	0.5	2.3	1.5	0.2	2.5	0	3

Source: Compiled from IMF, DOTS

On the export side, 51 percent of COMESA's export, 66 percent of UMA, 27 percent of SADC and ECOWAS was to the European Union in 2000-10. Likewise around 16 percent of IGAD's exports were to EU. But China emerged to be the most important export destination in 2000-10 for IGAD; 31 percent of its export was to China. Remarkably the so called BRICS economies (Brazil, Russia, India, China and South Africa) are becoming important trading partners for most RECs in the continent especially China. For some RECs such as ECOWAS and SADC, United States was key trading partner. 33 percent of ECOWAS export and 15.5 percent of SADC was to USA. Around 19 percent of IGAD's global exports in 2000-10 was to the rest of Africa.

Table (4) Intra-regional, global exports, in USD million – (2001-10)

RECs	ECOWAS			SADC			IGAD			COMESA		
Year	Intra	Total	*Share of Intra*	Intra	Total	*Share of Intra*	Intra	Total	*Share of Intra*	Intra	Total	*Share of Intra*
2001	2255	27155	*8.3*	3983	44531	*8.9*	827.8	4635	*17.9*	1626	27598	*5.9*
2002	3144	29031	*10.8*	4467	45992	*9.7*	809.6	5326	*15.2*	1739	27198	*6.4*
2003	3298	35928	*9.2*	5663	55649	*10.2*	970	6485	*15*	2004	35254	*5.7*
2004	4636	46988	*9.9*	6654	68163	*9.8*	981.8	8192	*12*	2293	43648	*5.3*
2005	5546	58872	*9.4*	7799	83556	*9.3*	1094	10385	*10.5*	2694	58602	*4.6*
2006	5956	75580	*7.9*	8700	96049	*9.1*	1163	11980	*9.7*	2917	75465	*3.9*
2007	6806	86504	*7.9*	12051	1E+05	*10.2*	1319	16391	*8*	4021	89557	*4.5*
2008	9476	1E+05	*8.7*	16010	2E+05	*10.3*	1640	21194	*7.7*	6676	1E+05	*5.4*
2009	7379	73569	*10*	12004	1E+05	*11.3*	1435	15337	*9.4*	6122	85759	*7.1*
2010	9364	1E+05	*9.2*	14685	1E+05	*9.9*	1823	18705	*9.7*	8083	1E+05	*7.4*

Source: Compiled from IMF, DOTS

Even if trade in goods and services is one of COMESA's focal area of integration, the sub-region's intra-trade remains low. In 2001 the intra-COMESA export valued at USD 1.6 billion which was 5.9 percent of its global exports. Between 2001 and 2010, COMESA's intra-export share increased by only 1.5 percentage points from 5.9 percent in 2000 to 7.4 percent in 2010. In 2001 intra-ECOWAS export constituted around 8.3 percent and reached 9.2 percent in 2010. IGAD had a higher intra export share of 14 percent in 2000 but in 2010 it decreased to 10 percent. The South African Development Cooperation had around 9 percent intra-regional trade in 2001 which rose to 10 percent in 2010. The contribution of the regional economic communities in Africa towards intra-regional trade expansion has been negligible as the share of intra-regional trade remains static (table 4).

Table (5) Intra-regional imports in USD Millions (2001-10)

	2002	2003	2004	2005	2006	2007	2008	2009	2010
SADC	4508	4880	7130	7926	9836	12655	16916	12469	16109
IGAD	687.9	869.6	820.9	1137	1181	1262	1801	1576	2001
COMESA	1871	2203	2424	3997	4461	4644	7756	6892	9007
ECOWAS	2415	3478	4902	5748	6304	7231	10049	8026	10182

Source: IMF, DOTS

The trend of intra-regional imports for the RECs considered is the same as that of the intra-regional exports. In value terms, the intra-regional imports for all RECs had increased in 2000-10 (table 5). But all RECs recorded declined intra-regional imports in 2009 following the global financial recession of 2008.

Table (6) Intra-regional trade intensity index (1999-2008)

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
COMESA	14.16	15.2	15.2	18.6	21.8	17.2	17.8	19.6	15.1	10.2
ECOWAS	32.93	28.3	31.2	33.6	25.1	185	140	19.8	19.1	---
IGAD	107.9	88.9	59.6	81.3	68.2	55.3	45.1	37.5	46.9	25.8
SADC	13.14	23.8	23.4	27.3	23.6	21	19.4	17	18.1	18.9

Source: RIKS database as of April 2013

Though intra-regional trade in most African RECs as shown in tables (4 and 5) is low, the intra-regional trade intensity indices (given in table 6) for COMESA, ECOWAS, IGAD and SADC show that these RECs have larger than one value indicating that trade within each REC is greater than should be expected relative to the RECs' importance in world trade[6]. It also indicates that IGAD's integration declines overtime whereas the other RECs experienced stagnant integration.

[6] Intra-regional trade intensity index is the ratio of intra-regional trade share and region's share in global trade. The index is equal to one if the region's intra trade weight is equal to the region's global trade weight. If a region's intra-trade is more important than trade flows to the rest of the world as is mostly the case for most African RECs, then intra-regional trade intensity index is greater than one. An increase in this index through time is an ex post indication of regional trade integration.

Manufactured goods constitute relatively higher share in intra-African trade compared to the global trade in which manufactured goods constituted not more than 20 percent in Africa's global exports in 2010. Among the commodities traded between the African countries, fuel and food items altogether constitute the largest share followed by manufactured goods. In 2010, 43.3 percent of the total commodities traded within Africa were manufactured goods; fuels and food items each constituted 29 and 17 percent respectively.

Table (7) Intra-African exports by commodities in percentage (2001-2010)

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
All Food Items	20.5	19.6	19.3	16.3	14.8	15.2	14.1	14.1	18	16.9
Agricultural raw materials	3.4	2.9	4	3.2	2.6	2.3	2.1	1.7	1.6	1.6
Fuels	26.2	22.9	23.9	29.2	33.5	34.4	34.2	33.7	28.6	29.4
Manufactured Goods	45.5	50.6	48	45.6	40.7	40.1	40.8	40.7	44.4	43.3

Source: UNCTAD*stat*

3. LITERATURE REVIEW

3.1. Theoretical Review of Regional Economic Integration

Regional trade agreements do vary widely but have some common objective of reducing trade barriers (tariff and non-tariffs) among member states; and members apply a geographic discriminatory trade policy towards non-member countries. There are different stages of regional integration agreements; these are preferential trade agreement, free trade area, customs union, common market and monetary union.

It was widely accepted that regional trading blocs increase intra bloc trade and raises efficiency by enlarging markets, and it was viewed as welfare enhancing. But in his seminal work on the theory of customs union, Viner (1950) pointed out that the welfare impact of preferential

trade agreement or custom union is ambiguous for such agreements involve only partial elimination of tariffs. In his view there are trade creation and trade diversion effect of such arrangements. Trade is created when member countries of the FTA (or PTA) shift away from reliance on high-cost domestic industry to imports from the lower-cost partner countries; whereas trade diversion occurs when imports from low cost non-member countries are displaced by relatively high cost member states. Hence member and non-member countries alike could be worse off following the geographic discriminatory tariff reduction if trade diversion outweighs trade creation. Lipsey (1957) cited in Baldwin and Venables (2006) argue that regional integration agreements (RIAs) are more likely to be trade creating and welfare enhancing if the RIA member countries initially account for large shares of each other's imports. Krishna and Panagariya (2002), Kemp and Wan (1976), Grinols (1981) and Feenstra (2003) have theoretically proved that customs union as well as free trade agreements could in fact be welfare enhancing to participating parties; but Feenstra (2003) stresses that we should not infer from this that regional integration agreements are necessarily a good thing in practice.

Baldwin and Venables (2005) distinguished the economic effects of preferential trade agreement in to three: allocation, accumulation and location factors. The allocation impact of regional integration agreement includes the static allocation of resources. The accumulation effect works through technology spillovers as a consequence of increased trade volume which in turn affect long term growth of member countries. It also affects factor prices including rate of return on capital in member as well as non-member states that could change investment in in physical, human capital and spurs accumulation. The formation of regional integration arrangement will also lead to shifts in production of liberalized goods to liberalized markets and there might be agglomeration effect depending on the change in trade costs.

3.2. Empirical Literature

Many empirical studies have been carried out on determinants of bilateral trade and the effect of regional trading arrangements (RTAs) following the seminal work of Tinbergen (1962)[7]. Tinbergen (1962) applied gravity model to analyze the trade flows among 42 countries. He found that distance elasticity of trade flow of around -.89 and the GDP of the exporting and importing countries impact the trade flows positively as expected.

In order to analyze the impact of history on trade, Eichengreen and Irwin (1995) applied the gravity model in a dynamic framework. Countries with a history of trading with one another-whether for reasons related to politics, policies or other factors, tend to continue trading. In line with their expectation and argument, the authors found that lagged bilateral trade stimulate present trade between partners even after controlling for the arguments of the traditional gravity model. So according to Eichengreen and Irwin (1995) omission of historical factors overstates the impact of trading blocs.

Frankel (1997) applied the gravity model to investigate the role played by regional integration arrangements (European Community, ASEAN, Mercosur, Australia-New Zealand) on bilateral trade flows. He finds strong and statistically significant effect of different trading blocs on bilateral trade. ASEAN and the Australia-New Zealand CER serve to boost trade among member states close to five folds and more. Interestingly Frankel's finding shows that despite the high level of intra-European community (EC) trade in the 1960s and 70s, most of this trade is explained by country size, level of economic development, proximity, contiguity, common language. After controlling for these variables, there is little intra-trade left to be attributed to the European Community until the 1980s. He finds clear upward trend in the bloc effect of Mercosur. The effect of this regional arrangement is not statistically significant during 1965-75.

[7] Shaping the World Economy, New York, 1962

Thereafter its effect became higher and significant especially in 1990. Mercosur member states traded among themselves seven times as much as otherwise.

Cheng and Wall (2005) compared different specifications of gravity model of trade. They also examined the impact of regional integration on trade volumes by taking five regional trading blocs (i.e. the European trading bloc, the North American trading bloc, Mercosur, the Australian-New Zealand Closer Economic Relations, and the Israel-USA Free Trade Agreement. The authors applied different specifications (pooled cross-section model and fixed effects model). They found out that the effect of European trade bloc on trade volume is modest. The result from the fixed effect model suggests that the trading bloc had a significant effect of 8.2 percent.

With particular emphasis to COMESA and SADC, Alemayehu and Haile (2008) reviewed the prospects and challenges of regional integration in Africa**;** they also tested for the determinants of bilateral trade flows. The result shows that the usual gravity model variables (GDP of the exporting and importing countries, bilateral distance, and border) with the exception of language have the expected sign. Their result also supports the Linder Hypothesis that similar countries trade more. Policy variable like broad money as percentage of GDP has positive impact on bilateral trade. But against the expectation, the regional integration dummy is found to have insignificant negative coefficient implying that regional trading blocs in Africa (especially COMESA) fail to promote intra-regional trade.

Foroutan and Pritchett (1993) applied the traditional gravity model to examine the trade potential of Sub-Saharan Africa. Though the intra-Sub Saharan Africa trade is very low, Foroutan and Pritchett's finding show that actual intra-trade is higher than the potential as the estimated result from the gravity model reveals. The actual share of SSA's imports plus exports was an average of 8.1 per cent while the gravity model predicts a slightly lower, not higher, mean of 7.5 per cent. Consistent with the gravity model, the trade intensity index

indicates that African intra-trade is somewhat higher than what should be expected.

Yeats (1997) examined the determinants of trade flow and intra-regional trade potential in Sub-Saharan Africa, and the concentration of intra-regional trade. The result shows that cross border trade accounts for the larger share of intra-regional trade. Distance also appears to be the factor behind the concentration of bilateral trade between countries in the continent. Yeats' study also shows that there exists high level of sub-regional concentration of intra-Africa trade, with countries in Eastern Africa trade little with West African countries. Besides the sub-regional concentration of intra-regional trade, most African countries' import manufactured goods and export agricultural raw materials and fuels. The composition of countries export matches that of the imports of other countries in the continent very poorly. Yeats argue that actual intra-regional trade in Sub-Saharan Africa is more than its potential given the existence of trade barriers, absence of infrastructure, low complementarity of countries' tradable goods.

DeRosa (2008) investigated determinants of bilateral merchandise trade flow and inward stocks of foreign direct investment applying the gravity model approach in a panel data set up. In addition to the traditional gravity model variables, DeRosa (2008) included dummy variables to control for the impact of regional economic communities on trade and FDI inflows. His result shows that distance between trading partners and being landlocked reduce bilateral trade and investment. But joint GDP of the partners expands bilateral trade, *ceteris paribus*. Adjacency, having colonial relationship, and being beneficiary of Generalized System of Preferences (GSP) do expand trade between countries. All regional economic communities included in the study (EU, EU FTA, NAFTA, Mercosur) impact bilateral trade flow positively and the coefficients are all significant.

Focusing on the Southern African Development Community (SADC), Cassim (2001) examined the fundamental structural factors that

determine the scope and success of any regional integration initiatives. The study also provided estimates of trade potential of the sub-region and contrasted the actual intra-regional trade employing a gravity model. The result revealed that fundamental structural and economic factors such as the transaction costs in the trading partners, the growth paths of member economies and changes in per capita income are key factors behind the success of regional integration scheme than the trade policies by themselves. It confirms that economic and geographic size of the trading partners as measured by GDP and areas have significant impact on trade flows. Transport costs adversely impact the bilateral trade. Some of the regional dummies included in the gravity model i.e. ASEAN and SADC have the expected positive and significant coefficients implying that SADC and ASEAN have trading effect on the regions, whereas the COMESA and Mercosur coefficients are found to be insignificant.

Makochekanwa (2012) analysed the impact of regional trade agreements on intra-trade in selected agro-food products (i.e. maize, rice and wheat) in three regional economic communities (RECs) namely COMESA, EAC and SADC. The study found that geographic distance impacts the intra-regional trade in these commodities negatively; whereas the GDP of the partner countries have the expected positive signs. Besides the traditional determinants of bilateral trade, the author found positive and significant coefficients for the regional trading blocs which imply that these trading blocs promote intra-regional trade in the commodities.

Foote (2009) investigated the partial and general equilibrium impacts of major regional trade agreements in Africa applying the gravity model. He found that African economic integration agreements don't follow the classical economic theory presumption that trade flows will increase when trade barriers are reduced. With the exception of AMU, all RECs included in the study have statistically significant negative impacts on trade flows among members.

A paper by Martinez-Zarzoso and Nowak-Lehmann (2001) explored the determinants of bilateral trade flows between the European Union and Mercosur applying the gravity model in panel data framework and analyzed the trade potential between the two trading blocs. The authors indicated that the partners' incomes had the expected positive impact on bilateral trade flows and the income elasticity of trade flows was found to be near unity in line with the theoretical expectation. But the effect of the exporting and importing countries' population was opposite; exporting countries' population has large negative coefficients implying domestic absorption effect whereas that of importing countries' had large positive impact suggesting that highly populated countries import more compared to those less populated countries. Exchange rate and income differences are also found to be important determinants of trade flow in these two trading blocs. The preferential dummy variables for both EU and Mercosur present positive and significant coefficients indicating that belonging to one of the two preferential arrangements foster trade between the countries.

4. ESTIMATION TECHNIQUES AND DATA SOURCES

4.1. Foundation of Gravity Model

Even though gravity model has had consistent empirical success as an ex post analysis in international trade, it was criticized for lack of theoretical foundations. Following this criticism, trade economists had tried to formulate the theoretical justifications based on different foundations (Anderson [1979], Bergtrand [1985, 1989 and 1990], Deardorff [1998], Helpman [1987], Helpman and Krugman [1985], Eaton and Kortum [2002], Anderson and van Wincoop [2003] among others).

It was Anderson (1979) who first attempted to provide theoretical justification for gravity model based on constant elasticity of substitution (CES) preferences and goods that are differentiated by country of origin which came to be known as the Armington assumption. The implication of these assumptions is that countries

consume at least some of every goods from every country no matter what the prices are. Therefore, in equilibrium, all countries participate in international trade and all commodities are traded so that national income is the sum of home and foreign demand for the commodity that each country produces. Hence larger countries tend to export more and import more.

Following Anderson (1979), Bergstrand (1985 and 1989) elucidates that gravity model is implied by a model of trade based on monopolistic competition. According to this model, identical countries trade differentiated commodities because consumers have preferences for varieties.

Helpman and Krugman (1985) derive the gravity model under the assumption of increasing returns to scale to production. Deardorff (1998) formulates the theoretical explanation for the gravity model based on the Heckscher-Ohlin assumptions of factor endowment. Eaton and Kortum (2002) develop a Ricardian model of international trade based on difference in technology that incorporates geographic factors. Eaton and Kortum's model gives simple expression that relates bilateral trade volumes to deviations from purchasing power parity and to technology and geographic barriers.

Anderson and van Wincoop (2003) develop a theoretically grounded estimable gravity model with homothetic preferences approximated by constant elasticity of substitution (CES) utility function for consumers. On the production side, Anderson-van Wincoop model assumed that each firm produces a unique product under increasing returns to scale. The model takes multilateral trade resistance into account.

4.2. Model Specification

The gravity model has been used extensively in international trade studies since the independent pioneering works of Tinbergen (1962) and Poyhonen (1963). The traditional gravity model predicts that bilateral trade (exports or imports) between countries is determined by

the gross national products of the exporting and importing countries and the geographic distance between them. The gross national product (GNP) of the exporting country indicates the supply capacity whereas the importing country's GNP indicates the total demand. On the other hand, the geographic distance between the countries is used as measures of transport costs. According to the model, bilateral trade between countries is expected to increase when the GNP of both the exporting and importing countries increase; and it decreases if the geographic distance between the trading partners increases. Mathematically the traditional gravity model is expressed as:

$$T_{ij} = \alpha Y_i^{\beta_1} Y_j^{\beta_2} D_{ij}^{\beta_3} \eta_{ij} \text{ .....(1)}$$

Where T_{ij} is bilateral trade (exports), $Y_{i(j)}$ is the GNP of the countries, D_{ij} is the geographic distance between the countries, and α, β's are parameters to be estimated. Whereas η_{ij} is an error term assumed to be statistically independent of the regressors. Following the works of Tinbergen, Linneman (1966) augmented the gravity model by including population as explanatory variable in the equation. In recent empirical literatures the traditional gravity model is further augmented by including a set of dummy variables that affect the trade costs between pair of countries such as adjacency dummy, common official language, colonial relation, and RTAs (Frankel [1997], Silva and Tenreyro [2006], Cheng and Wall [2005]).

Anderson and van Wincoop (2003) argue rightly that the traditional gravity models with bilateral friction alone do not fully explain the trade flow between countries. Bilateral trade between partners is also influenced by resistance to country i's shipment on all other possible trading partners, and resistance to shipments to country j's from j's

possible trading partners[8]. Hence some authors (Silva and Tenreyro [2006]) include atheoretical index called remoteness in the gravity equation to control for such trade resistance. This index, $REM_{i(j)t}$ measures the average distance of country i from all trading partners. The estimated effect of the remoteness index is expected to be positive implying that less remote countries from the rest of the region have more sources for their imports so their import share from each particular country will be smaller[9].

The traditional augmented gravity model including the remoteness proxy is given as follows:

$$T_{ij} = \alpha Y_i^{\beta_1} Y_j^{\beta_2} D_{ij}^{\beta_3} N_i^{\beta_4} N_j^{\beta_5} RTA_{ij}^{\beta_6} A_{ij}^{\beta_7} REM_{it}^{\beta_8} REM_{jt}^{\beta_9} \eta_{ij} \quad \text{.....(2)}$$

Where N denotes population, RTA is a dummy variable that takes one if both the exporting and importing countries belong to the same regional trading bloc zero otherwise; A represents all other dummy variables which could deter or facilitate the bilateral trade flows (like common border, common language, colonial ties). Alternatively per capita income may be used instead of population in the above specification (equation 2).

It is customary to log-linearize equation (2) and estimate by OLS using the equation:

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[8] Suppose that two pair of countries (a,b) and (c,d) with equal distance i.e. $D_{ab} = D_{cd}$ but a and b are closer to other trading partners. The relatively more remote countries [c and d] trade more between each other because they don't have nearby alternative trading partners. So the REM_{it} variable captures that effect.

[9] $REM_{it} = \sum_j w_{jt} D_{ij}$ for $i \neq j$ with where D_{ij} is the bilateral distance between i and j, w_{jt} is the ratio of Y_{jt} and Y_G. Y_{jt} is GDP of j and Y_G is the global GDP.

$$\ln T_{ij} = \ln \alpha + \beta_1 \ln Y_i + \beta_2 \ln Y_j + \beta_3 \ln D_{ij} + \beta_4 \ln(N_i) + \beta_5 \ln(N_j) + \beta_6 RTA_{ij} + \beta_7 A_{ij} + \beta_8 \ln REM_i + \beta_9 \ln REM_j + \ln \eta_{ij} \text{.....(3)}$$

As proposed by Anderson and van Wincoop (2003) multilateral resistance (MRT) can be better handled in the estimation by controlling for importer and exporter time varying individual effects in the estimation which gives us consistent and unbiased estimators. But controlling for these time varying individual effects has a cost; the coefficients of GDP, population and other time varying country specific variables can't be estimated. The Anderson-van Wincoop gravity model is given as:

$$\ln T_{ijt} = \beta_0 + \beta_1 d_t + \beta_2 d_{it} + \beta_3 d_{jt} + \beta_4 \ln D_{ij} + \beta_5 t_{ij} + \beta_6 C_{ijt} + U_{ijt} \quad \textbf{.....(4)}$$

d_t denotes dummy variable for specific year, t_{ij} represents the bilateral trade costs other than bilateral distance D_{ij} that don't vary over time (common border dummy, common language and common colonizer dummy). C_{ijt} is for those variables which are bilateral and vary over time (bilateral exchange rate, per capita income difference) including the RECs dummies.

d_{it} and d_{jt} denote time varying exporter and importer fixed effects respectively. Such specification helps us to account for multilateral resistance to trade which may change overtime due to change in the composition of trade partners and also it controls for global events (inflation, financial crisis).

But Silva and Tenreyro (2006) argue that log-linearization of equations (3 and 4) poses serious econometric problem and changes the property of the error term. The error term in equation (2), i.e. $\ln \eta_{ij}$, is heteroskadastic which violates one of the classical assumptions of OLS that $\ln \eta_{ij}$ is statistically independent of the

regressors; so that the estimation method will lead to inconsistent estimates. In addition to this, such standard cross section estimates of the gravity model may give us biased results for cross section does not allow heterogeneity. It may be the case that a country would export different amounts two countries though the two export markets have the same GDP and are equi-distance from the exporter[10].

Besides the above mentioned problems associated with estimating the gravity equation by OLS, there is problem of zero trade between countries that poses difficulty in using the log linear transformation and estimate it by OLS. Three alternative methods have been applied in the literature to handle the problem of zero trade issue. The first one is to drop the zero trade observations and truncate the sample; the second alternative is to add a small constant to the value of trade before taking logarithms or to estimate the model in levels[11]. The first alternative is appropriate only if the zeros are randomly distributed. However if they are not randomly distributed, dropping these observations results in loss of important and useful information.

In this study Pseudo Poisson Maximum Likelihood (PPML) is employed to estimate both the traditional and the Anderson-van Wincoop gravity model where the dependent variable (export flow) will be in level as recommended by Silva and Tenreyro (2006) to address the problems stated above. Poisson models were originally applicable for count data but as pointed out by Wooldridge (2002) they are also applicable for non-negative continuous dependent variables. Therefore the Poisson regression model which explains that the volume of trade between countries T_{ij} has a Poisson distribution with a conditional mean μ_{ij} :

$$\Pr(T_{ij}) = \frac{\exp(-\mu_{ij})\mu_{ij}^{T_{ij}}}{T_{ij}!}, \quad T_{ij} = 0,1,2,... \qquad \text{.....(5)}$$

[10] Cheng and Wall (2005)
[11] A Practical Guide to Trade Policy Analysis

Where μ_{ij} is the conditional mean that is exponentially related to the set of independent variables, X_{ij}.

$$\mu_{ij} = \exp(\alpha_0 + \beta' X_{ij} + \eta_i + \gamma_j) \quad \text{.....(6)}$$

4.3. Data Sources

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, DOTS covering 48 African countries between 1993 and 2010 counting around 40,608 data points. But approximately 12 percent of the bilateral trade is missing. Exporters and importers' GDP, GDP per capita and population are taken from World Development Indicators (WDI) database[12]. Distance, area and other dummy variables (contiguity, language, common colonizer and whether the countries are landlocked or not) are derived from CEPII database[13]. The distance variable as developed by Mayer and Zignago (2005) is computed based on latitude and longitude of the capital cities. Whereas the proxy for the multilateral trade resistance, i.e REM_{it} is own computation following Brun et al (2005). Bilateral exchange rate, RER_{ijt}, which is the ratio of exporter's exchange rate to importer's exchange rate is also own computation using Darvas (2012) exchange rate data. Depreciation of exporter's exchange rate *vis-à-vis* the importer's real exchange rate increases the exporter's competitiveness in the importer's market and expected to increase exports.

Table (8) Variable Description and data Sources

[12] Gravity model is an expenditure function that explains the value of spending by one nation on the goods produced by another nation. Hence as Baldwin and Taglioni (2006) call it is a silver medal mistake to deflate GDP and exports.

[13] CEPII, Research and Expertise on the World Economy. http://www.cepii.fr/anglaisgraph/bdd/distances.htm as of April 2013.

Variable Name	Description	Data Source
Exports (T_{ijt})	Bilateral export (f.o.b) between pair of countries is the dependent variable.	IMF DOTS (2010)
GDP	GDP is measure of economic mass of partners. It is nominal for gravity model is an expenditure function. It is in log form.	WDI (2013)
Landlocked	It is a dummy that takes 1 if the country is landlocked 0 otherwise	CEPII
Adjacency	It takes value 1 if the exporter and importer share common border zero otherwise	CEPII
Common Language	It assumes one if both the exporter and importer countries have common official language	CEPII
Common Colonizer	It assumes one if both the exporter and importer countries have common colonizer	CEPII
Distance	The distance between the pair of countries based on latitude and longitude of the capital cities	CEPII
Per Capita Difference	It is the absolute value of the difference in GDP per capita income between the reporter and partner countries. It is in log form.	WDI (2013)
Area	Area in square kilometer for both exporter and importer countries. It is in log form.	CEPII
Population	Population size of exporter and importer countries. It is in log form.	WDI (2013)
Bilateral Exchange Rate	It is the ratio of exporter's real exchange rate to importer's real exchange rate.	Computed based on Darvas (2012) REER data
Remoteness Index	This is an index to control for multilateral trade resistance and calculated for both reporter and partner countries. It is in log form.	Own Computation
REC Dummy	It takes 1 if the exporter and importer belong to a REC & 0 otherwise. There are four REC dummies namely COMESA, ECOWAS, IGAD & SADC.	Own Computation

5. DISCUSSION AND EMPIRICAL RESULTS

5.1. The Intuitive Gravity Model Result

After some sensitivity analysis about the robustness of the result for the traditional gravity model, the estimation results from the Poisson Pseudo-Maximum Likelihood (PPML) are presented in table 9 below. The results confirm that the traditional gravity model variables are found to be the most important determinants of bilateral trade flows. Both importers' and exporters' income as measured by nominal GDP (at current USD) have the expected positive impacts on trade flows. PPML gives us highly statistically significant positive coefficients for GDP.

Table (9): The Traditional Augmented Gravity Model Estimation Result

Estimation Technique	PPML	
Variable Name	Xijt (Coefficients)	Standard Errors
Ln (GDP)_reporter	1.807***	(0.0254)
Ln (GDP)_ partner	0.214***	(0.0243)
Landlocked dummy_ reporter	-0.577***	(0.153)
Landlocked dummy_ partner	-1.382***	(0.172)
Adjacency dummy	1.615***	(0.252)
Common Language dummy	0.134	(0.139)
Common Colonizer dummy	1.033***	(0.139)
Ln (Bilateral Distance)	-1.300***	(0.131)
Ln(Per capita difference)	-0.00066	(0.00297)
Ln (area)_reporter	-0.253***	(0.0454)
Ln (area)_ partner	-0.476***	(0.041)
Bilateral exchange rate	0.0577***	(0.00562)
Ln (Population)_ reporter	-0.0623	(0.0464)
Ln (Population)_ partner	0.986***	(0.0441)
Ln (Remoteness)_ reporter	0.323***	(0.0124)
Ln (Remoteness)_ partner	0.409***	(0.0118)
IGAD	0.33	(0.582)
COMESA	-0.143***	(0.0165)
SADC	0.324***	(0.0298)
ECOWAS	2.003***	(0.224)
Constant	-42.39***	-1.265
Observations	30,503	

Number of Paired	1,793

*** p<0.01, ** p<0.05, * p<0.1

All measures of bilateral trade costs (geographic distance, common official language, common border, and common colonizer dummy) have the expected signs. In line with the theory and previous empirical researches, geographic distance adversely impacts bilateral trade in Africa; the coefficient of distance is negative and statistically significant. The Pseudo Poisson Maximum Likelihood estimation technique reveals that the elasticity of trade to distance is -1.3 so a 10 percent increase in distance reduces trade by around 13 percent among African countries. The landlocked dummies for both importer and exporter are found to be statistically significant and negative implying that being landlocked reduces bilateral trade between partners. It reflects the fact that landlocked countries incur high transportation costs to access the ocean via neighboring countries which raises trade cost and deters bilateral trade. Consistent with this finding the World Bank doing business (2010) report shows that the cost to export and import in landlocked countries is very high and the time it takes to export and import is long. In Chad and Central African Republic, for example, it costs more than USD 5000 per container to export and import whereas in those countries with access to the sea such as Ghana, Tunisia, Egypt, Morocco, the cost to export a container is relatively cheap (Annex 3). Country pairs with common border trade as much as four times than those of with no common border. The common language dummy has a positive coefficient of around 0.134 which implies that those pair of countries with common official language trade around 14 percent more than those countries which do not have common official language[14]. The other historical and cultural ties indicator variable (i.e. having had common colonizer) also reduce transaction costs and encourage bilateral trade.

[14] The effect of dummy variables can be computed using this formula: $(e^{\beta_i} - 1) \times 100\%$, where β_i is the estimated coefficients.

Consistent with expectations, exporter's and importer's country size as measured by land area impact bilateral trade negatively. The PPML estimator shows that a 10 percent increase in exporter's area decreases trade volume by around 25 percent. So the bigger the country is, the lower the necessity to trade. The remoteness index that is used as proxy for multilateral resistance has positive significant coefficients for both importer and exporter supporting the claim that more remote country pairs from the rest of the world trade more with each other.

In 1961 Linder hypothesized that countries with similar preference structure trade more among themselves. Hence according to this hypothesis per-capita income difference between partner countries (as proxy for preference structure) impacts bilateral trade negatively; high proportion of bilateral trade occurs between countries with the same level of per capita income. Consistent with this hypothesis, the Poisson estimate gives us statistically significant negative coefficient for per capita income difference. Bilateral real effective exchange rate as expected has a positive impact on trade flows implying that depreciation of exporter countries' currencies against that of importer countries makes the exporter countries commodities cheaper in the importer countries.

The result from the traditional gravity model shows that SADC and ECOWAS have created trade among the members as their coefficients are positive and statistically significant while the IGAD dummy has insignificant positive coefficient and implausibly the COMESA dummy has negative sign. This result may not be surprising given the infrastructural deficiency among member states of COMESA which stretches from Egypt and Libya in the North to Swaziland in the South. Besides this, the insignificant effect of the RECs might be because of endogeneity in the sense that some of the RECs are formed between those countries with high previous trade relations. SADC member states trade 38 percent more than non-member states whereas ECOWAS member trade around 6 times more compared to non-members.

Infrastructural deficiency prevails in the whole parts of the continent which deters the bilateral trade. Table (10) below shows the quality of trade and transport related infrastructure measured by logistic performance index in selected regions[15]. As can be seen, Sub-Saharan Africa has the worst trade and transport-related infrastructures compared to other regions. Infrastructural inadequacy could be another important factor behind the low level of intra-bloc trade in Africa.

Table (10): Logistics performance index: Quality of trade and transport-related infrastructure

Sub-region	2007	2010	2012
European Union	3.34	3.34	3.44
East Asia & Pacific	2.88	2.94	3.03
High income: OECD	3.61	3.67	3.68
Latin America & Caribbean	2.38	2.45	2.58
Sub-Saharan Africa	**2.11**	**2.05**	**2.30**
Middle East & North Africa	2.56	2.74	2.68

Source: World Development Indicators (2013)

5.2. Anderson-van Wincoop Gravity Model result

Table (11) reports the estimation result for the theoretically based augmented gravity model (Anderson-van Wincoop model) which introduces year, importer and exporter fixed effects which varies over time to control for multilateral trade resistance properly. It supports the previous results that adjacency, common official language and common colonizer facilitate bilateral trade whereas geographic distance deters trade. Trade partners with adjacent borders trade much with each other; they trade around 6 times more between themselves. Official language and colonial ties have almost the same impact on trade; pair of countries with common official language trade by

[15] The logistic performance index measures the quality of trade and transport-related infrastructures such as ports, railroads, roads, information technology which takes a rating ranging from 1 (very low) to 5 (very high).

around 49 percent more; while having common colonizer increases trade by 66 percent compared to those which had different colonizers. The estimated coefficient of distance from the Anderson-van Wincoop model is much higher relative to that of the traditional gravity model result. It reveals that a 10 percent increase in bilateral distance deters bilateral trade by 20 percent implying that distance is the most important component of trade costs in Africa. According to a 2010 report by UNECA it was only 30 percent of the total road that was paved so shipping a car from Japan to Abidjan costs USD 1,500 but shipping the same car from Addis Ababa to Abidjan costs three times more.

Table (11) Anderson-van Wincoop gravity model with time varying country specific effects

Estimation Technique	PPML	
Variable Name	Xijt	Standard Errors
Adjacency dummy	1.940***	(0.194)
Common Language dummy	0.400***	(0.136)
Common Colonizer dummy	0.506***	(0.151)
Ln(Distance)	-2.054***	(0.108)
Ln(Per capita difference)	-0.0816***	(0.00481)
Bilateral Exchange rate	0.776***	(0.0303)
Exporter Fixed Effects	Yes	---
Importer Fixed Effect	Yes	---
Year Fixed Effects	Yes	---
IGAD	1.651***	(0.523)
COMESA	-0.0309	(0.0266)
SADC	0.193***	(0.0525)
ECOWAS	0.292	(0.241)
Constant	-24.36	(29.03)
Observations	31,477	

*** p<0.01, ** p<0.05, * p<0.1

The regional dummies included in the estimation (COMESA, IGAD, ECOWAS and SADC) have different signs and diverse impact on trade flows. The coefficient of COMESA is found to be insignificant suggesting that this REC is weak in facilitating bilateral trade among

member states which is consistent with the findings by Cassim (2001), Alemayehu and Haile (2008), and Foote (2009). In line with the result from the traditional gravity model, SADC on the other hand has created trade among member states. The positive and significant coefficient for this RECs indicate that member states trade more with one another than predicted by their incomes, population, and distance suggesting that the regional trade arrangements is trade-creating for their members.

Most of African countries face trade facilitation constraints that should be urgently addressed to further promote the intra-regional trade. These constraints include complex customs and administrative procedures and regulations, inefficient and costly transit systems as evident by numerous informal roadblocks and checkpoints along many trade corridors in Africa. According to ECA (2004), in between Lagos, Nigeria and Abidjan, Cote d'Ivoire, for example, there were around 69 checkpoints. Moreover, there exist differences in rules of origin, trade documentation, and standards.

6. CONCLUDING REMARKS

Despite the existence of many regional economic communities in Africa, the continent has low level of intra African trade when compared to other trading blocs in Europe and Asia, and has remained marginalized in the global market. Excluding the informal cross border trade among many African countries the formal intra-regional trade in the continent lingers around 10 to 12 percent of its global exports. Hence this study tries to uncover the main factors behind the low level of intra-regional trade in Africa and the contribution of the existing regional economic communities (taking four selected economic communities namely COMESA, ECOWAS, IGAD and SADC) in promoting trade in the continent using the intuitive and theoretical augmented gravity model.

The study finds that the traditional gravity model variables (GDP, bilateral distance, common border, common official language,

common colonizer, landlockedness) are found to be important determinants of bilateral trade flows in Africa. Besides these factors bilateral real exchange rate between partner countries and difference in preference and taste among countries do affect trade flows. As measured by GDP of the exporting and importing countries, production capacity and demand potential do affect trade between countries. GDP of the exporting and importing countries impacts bilateral trade positively. Geographic distance and landlockedness deter trade. Landlocked countries incur higher cost of export and import per unit of container so such countries trade less compared to those countries with sea access. Common official language and common colonizer dummies indicate the cultural ties between the partners.

Regional economic integrations are thought to promote bilateral trade and then growth by bringing fragmented economies into a single large market. But the empirical researches carried out have mixed result on the contribution of regional economic communities (RECs) on intra-regional trade in African. The result from the traditional gravity model shows that two of the RECs (SADC and ECOWAS) have created trade among the members. On the other hand IGAD and COMESA contrary to expectation have not contributed to the promotion of trade.

A theoretical gravity model of Anderson-van Wincoop is estimated to check the robustness of the result from traditional gravity model. The result from the Anderson-van Wincoop model gives almost the same result. But the IGAD dummy is found to be significant and positive implying that IGAD promotes intra-regional trade.

The result from this paper implies that African countries should invest much on physical infrastructure to link neighboring countries, harmonize trade policies, and simplify custom procedures so that the existing regional economic communities would promote intra-regional trade. In addition to this, these countries should adopt and implement coherent and coordinated trade policies to promote intra-regional policies.

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ANNEXES

Annex 1: Countries included in the gravity equation by regional economic communities (RECs)

COMESA	ECOWAS	SADC	IGAD	OTHERS*
Burundi	Benin	Angola	Djibouti	Algeria
Comoros	Burkina Faso	Congo, Dem. R.	Ethiopia	Tunisia
Congo, Dem. R	Cape Verde	Madagascar	Kenya	Morocco
Djibouti	Cote d'Ivoire	Malawi	Somalia	Mauritania
Egypt	Gambia, The	Mauritius	Sudan	Cameron
Ethiopia	Ghana	Mozambique	Uganda	Central African R.
Kenya	Guinea	Seychelles		Chad
Libya	Guinea-Bissau	South Africa		Congo, Rep.
Madagascar	Liberia	Tanzania		Gabon
Malawi	Mali	Zambia		Equatorial Guinea
Mauritius	Niger	Zimbabwe		São Tomé and Principe
Rwanda	Nigeria			
Seychelles	Senegal			
Sudan	Sierra Leone			
Uganda	Togo			
Zambia				
Zimbabwe				

*Other African countries included in the study but don't belong to any of the four RECs (COMESA, ECOWAS, IGAD and SADC)

Annex 2: Cost to import and export for selected African countries (2010)

	Land locked	Time to export (days)	Cost to export (US$ per container)	Time to import (days)	Cost to import (US$ per container)
Chad	Yes	75	5,497	100	6,345
Central Africa R	Yes	54	5,491	62	5,554
Niger	Yes	59	3,545	66	3,545
Zimbabwe	Yes	53	3,280	73	5,101
Rwanda	Yes	38	3,275	35	4,990
Uganda	Yes	33	3,190	31	3,390
Ghana	No	19	815	29	1,203
Tunisia	No	13	773	21	858
Egypt.	No	14	737	16	880
Mauritius	No	11	737	11	689
São Tomé and P.	No	27	690	29	577
Morocco	No	13	577	17	1,000

Source: World Bank Doing Business (2010)s

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