Journal of Economics and Sustainable Development
ISSN 2222-1700 (Paper) ISSN 2222-2855 (Online)
Vol.5, No.4, 2014

Determinants of Tanzania and Kenya Trade in the East African Community: A Gravity Model Approach

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Abstract
The paper aims at studying the determinants of trade in the East African Community (EAC). The paper explains as to why despite having five members, the two countries Kenya and Tanzania dominates trade among EAC members.Using the aggregated gravity model, the study finds that, Tanzania and Kenya Trade are much determined by the economic size (GDP) of the EAC members rather than the Per capita GDPs of these countries. The coefficient of a distance variable has negative impact meaning the costs of trading, time related costs and costs related to market access are higher.
In a disintegrated model, the economic size of the respective countries, Kenya and Tanzania,exerts a positive impact but Tanzania's GDP have a higher value of coefficient than Kenya. The Tanzania's importers GDPs coefficient is positive but not significant for Tanzania, while it is positive and significant for Kenya's export Trade. Importers population showed a remarkable contribution to bilateral trade between Tanzania, Kenya and the rest of EAC. However, per capita income coefficient explains that Kenya and Tanzania does not trade high income oriented products for the coefficient had a negative sign which is significant. The distance, representing the cost of trading, is affects Tanzania export negatively more than how it does for Kenya. The exchange rate coefficient shows that price competition is important because for Tanzania lowering her currency does not half the export as if Kenya would do. Openness variable shows trade liberalization, perhaps the formation of EAC bloc;measures have significantly improved trade flows between EAC countries.
Keywords: Gravity model, export oriented economy; Regional or Free Trade Agreements; production's specialization and competitiveness

1. Introduction

Trade between EAC member states is arguably as old as the history of these states. However, trade between Kenya and Tanzania which is the focus of this paper is of particular interest for one major reason; together the volume of trade between the two states constitutes over 45%of the entire EAC trade. Furthermore, there is currently more pronounced cross border investments between Kenya and Tanzania than in any other EAC member states. There are indications that once formalized; labor movements across the two countries are likely to be more predominant than in other member states.
The East African Community (EAC) is an intergovernmental organization made of five member states namely Tanzania, Kenya, Uganda, Rwanda and Burundi. Historically there has been two phases in the creation of EAC. The first phase (referred herein as EAC I) stretches from 1967 when the Treaty which established EAC I was signed up to 1977 when the scheme collapsed amid political and economic frictions. During this phase EAC I had only three member states namely Tanzania, Kenya and Uganda. The second phase (i.e. EAC II) was embark upon by member states after realizing the loss of economies of scale and other benefits of the defunct EAC I and hence in 1999, a Treaty for establishing the second phase of EAC was signed by the respective Heads of State of the member countries. One of the significant developments of EAC II has been the inclusion of two new members; Rwanda and Burundi thus making the current membership of EAC to five. In terms of size, EAC has a total area of 1,817,945 km2 and an estimated population of 131.9 million people. The total Gross Domestic Product (GDP) of the region was estimated (2007) to be 61US $ bn. which culminates into an average per capita income of over US $ 450.
Traditionally the rationale for the creation of regional integration schemes like EAC was in terms of trade promotion in member states. While trade promotion has remained the cornerstone for the regional economic groupings there is an upsurge of literature which had advocated for a broader developmental focus of the schemes.
The history of economic and social cooperation in East Africa is as old as the history of the region. There is sufficient evidence to support the claim that the peoples of the region have enjoyed close socio-economic ties among themselves. Long before the creation of EAC (I) the colonial powers (mainly Britain which had a mandate over Kenya, Uganda and Tanzania after the end of the Second World War) had devised various approaches aimed at exploiting the economic potentials of the region. In 1917 for example, the British government established a customs union between Kenya and Uganda aimed at promoting trade between them. Tanzania (then Tanganyika) joined the union in later in 1923. A further attempt aimed at forging closer economic ties in the (East African) region was made in 1961 when the East African Common Services

Organization (EACSO) was created to cater to common services (including railway, road, postal etc) that were offered in the region. EASCO operations were finally stopped in 1967 when EAC (I) was created in 1967.
The objectives of EAC (I) were, inter alia, to achieve a balanced economic growth within the EAC member states through the establishment of a common market, common customs tariff, and common public services (see for example, Kirkpatrick and Watanabe, 2005 and Ng'ang'a, 2006). The EAC (I) lasted for a period of ten years but collapsed in 1977 amid the existence of what seemed to be irreconcilable political and economic frictions of that era. Some analysts have observed for example that while Tanzania and Uganda were at that time experimenting with different brand of African socialism Kenya was pursuing the capitalist path. Such political differences were further complicated by a military coup in 1971 which installed in Uganda Dictator Idi.
The collapse of EAC (I) had profound negative impacts on the economies of Kenya, Uganda and Tanzania. Besides losing the economies of scale advantage the region had prior to the collapse of EAC (I) each country had to re-start a costly programme of establishing services and industries which were somewhat efficiently at the EAC level.Realizing the lost advantages of EAC (I) the three member states began the process of re-establishing closer ties among them. Finally in 1999 following a series of consultations and negotiations a Treaty for establishing EAC (II) was signed in Arusha, Tanzania. Apart from the expansion of the EAC membership the other milestones so far registered in EAC include (i) the establishment of the customs union (ii) the establishment of the common market (iii) convertibility of Kenya, Uganda and Tanzanian (iv) harmonization of goods produced in the region (v) reduction of tariff and non-tariff barriers and (vi) free movement of stock (EAC, 2010).

2 Trade Flows between Tanzania and Kenya

Although the EAC sub-region has witnessed a surge in trade flows among member states particularly after the establishment in 1st July, 2010 of the common market.The EAC common market has provided for "four freedoms" namely; free movement of goods, labor, services and capital all of which are expected to boost trade and investment within the region.
Interest in analyzing the trade flows between Tanzania and Kenya is based on economic as well as non-economic factors. The essence of focusing on trade flows between Tanzania and Kenya is that currently the two countries dominate the economy of the sub-region, in many aspects. Kenya and Tanzania are currently the "power houses" of the EAC economy. In 2010 for example, the combined GDP of the sub-region was US $ 79.3 billion. Kenya's GDP during the same year was US $ 32.2 billion equivalent to 40.6%. Tanzania's GDP was US $ 22.9 billion (equivalent 28.9%) during the same year. This implies that the combined GDP of Kenya and Tanzania was equivalent to 69.5% of the total EAC GDP.
The share of the other three countries (Uganda, Rwanda and Burundi) was 30.5%. According to data from the World Bank the two countries dominate the region where GDP per capita is concern. In 2010 Kenya had the highest GDP per capita (US $ 468.7) compared to Tanzania's per capita GDP of US $ 458.4. The per capita GDP in the rest of EAC member states was lower than those for Kenya and Tanzania.Trade as a percentage of GDP was the highest in Kenya (65.4%) but was closely followed up by Tanzania whose ratio in the same year was 63.8%.Recent trade trends between Tanzania and Kenya (Table 1) suggest that apart from their relative large GDPs, they still (Kenya and Tanzania) dominate the region's trade flows(Note 1: Table 1: Trade Flows in EAC: 2009 – 2011 (US $ m)
In 2009 Tanzania's exports to the rest of the World (ROW) was US $ 2,982,405million compared to the country's exports to Kenya which were valued at US $ 192,904 million (equivalent to 6.5%). This ratio increased to 8.0% in 2010 before leveling off to 4.7% in 2011. Tanzania's exports to Kenya during the 2009 – 2011 period averaged US $ 246,368 million compared to the value of Tanzania's exports to ROW which totaled US $ 3,922,637 million.Kenya is an important destination for Tanzania's exports than all the other EAC countries combined(Note 2: Table 2: Economic Growth in EAC Region 1990 – 2010)

3 Modeling the Determinants of Trade Flows between Kenya and Tanzania

The gravity model used in international trade analysis draws its theoretical foundations from gravity modelsused in natural sciences. The model predicts bilateral trade flowsbased on the economic sizes of countries (using GDP) and distance between them. The model was first used by Tinbergen in 1962 and pöyhönen (1963) who postulated that trade between two countries (i and j) takes the form of:

$$F_{ij} = G\frac{M_i M_j}{D_{ij}}$$

Where Fij is the trade flow, Mij are the economic masses of each country, Dij is the distance between them and G is a constant. Besides being deployed to analyze trade flows between countries the model has also been used in international relations including evaluating the impact of treaties and alliances on trade.

Since then (1963), the gravity model has become a popular instrument in empirical foreign trade analysis such that different scholar has successfully applied the model to show flows of varying types such migration, foreign direct investment and more specifically to international trade flows. According to this model, exports from country i to country j are explained by their economic sizes (GDP or GNP), their populations, direct geographical distances and a set of dummies incorporating some kind of institutional characteristics common to specific flows.

The following are the theoretical development which has appeared in support of the gravity model since the second half of 1970s. They show the theoretical support of the research in this field which was originally very poor. Anderson (1979) made the first formal attempt to derive the gravity equation from a model that assumed product differentiation. Bergstrand (1985, 1989) also explored the theoretical determination of bilateral trade in a series of papers in which gravity equations were associated with simple monopolistic competition models. Helpman and Krugman (1985) used a differentiated product framework with increasing returns to scale to justify the gravity model. Deardorff (1995) has proven that the gravity equation characterizes many models and can be justified from standard trade theories. Finally, Anderson and Wincoop (2001) derived an operational gravity model based on the manipulation of the CES expenditure system that can be easily estimated and helps to solve the so-called border puzzle. The differences in these theories help to explain the various specifications and some diversity in the results of the empirical applications.

There are a huge number of empirical applications in the literature of international trade, which have contributed to the improvement of performance of the gravity equation. Some of them are closer related to our work. Firstly, Mátyás (1997) and (1998), Chen and Wall (1999), Breuss and Egger (1999) and Egger (2000) improved the econometric specification of the gravity equation. Second, Berstrand (1985), Helpman (1987), Wei, (1996), Soloaga and Winters (1999), Limao and Venables (1999), and Bougheas et al, (1999) among others, contributed to the refinement of the explanatory variables considered in the analysis and to the addition of new variables. In other occasions the model has been used to test the effectiveness of trade agreements and organizations such as the North American Free Trade Agreement (NAFTA) and the World Trade Organization (see for example Helman, 2003, Panagariya, 1999, and Krugman 2001 among others). In other occasions the model has been used to test the effectiveness of trade agreements and organizations such as the North American Free Trade Agreement (NAFTA) and the World Trade Organization (Helman, 2003, Panagariya, 1999, and Krugman 2001 among others).

While the model's basic form consists of factors that have more to do with geography andspatiality, the gravity model has been used to test hypotheses rooted in purer economic theories of trade as well. One such theory predicts that trade will be based on relative factor abundances. One of the common relative factor abundance models is theHeckscher-Ohlin model. This theory would predict that trade patterns would be based on relative factor abundance. Those countries with a relative abundance of one factor would be expected to produce goods that require a relatively large amount of that factor in their production. While a generally accepted theory of trade, comparative advantage has suffered empirical problems.

Investigations into real world trading patterns have produced a number of results that do not match the expectations of comparative advantage theories. Notably, a study by Wassily Leontief who found that the United States, the most capital endowed country in the world, actually exports more in labor intensive industries. Comparative advantage in factor endowments would suggest the opposite would occur. Other theories of trade and explanations for this relationship were proposed in order to explain the discrepancy between Leontief's empirical findings and economic theory. The problem has become known as the Leontief paradox.

The paper first uses a simplified version of the gravity model to analyze the determinants of trade between Kenya, Tanzania with the rest of EAC countries respectively, and whether the creation of the EAC has benefitted them. This simplified version of the gravity model examines the determinants mainly GDP as the economic size, per capita income, and distance. Essentially, the gravity model traces geographical-spatial relationship of the foreign trade between Kenya and Tanzania in the EAC bloc. Used in the economics sense, the gravity model stipulates that the economic size of countries and geographical distance are the two basic factors determining the bilateral trade flows between Kenya and Tanzania.

The stochastic form of the equation to estimate the determinants of trade of trade flow between Kenya and Tanzania is given as:

$$TD_{ij} = \beta_o Y_i^{\beta_1} Y_j^{\beta_2} (Y/P)_i^{\beta_3} (Y/P)_j^{\beta_4} D_{ij}^{\beta_5} A_{ij}^{\beta_6} \mu_{ij} \quad (1)$$

Where:

$TD_{ij} =$ Bilateral trade volume (=export +import) between country i and j. i and J=1,2.....N

$Y_I and Y_j =$ GDPs of Kenya or Tanzania with the rest of EAC countries

$(Y/P)_i$ and $(Y/P)j$ = product of country i's and country j's per capita GDPs where P means population

D_{ij} = The distance between the capital cities of Kenya or Tanzania with the rest of EAC Countries

A_{ij} = Other factors (including cultural) influencing trade between block countries, in this study we use factors like terms of trade, openness, and inflation

μ_{ij} = Error term

The basic, standardized empirical gravity equation takes the following form:

$$LnTD_{ij} = \beta_0 + \beta_1 Ln(Y_i * Y_j) + \beta_2 Ln[(Y/P^*)_i * (Y/P^*)_j] + \beta_3 LnD_{ij} + \beta_4 Ln(P_i * P_j) + \mu_{ij} \quad \text{..... (2)}$$

Previous studies made a use of this empirical equation to identify the bilateral trade volume of country-pairs in NxN countries setting. Using the same equation, this paper tests how significantly the gravity model is applicable to explain Tanzania's or Kenya's bilateral trade flows in the EAC and tries to extract implication for Tanzania's and Kenya's trade policy. The equation's application first fixes Tanzania as i, but leaving the rest of EAC as j=1,2...N in a Nx1 setting, and then it does so for Kenya. In this kind of equation, all variables are in natural logarithm of real value terms expect dummy variables. Any variable with relatively small numbers are usually exempted from taking the logarithm (inflation, terms of trade and openness for this study).

In particular, since the EAC countries borders to each other, use common language, have colonial relationship or historical ties the dummy variable is not that much relevant in this model. Hence, the model starts with only three explanatory variables, namely the product of GDPs, the product of per capita GDPs and distance.

The explanatory variables, the product of GDPs serves as a proxy for the two countries' economic size, both in terms of production capacity and size of market. Larger countries, with great production capacity, are more likely to achieve economies of scale and increase their export based on comparative advantage. They also possess large domestic market able to absorbed more imports. Therefore an increase in the product of the two Countries' GDPs is expected to increase bilateral trade volume. Thus we expect the estimated coefficient of production capacity to be positive. Population has similar explanations but when the coefficient is positive, then the country has economies of scale while a negative sign implies when it is bigger it exports less.

Per capita GDP[1] is an explanatory variable that serves as a proxy for the income leve and/or purchasing power of the exporting and importing countries. Since, Tanzania or Kenya per capita is fixed, this variable will serve to predict whether Tanzania's or Kenya's trade flows are depend on its trading partner's income level.

The distance variable a trade resistance factor that represents trade barrier such transport costs, time, cultural unfamiliarity and market access barriers. Previous literatures interpret the coefficient of distance variable as elasticity with respect to an absolute level of geographical distance. In the gravity model, trade volume will be larger between countries pairs that are far from the rest of the world than between countries pairs that are close to the rest of the world (Anderson and Van Wincoop 2003; Harrigan 2003)[2].

3.2 Analysis of the 'Home-Market Effect'

As explained above, the explanatory variables, the product of GDP serves as a proxy for the two countries' economy size, both in terms of production capacity and size of the market. The per capita GDP, however, it serves as a proxy for the income level and/ or purchasing power of the exporting and importing countries. When the fit of the gravity model for Tanzania was run, the results turned out that, Tanzania's trade depend much on GDP for its bilateral trade flow and it is negatively related to the per capita patterns of trade.

To capture the home-market effect, as David and Weinstein (2003) showed the evidence of the broad home-market effects, the model in equation (2) is disintegrated so as to make use of Y_i and Y_j as in separate form, with T_{ij} representing either export of import of the country i. the model allow the coefficients of the two terms possibly different each other. This implies that there is possibility of significant 'home-market effect, meaning the advantage of a large home market as a foundation of export of a good. However, traditional neoclassical model of comparative advantage suggest that, all else equal, a country with extraordinarily strong demand for a good will be an importer of that good implying a 'reverse' home market effect. Increasing returns leads to a home-market effect in differentiated goods, whereas in homogeneous goods a gravity equation will apply, but

[1] Bergstrand (1989), combining economic geography and factor proportional theory, derived the gravity equation at the industry level which predicts that the export of a good in bilateral trade depend on income and per capital income as well, assuming a constant elasticity of transformation of supplies among different markets.

[2] A decrease of the distance coefficient indicates that trade with far away countries increases relative to the trade with closer countries, whereas an increase represents trade with closer countries increases faster than that with far way countries. The notion of relative distance remains significance at the NxN countries setting, whereas it is important drops sharply in our Nx1 because all distances are measured absolutely from Tanzania or Kenya, we anticipate the coefficient greater than one, but its magnitude matters.

without home market effects due to barriers to entry or national product differentiation.
Linearizing equation (1) by taking natural log of all variables results into equation (3) as follows:

$$LnTD_{ij} = \beta_0 + \beta_1 LnY_i + \beta_2 LnY_j + \beta_3 Ln(Y/P)_i + \beta_4 Ln(Y/P)j + \beta_5 \log D_{ij} + \beta_6 \log A_{ij} + \mu_{ij} \quad \ldots (3)$$

The current paper will deploy a stochastic form of the model (equation 3) to estimate the determinants of the trade flows between Tanzania and the rest of EAC Countries or Kenya and the rest of EAC Countries as follows: .

$$LnEXP_{ij} = \beta_0 + \beta_1 LnY_i + \beta_2 LnY_j + \beta_3 Ln(P)_i + \beta_4 Ln(P)j + \beta_5 Ln(Y/P)_i + \beta_6 Ln(Y/P)_j + \beta_7 LnD_{ij} + \beta_8 LnEXR_{ij} + \mu_{ij}$$

(4)
Where:
Yi and Yj = GDPs of Kenya or Tanzania with the rest of EAC Countries, respectively
Dij= Geographical distance between the capital of Kenyaor Tanzania with the rest of EAC Countries
EXP_{ij} = exports of Kenya or Tanzania to the rest of EAC countries
EXR_{ij} = bilateral exchanger rate of either Kenya or Tanzania with rest of EAC countries, which is defined as local currency value of 1 unit of country j currency. $(Y/P)_{ij}$ = per capita income of Tanzania or Kenya and the rest of EAC countries.

4Empirical Analysis

4.1. Estimating the aggregated trade volume of Tanzania's and Kenya's bilateral trade

Table (3) below represents OLS results of Tanzania's and Kenya's trade with the rest of EAC countries (Kenya is included for Tanzania bilateral trade and Tanzania visa visa); the overall performance of the model seems to be pretty good with R-square value around 0.893 for the basic equation for Tanzania's trade and 0.983 for Kenya's bilateral trade. Most of the explanatory variables are highly significant, meaning the gravity model is effective in explaining Tanzania's bilateral trade flows and that the gravity model is well applicable to a single country case.
The log of the products of two countries' GDPs, that is i and j, is highly significant in determining both Tanzania's and Kenya's bilateral trade volume. The estimates coefficient β_1 is positive and about 1.115. The result obtained is consistent with the basic hypothesis of the gravity model that the trade volume will increase with an increase in economic sizes. The variable also means that holding constant for other variables; a 1 percent point increase in GDP will result in about 1.115 percent point increase in Tanzania bilateral trade flows. Theoretically it's a bit surprising of find the coefficient of the product of GDPs is greater than one, though the higher value of the estimates implies a Heckscher-Ohlin type[3] basing on inter-industry trade (Deardorff, 1998; Grossman 1998 p.30). Kenya's trade is a bit different from that of Tanzania. The coefficient of the Product of GDPs is positive but less to one, the value is estimated to be 0.71, meaning that 1 percentage increase of GDPs will only lead to 0.7 percent increase in the bilateral trade volume(Note 3:Table 3: OLS results of Tanzania's and Kenya's bilateral trade with the rest of EAC countries
There different reasons as to why the increase in bilateral trade volume is less proportionate to the increase in GDP. Three possible sources are stipulated out; the first one is the existence of relatively large market home-market effect (trifler 1995p. 1032; McCallum[4], 1995) as such there is possibility of a home market effect, meaning a smaller trade than the theoretical prediction[5]. Secondly, the presence of lower level of intra-industry trade, where by the volume of trade is higher in sectors characterized by a monopolistic competition and/or scale economies (Harrigan, 2003). Thus a country enjoying a lesser scale economies will trade a smaller volume. The third is the extent of trade barriers; the higher and wider are the trade barriers the smaller will be the trade volume.
When the three reasons or source of the products of GDPs to be less than one are taken into account, the higher level of Tanzania home-market effect, the presence of inter-industry trade and lower trade barriers among EAC members account to the higher value of the coefficient of the product of GDPs[6]. For the case of Kenya's trade, the presence of home- biased market, lower level of intra- industry trade, and the possibility of trading away their products as far as the EAC market is concerned.
The per capita GDP variable is a significant factor in determining Tanzania's and Kenya's bilateral trade in the EAC bloc. However, it's negatively related to the bilateral trade flows. The estimated coefficient β_2 has a

[3] Frankel (1998) showed the coefficient lying in the range of 0.75-0.95. Our estimate more or less fit the range but in a higher level and lower level for Kenya's trade.
[4] Home-biased market effect, such as localized taste of local distribution network, plays a greater role in trade.
[5] This is true for a small market, theoretically the home-market effect can be interested as an elasticity of export with respect to domestic income that exceeds the importing country's income elasticity of export and import for a country, thus engendering the gravity analysis utilizing Y1and Y2 as a separate terms more appropriate.
[6] The results calls for a test of home market effect in the bilateral trade of Tanzania's and Kenya'strade

magnitude of -2.011 and -0.471 predicting that a 1 percent increase in per capita GDP leads to about 2 and 0.5 percent decrease in bilateral trade flow of Tanzania and Kenya, respectively. The empirical result is different from the regression analyses of Frankel (1997) that predicted that a 1% increase in per capita GDP leads to about 0.1% increase in bilateral trade flows. The findings implies that Tanzania trade patterns follow a GDP pattern rather than a per capita pattern, relying more on its trading partner's overall economic size than its income level[7]. Therefore, Tanzania trade can be characterized as the one which depend more on exporting of quantity-based standardized products that are sensitive to the overall market size, rather than exporting quality-based high value-added products that a sensitive to the trading partner's income level.

The estimation of the distance is significant with the expected negative sign. The results show that geographical distance is an important factor for Tanzania's trade. The coefficient β_3 is estimated to be -3.794 and -2.243 for Tanzania's and Kenya's bilateral trade, respectively. The results are higher compared to previous studies (Frankel 1997; Wall 1999; Buch et al. 2003), but in the line of Grossman (1998) who pointed out that most of empirical gravity studies show a surprising larger size of the estimated coefficient on the distance variable. Furthermore, the coefficient implies higher cost of trading in the EAC bloc because it reflects transport costs, time and market access barriers[8], and that the data used are of nearby countries because a decrease in of the distance coefficient indicates that trade with far away countries increase relative to the trade with closer countries, whereas an increase represents trade with closer countries increase faster than that with far countries. However, Tanzania trade bilateral shows are nearby concentrated trade of higher cost than that of Kenya.

4.2 Estimating the bilateral export of Kenya and Tanzania with the Rest of EAC countries

The specification used when the gravity model is applied to estimate bilateral export for specific product is the one explained in equation (3). A high level of income in the exporting country indicates a high level of production, which increases the availability of goods for exports. Therefore, it is expected that β_1 to be positive. The coefficient of Y_j, β_2, is also expected to be positive since a high level of income in the importing country suggests higher imports. In case of population of the exporters, β_3, may be either negative or positive signed, depending on whether the country exports less when it is big (absorption effect) or whether a big country exports more than a small country (economies of scale). The coefficient of the importers population β_4, has also ambiguous sign, for similar reasons. As usual, the distance coefficient is expected to be negative since it is a proxy of all possible trade cost sources[9].

The model also incorporates differences in incomes between exporters using a variable of per capita income. And finally, an exchange rate and openness variables are added to this specification.We estimate equation 3 for export trade flows using OLS method (Note 4: Table4: Random effect Regression results of Tanzania's Export trade with the rest of EAC (Kenya included) countries and Note 5: Table 5: Random Effect Regression results of Kenya's Export trade with the rest of EAC (Tanzania included) countries)

The two tables above reports the inclusive of the individual effects of variables. random or fixed effect can be used for analysis. We apply the random effect because it is appropriate when estimating typical trade flows between randomly drawn samples of trading partners from a larger population. On the other hand, the fixed effect model would be a better choice than random effect when one is interested in estimatingtypical trade flows between an ex ant predetermined selection of nations (Egger, 2000). The only problem faced with FEM is that we cannot directly estimate variables that do not change over time because the inherent transformation wipes out such variables.

We estimate equation (4) into categories starting with the standard model to including relative prices and exchange rates.

Table (4) and (5) carries the following explanations for the trade between Kenya and Tanzania respectively. Colum 1 on both tables explains that export volume of Tanzania and Kenya has a positive relationship with country's GDPs. The coefficient β_1 is positive for both countries, the value for Tanzania bilateral trade is estimated to be 3.738, implies that a 1 percentage increase of Tanzania's GDP will lead to about 3.74 percent increase in export volume. The coefficient further, explain the home- market effect for Tanzania, and since Tanzania is assumed to produce primary products, the higher coefficient shows the link between a country's

[7]The impact is a bit less when the bilateral trade for Kenya is considered showing the light of technology or differentiated product advancement

[8]Butch et al,. 2003 argue that changes in distance coefficient do not carry much information on changes in distance costs over time. Change in distance costs are to a large extent picked up solely in the constant term of the gravity models.

[9] Recently Bougheas et al. (1999) showed that transport cost are a function of not only of distance but also of public infrastructure so some literature augmented the gravity model by introducing additional infrastructure variable (stock of public capital and length of motorway network.

market size and its export that does not exist in trade model that are based on solely comparative advantage[10].

However, Kenya's export quantity has a slightly low value of β_1, the estimate value of the coefficient is 1.07, implies that a 1 percent increase of GDP leads to only 1 percent increase in the export quantity trade. When comes to trade partners' GDPs , export quantity from Tanzania seems not to be favored by the economic development of her partner countries, β_2 (0.153) , the coefficient of importers GDP is positively related to Tanzania's export quantity but not significant, while the coefficient for Kenya's trade, β_2 (0.414), positive and highly significant. This implies that for a 1 percent increase of economic development for Tanzania's trade partner countries leads to only 0.15 percent increase in her export trade, Kenya in the other hand enjoys a 0.4 percent increase in her export trade. In addition, the proxy of market size is further investigated by considering the population of exporter and importers.

Exporter's population did not show any remarkable output more than injuring the model and for that case were eliminated. The importers population however, showed a significant and remarkable contribution to bilateral trade of these two countries. In case of Tanzania's export quantity or trade, the variables showed a positive relationship, the coefficient estimator was 1.883 as compare to a negative impact to Kenya's export quantity. This means that a 1 percent increase in the population of Tanzania's trade partner would yield a 1.88 percent increase in her export, while it would yield a 0.32 percent increase in Kenya's export. The output further, explain the interdependency between the two countries (column 2); Tanzania's trade highly depend on the larger size (population's coefficient is 1.88) of her trading partners and not the economic development (the coefficient of GDP for partner country is – 0.87), but Kenya's trade enjoy both the economic development (GDP's coefficient is 0.23), and the population (coefficient's estimate is 0.32).

The per capita income (column 3) explains that both countries do not attract income level oriented export of goods that they export. The coefficient of the importers per capita income is estimated to be -1.88 for Tanzania's export and -0.33 for Kenya's export. The regression results implies that a 10 percent increase in the per capita income would lead to 18 percent decrease in Tanzania bilateral export and only 3 percent decrease into Kenya's bilateral export. The policy implication of this result is that since Tanzania is in the era of competition it need to improve more in production sector though encouraging more value-added products and differentiated if not sophisticated production. Not only that but also the regression results at this column emphasizes the importance of economic growth in line with the per capita increase. Comparing the importers GDP's coefficient is obviously that the per capita income increase facilitates the significance of economic development. Tanzania's bilateral export now is able to leap 1 percent increase when the GDP of her importer increase by 1 percent and Kenya is able to leap 0.5 percent increase in her bilateral export when the importers' GDP of her product increases by 1 percent.

The impact of distance in bilateral trade is highly estimated to the model's expectations, having the negative sign but also it reflects the probity that trade is done within nearby countries. The only difference between the two countries is that, Tanzania's exported quantity is negatively affected higher by the distance than that how Kenya does. For instance, a 1 percent decrease of trade costs, would lead to a 3 percent increase in Tanzania's export as compared to only 2.6 percent increase in Kenya's export[11]. Our result is concomitant to the reality when the two countries are compared in terms of technology and infrastructure development. In other words, doing business in Tanzania is more expensive as compared to doing business in Kenya (World Bank, 2012)[12] . The coefficients of distance are higher and at least constant in almost all the regression columns expect when exchange rate variable is considered. The distance coefficient is estimate to be -7.433 for Tanzania's bilateral export trade and only 2.23 percent for Kenya's bilateral export. The main implication of the distance's coefficient shows the value of money is vital when considering trade bloc. For Tanzania's export trade, the EAC bloc is more or less underutilized since currency difference increases the trade barriers such that 1 percent increase in trade barriers has the impact of 7 percent decrease in Tanzania's export trade and 2.23 percent in in Kenya's bilateral export. This is a massage for policymakers that having a single currency would facilitate trade flow increase in the bloc

Column 4 of table (4) and (5) reports the regression results when movement in exchange rate is considered. The estimated coefficient for exchange is positive for Tanzania's and negative for Kenya's bilateral export. The result signifies that, price competition is important. Export quantity and value for Tanzania has being favored by

[10]In Krugman (1980), the demand for individual goods varies across markets because of differences in consumer preferences (e.g., German consumers prefer beer, French consumers prefer wine), leading production of a good to concentrate in markets with high levels of demand.

[11]Recently Bougheas et al. (1999) showed that transport cost are a function of not only of distance but also of public infrastructure so some literature augmented the gravity model by introducing additional infrastructure variable (stock of public capital and length of motorway network.

[12] Doing business (World Bank, 2012), Tanzania is ranked 127 while Kenya is ranked 109 among 187 countries

her lower exchange rate, but that of Kenya is being half by the higher exchange rate value of Kenya's currency. For Tanzania's trade, depreciation (devaluation) of exporter currency by 10 percent raises export by 7 percent, but 18 percent for Kenya's bilateral export. Price competition also adds the trade barriers to trade. For instance a there is a remarkable estimated value of distance is when exchange rate is regressed with the basic variables. .

The interpretation of the coefficient of the openness variable is also relevant to our study. This is tested so as to explain the influence of Tanzania's and Kenya's trade and openness (defined as total exports plus total imports divided by GDP) on the trade flows to their partner countries. The results indicated that the estimated coefficient on the openness index is 0.92 for Tanzania's bilateral trade and 1 for Kenya's trade. The results are robust with the present specification of the gravity equation. This result implies that when Tanzania tariff and policy liberalization change by 1% the country's export tend to increase by 0.9%, and by 1% for Tanzania and Kenya, respectively. This suggests further that there is some correlation between Tanzania tariff liberalization in EAC and her export performance.

The finding is in line with the standard international trade theories. In the presence of compensatory and complimentary policies, openness to international trade tends to accelerates development of poor countries (Dollar and Kraay, 2000).on the other hand, with the same variables, column 5 it shows that openness over rules the impact of distance such that distance coefficient decreases to 1.18 for Tanzania and -0.371 for Kenya, implies that with the sandwich of openness distance (trade costs) are reduced and the variable shows a positive impact on trade flow. For Tanzania a 1 percent decrease of trade barrier would lead to 1.2 percent increase in bilateral export while it would lead to only 0.39 percent decrease of Kenya's bilateral trade, other factors being equal.

Although high openness index is widely accepted indicator of the degree of trade liberalization, it is certainly not a sufficient indicator of the welfare part of trade policy reform. The World Development Indicator (2006), for example, show that Sub Saharan Africa as a region managed to increase its openness index from 56% in 1975 to 66% in 2004. China on the other hand increased its openness index from just 9% in 1975 to 65% in 2005. While Sub Saharan Africa hasn't managed to eradicate object poverty, China has succeeded to do so.

This finding has important policy messages for Tanzania and Kenya and EAC country members. It calls for policy makers to focus more on the fundamentals of economic growth, investment, macroeconomic stability, human resources and good governance as a strategy for addressing poverty. Flexibility is highly needed while pursuing this policy. Since complete openness might expose a country to greater risk from external shocks. Poor country like Tanzania may find it hard to buffer these shocks and to bear the costs they incur.

5.Conclusions and Recommendation

The purpose of this paper is to contribute to the on-going debate on the determinants of trade between nations which began during the mercantilist era and was later shaped by the introduction of absolute and comparative cost advantage theories. The Heckscher – Ohlin and later the Linder hypotheses and other modern trade theories also contributed significantly to the understanding of trade flows between nations.

Different forms of the gravity model were tested in the current paper.The results obtained generally support the basic hypothesis of the gravity model that the economic size of the respective countriesexerts a positive impact on the trade between nations. This result is hardly surprising. GDP is a reflection of not only the production capacity of a country but also the consumption and export ability of countries. Thus the results indicate that the commodities produced in both Kenya and Tanzania not only sustains consumption levels in the two countries but also is exported to markets in the respective EAC countries.

The results obtained with respect to the combined per capita income in Kenya's and Tanzania's trade are unexpected. The impact of this variable was supposed to "mirror" that of combine GDPs. Instead, the result shows this variable has a negative impact on the trade flows of both Tanzania and Kenya when trading with the rest of EAC countries. One possible explanation for this result is that Tanzania tends to depend more on exporting quantity products that satisfy the broad EAC market instead of producing goods that are sensitive to the EAC partners' income levels.Nonetheless, Kenya's products are sensitive to EAC partners' income level despite its negative sign in the coefficient of per capita income.

The distance variable was expected to have a negative impact on trade flows between Kenya's and Tanzania's Tradewith the rest of the EAC countries implies among other things the existence of high costs of trading between countries in the EAC. The costs of trading refereed to here include transport costs (freight etc.), time related costs and costs related to market access.

Using the disintegrated trade volume by taking thebilateral export trade of Tanzania and Kenyareviles that both countries depend has their GDPs (exporters GDP meaning growth of their Economy), and importers GDPs too and also the populations of the partner countries. The distance shows that trading in the EAC bloc is associated with high trading costs. And for Tanzania more export is due to her low exchange rate while high exchange rate for Kenya, strong currency, reduces it export to the rest of EAC countries. Openness variable shows trade liberalization measures have significantly improved trade flows between EAC countries. However, the

differences seen among the due causes of Tanzania's and Kenya's trade flow in the EAC bloc coincides with recent trade theory of factor differences. Due to this factor 'abundance theory', or the Heckscher-Ohlin (H-O) model, it is predicted that a country will export commodities that are relatively intensive in the factor with which the country is relatively well endowed.

The results obtained herein have policy implications for both Kenya and Tanzania. They point to the importance of the two countries focusing more on policies aimed at promoting economic growth with a view to promoting trade flows between their countries and more significantly within the EAC flows. Furthermore there is need to encourage the industries which cater specifically for the needs of over 130 million people the region is a ready market for products from such industries.

Efforts need to be made especially on measures aimed at reducing trade related costs in EACbloc. The countries have to come up with concrete measures aimed at reducing tariff and non-tariff restrictions to trade while increasing investments. There is also, a need to undertake further trade liberation of their economies countries with a view to promoting trade activities within the region.The interest in analyzing the trade flows between the two countries has come as a result of the observation that the two countries can loosely be referred as the "economic powerhouses" within the auspices of the EAC. The combined GDPs of Kenya and Tanzania constitute over 60% of the total EAC GDP.

Likewise there are significant recorded and unrecorded trade activities between Kenya and Tanzania than in other EAC countries. The importance of the two countries in influencing not only trade activities but also economic development of the region is likely to increase with the intensification of the EAC integration especially towards the formation of the common market and monetary union. That is why a better understanding of the trade flows between Kenya and Tanzania is essential in enabling the EAC countries to formulate appropriate macroeconomic policies for the development the region.

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Notes:

Table 1: Trade Flows in EAC: 2009 – 2011 (US $ m)

Year	**Tanzania's Exports to Kenya (1) (US $m)**	**Tanzania's Exports to Rest of World (2) (US $m)**	**(1) as % of (2)**
2009	192,904	2,982,405	6.5
2010	324,888	4,050,546	8.0
2011	221,313	4,734,960	4.7
Avg.2009-2011	246,368	3,922,637	6.2
Year	**Tanzania's Exports to Uganda(1) (US $m)**	**Tanzania's Exports to Rest of World (2) (US $m)**	**(1) as % of (2)**
2009	51,651	2,982,405	1.7
2010	60,205	4,050,546	1.5
2011	52,634	4,734,960	1.1
Avg.2009-2011	54,830	3,922,637	1.4
Year	**Tanzania's Exports to Rwanda (1) (US $m)**	**Tanzania's Exports to Rest of World (2) (US $m)**	**(1) as % of (2)**
2009	15,805	2,982,405	0.5
2010	116,802	4,050,546	2.8
2011	95,160	4,734,960	2.0
Avg.2009-2011	75,922	3,922,637	1.7
Year	**Tanzania's Exports to Burundi (1) (US $m)**	**Tanzania's Exports to Rest of World (2) (US $m)**	**(1)as % of (2)**
2009	24,632	2,982,405	0.8
2010	56,132	4,050,546	1.3
2011	39,848	4,734,960	0.8
Avg.2009-2011	40,204	3,922,637	0.9

Source(s). World Bank 2010
EAC 2011

Table 2: Economic Growth in EAC Region 1990 - 2010

Region	1990 – 1999	2006	2007	2008	2009	2010
Burundi	-1.3	5.2	3.6	4.3	3.5	3.9
Kenya	2.1	6.3	7.0	1.5	2.6	5.6
Rwanda	-0.1	8.6	7.7	11.5	6.1	7.5
Tanzania	3.1	6.7	7.1	7.4	6	7.0
Uganda	6.3	7.0	8.1	10.4	3.9	5.6

Source: EAC Report (2011)

Table 3: OLS results of Tanzania's and Kenya's bilateral trade with the rest of EAC countries

Explanatory variables	DependentVariable (Tanzania's Total trade (log))	Dependent Variable (Kenya's Total Volume of Trade (log))
	OLS Coefficient	OLS Coefficient
Constant	13.447**(4.757)	6.269***(0.429)
GDPs(Product)	1.115***(0.234)	0.702***(0.059)
PCIs(Product)	-2.011***(0.461)	-0.471***(0.121)
Distance	-3.940***(0.532)	-2.243***(0.171)
No. obsrv	32	32
R^2	0.893	0.983
Adjusted R^2	0.854	0.864
Hausman Test	0.524	0.881

Note; 1) the numbers in parenthesis are standard error
2) *** and ** and * means significant at 1%, 5% and 10% level, respectively

Table 4: Random effect Regression results of Tanzania's Export trade to the rest of EAC (Kenya included) countries

Explanatory variables	Model 1.	Model 2.	Model 3	Model 4	Model 5
	RE Coeff	RE Coeff.	RE Coeff.	RE Coeff.	RE Coeff.
Constant	6.652***(1.592)	3.806*(1.535)	8.141***(1.405)	16.88***(3.063)	3.412***(0.395)
GDP (Tanzania)	3.738*(1.414)	3.842*(1.440)	3.842*(1.440)	4.278*(1.588)	1.448*(0.524)
Importer GDP	0.153(0.134)	-0.876**(0.284)	1.007***(0.244)	-0.111(0.130)	-0.041(0.120)
Distance	-3.029***(0.676)	-2.605***(0.555)	-2.606***(0.556)	-7.433***(1.296)	1.183(0.208)
ImporterPop		1.883***(0.481)			
Importer PCI			-1.881(0.482)		
Exc. Rate				0.708***(0.189)	
openness					0.959***(0.037)
R^2	0.715	0.816	0.815	0.809	0.988
Adjusted R^2	0.690	0.783	0700	0.788	0.888
Hausman Test	1.000	1.000	1.000	1.000	0.999

Note; 1) the numbers in parenthesis are standard error
2) *** and ** and * means significant at 1%, 5% and 10% level, respectively

Table 5: Random effect Regression results of Kenya's Export trade to the rest of EAC (Tanzania included) countries

Explanatory variables	Model 1.	Model 2.	Model 3	Model 4	Model 5
	OLS Coeff	OLS Coeff.	OLSCoeff.	OLSCoeff.	OLS Coeff.
Constant	5.275***(0.789)	4.859***(0.389)	5.574***(0.374)	4.235***(0.484)	5.490***(0160)
GDP(Kenya)	1.07*(0.504)	1.129*(0.483)	1.123*(0.459)	0.959*(0.521)	0.863***(0.079)
GDP(importer)	0.414***(0.078)	0.226**(0.071)	0.552***(0.055)	-0.430***(0.028)	-0.090**(0.027)
Distance	-2.577***(0.432)	-2.547***(0.110)	-2.528***(0.160)	-2.264***(0.177)	-0.371**(0.112)
Pop.(Importer)		0.319**(0.158)			
PCI(Importer)			-0.326(0.113)		
Exchange Rate				-0.187***(0.057)	0.090***(0.024)
Openness					1.0***(0.050)
R^2	0.914	0.987	0.988	0.989	0.988
Adjusted R^2	0.889	0.899	0.886	0.788	0.900
Hausman Test	0.622	0.370	0.634	0.388	0.09

Note; 1) the numbers in parenthesis are standard error
2) *** and ** and * means significant at 1%, 5% and 10% level, respectively