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Ethiopia's Export Performance with Major Trade Partners: A Gravity Model Approach

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Abstract
A gravity model is very important in the analysis of bilateral trade flows, and has proven to be a useful tool in determining export potential of a country. Accordingly, the purpose of this study is to analyze factors that determine export flows between Ethiopia and its trading partners using a gravity model approach. The research had used secondary data collected from different sources and covers periods from 1995-2010 for 14 importing countries, which implies that the data were panel. There was consideration of the importing capacity of the countries and successiveness of their importing condition for considering the countries as a sample. Different tests were applied in order to select the appropriate model to regress the gravity model. As of those tests, the research had adopted the random effects gravity model. The model result showed that six of the total variables (nine) are significant at different level of significance. Coefficients of per capita GDPs of importer and exporter countries, population size of trading partners, and the distance between nations are significant and as to the expected sign. However, the coefficients of population sizes of Ethiopia and bilateral exchange rate between nations are significant and against the hypotheses. Based on the result, successive enlargement of the foreign per capita GDP directly result into increment in the export revenue of Ethiopia. In addition, the more populous the trading partners of Ethiopia, the higher its export volumes as they imports much to satisfy large domestic demands. Moreover, distance between two countries, which is a proxy for transport costs, affects Ethiopian exports negatively.
Keywords: Export, Gravity model, random effects, Panel data, Demand and Supply side factors

1. INTRODUCTION

International agricultural trade enables countries to obtain the benefits of specialization, such as increases in output of goods and services; obtain those commodities and services which they do not produce or do not produce in sufficient quantities (Arene, 2008). He further stated that some of the benefits of international agricultural trade include increases in foreign exchange earnings especially for the weak currency developing countries and increase competition among producing nations thereby improving efficiency in production that brings about reduction in selling prices of products. USAID (2010) had shown that agricultural trade is important to the poor in developing countries because most of the world's poor live in rural areas where agriculture is a key source of income and consumption.

Developing countries have progressively increased their share in global trade from just one quarter to about one third over the past two decades. Asia and particularly China account for most of the change, which has been facilitated by diversification of exports. While developing Asia's share in total world exports increased from11.7% in 1985 to 21.5% in 2005, Africa's share decreased from 4.3% to 2.9% over the same period (Bacchetta, 2007). One of the main considerations in assessing the export performance of a country may relate to its importance in the overall GDP. If the share is high, it can be said that the country is largely engaging in export trade and is benefiting a lot from it. If it is low, this may mean that the country is less involved in the export or it does not earn sufficient revenue from what it exports (Kebede, 2011).

Ethiopia's export sector is dominated by export of few primary commodities which include agricultural products mainly coffee, oilseeds, gold, pulses, live animals, chat, flower, and hide and skins. The export performance has reached remarkable level in the recent few years that is it reached a never-before-seen level of $2 billion in the year 2010. This growth is an impressive one that was 38% increase from the $1.5 billion in exports registered in the previous year (2009), and nearly three times the average annual export level of the prior decade (2000-2009) (Kiros, 2012).

Ethiopia has a trade relationship with many of the nations in the world especially with nations from Europe, Africa and south East Asian. In an anticipation to drive some gains from the international trade most countries, particularly the developing ones, have introduced economic reforms and joined bilateral and regional trade agreements. The major export markets of the country (destinations) are nations in Europe followed by Asian and African nations respectively (Khalafalla and Omer, 2012). Taking into account the focus given to the export sector, it is rational to investigate factors determining export flows between Ethiopia and its trading partners. Therefore, the objective of this paper is to examine how the demand and supply side factors affect Ethiopian's export market.

2. CONCEPTUAL AND METHODOLOGICAL ISSUES

2.1. Determinants of Export Performance

Redding and Venables (2004) considered that determinants of export performance can be split into external and internal components. External components include market access/entry conditions and a country's location vis à vis international markets, whereas internal components relate to supply-side conditions. They investigate the relative contribution towards export performance of external geography (particularly linkages to international demand) relative to capacity of internal supply (mainly internal geographical factors) using aggregated trade data. They emphasize on the fact that countries geographically close to regions where there is strong aggregate import demand will tend to have better export growth. Fugazza (2004) and Bacchetta (2007) also categorized determinants of a country's export performance into two major factors: internal supply and external market**.**

Supply capacity conditions: Supply conditions are fundamental in defining the export potential of an economy and, for a given level of access to international markets, countries with better supply conditions are expected to export more (Fugazza, 2004). Key determinants of supply side conditions are specific factors influencing export performance vary from one country to another. The agenda for assessing export supply constraints needs to consider both constraints to traditional export supply as well as constraints to shifting resources into new export activities (Biggs, 2007).

Market access conditions: In the case of foreign market access, two dimensions can be considered. The first is explained through interventions by trading partners, and the second one is related to the measures implemented by the exporting country to provide its exportables with a price advantage (McCarthy, 2008). Trading partners influence the export performance of a country through their trade policies (tariff and non-tariff measures) (Fugazza, 2004 and Biggs, 2007). Apart from trade barriers, foreign market access is also determined by international transportation costs (UNCTAD, 2005), which constitute an important element for countries to supply their exports at a competitive price in the world market. Hence, transport costs are amongst the most important trade barriers for low-income countries.

2.2. Theoretical Foundation of Gravity Model

Gravity model is one of the most important empirical approaches in international trade. Accordingly, an extensive amount of literature has been published on this model. Its origin goes back to the Newton's law in physics, in which the gravitational attraction between two objects is equated to the product of their masses divided by the distance between them (Rahman, 2006).

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. 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.

Anderson and van Wincoop (2003) develop a theoretically grounded estimable gravity model which owes its form to homothetic preferences approximated by constant elasticity of substitution (CES) utility function for consumers. Consumers' utilities increase from consuming more of a particular good, or from consuming a variety of goods. On the production side, Anderson-van Wincoop model assumes that each firm produces a unique product under increasing returns to scale. Hence consumers enjoy variety of products from different countries.

2.3. Data Sources

The research used secondary data, which were collected from different sources such as WB, IMF, EEPRI Data Base and National Bank of Ethiopia, in which they had collected for their own purpose. In order to deduce sound conclusions from the empirical study, it is important to choose an appropriate time period and to include as many countries as possible into the sample. Hence, the study covers the period from 1995 to 2010 for a total of 14 major trading partners of Ethiopia. The year considered were enough as compared with the number of years taken into account by other studies. Sample countries are chosen based on their importance for Ethiopia as a trading partner and the data availability for the different variables.

The values of aggregate bilateral exports of Ethiopia to the trading partners have been taken from the

National Bank of Ethiopia and reported in the Appendix Table A2. The data for most of the variables including GDP (in billions of US Dollar), nominal exchange rate (national currency per US Dollar), population size (in millions) and internal transport infrastructure (the percentage of paved road out of total road network of the country) have been obtained from the World Bank, IMF, and EEPRI databases.

2.4. Specification of the Model

Based on the above theoretical concepts, it is possible to distinguish between foreign market access and supply capacity determinants of Ethiopia's export performance using the bilateral trade information between Ethiopia and its trading partners. Thus, the value of total exports of Ethiopia to all destinations is given by:

$$X_{ij} = f(SC_i, FMA_{ij}) \quad (1)$$

Where X_{ij} is the total value of exports from Ethiopia (country i) to its trading partner (country j), SC_i is Ethiopia's supply capacity, and FMA_{ij} are the market access conditions for Ethiopian exports of Ethiopia's trading partner j. The most important determinants of a country's export performance as identified in the literature are integrated into the model. For any given point in time, the foreign market access variable can be written as a function:

$$FMA_{ij} = g(\mathrm{GDP_j}, \sum (\mathrm{T_{ij)}}^{1-\alpha}); \quad \text{Where } (\mathrm{T_{ij}})^{1-\alpha} = f(DIST_{ij}, FTP_j)^{1-\alpha} \quad (2)$$

FMA contains the importing country j's characteristics such as economic size (GDP), factors affecting costs related to trade flows, i.e. international transport costs as proxied by distance (DIST), and foreign trade policy (FTP) barriers (tariff and NTBs).

In order to overcome the problem of time invariant nature in panel-data, weighted distance developed by Karagöz and Saray (2008) was used. The formula is given by:

$$WDIST_{ijt} = (DIST_{ij} \times GDP_{it}) / \sum GDP_i \quad (3)$$

Where $WDIST_{ijt}$ is the weighted distance between country i (Ethiopia) and j (Ethiopia's trading partner) in year t; $DIST_{ij}$ is the geographical distance between countries i and j; GDP_{it} is GDP of country i in year t; and ΣGDP_i is overall sum of the GDPs of country i.

On the other hand, supply capacity can be written as a function:

$$SC_i = h(GDP_i, FDI_i, PERCAP_i, RER_i) \quad (4)$$

Where:

- ✓ GDP is the economic potential of the exporting country,
- ✓ FDI is foreign direct investment
- ✓ RER is real exchange rate, and
- ✓ PERCAP is per capita GDPs

As explained above, gradual improvements have been made to the gravity model so that it became more suitable for analyzing bilateral trade flows between a pair of countries. The standard gravity model states that the trade between two countries is determined positively by each country's GDP, and negatively by the distance between them (Hatab *et al.,* 2010). Thus, the simplest gravity equation can be stated as follows:

$$\mathrm{X_{ij}} = \alpha_0 (\mathrm{GDP}_i)^{\beta_1} (\mathrm{GDP}_j)^{\beta_2} (\mathrm{DIS_{ij}})^{\beta_3} \quad (5)$$

Where, X_{ij}= bilateral trade between country i and country j; GDP_i - GDP of country i; GDP_j - GDP of country j; and DIS_{ij} - Distance between the two countries' capital cities.

Usually, the gravity models are estimated in log linear form, in which case the estimated coefficients would be interpreted as elasticities. Accordingly, equation (5) would take the following form:

$$\ln X_{ij} = \alpha_0 + \beta_1 \ln GDP_i + \beta_2 \ln GDP_j + \beta_3 \ln DIS_{ij} + U_{ij} \quad (6)$$

Where, U_{ij} is the error term.

Furthermore, the generalized gravity model augments the basic model with other variables which are thought to explain the flow of trade among countries. It states that the volume of bilateral trade between a pair countries does not depend only on their incomes(GDPs) and geographical distance, but also on their populations and a set of dummy variables either facilitating or hindering trade between pairs of countries (Martinez-Zarzoso and Nowak-Lehmann, 2003).

Hence, allowing for changes over time, the model to analyze Ethiopia's export performance is as follows:

$$\ln X_{ijt} = \alpha + \beta_1 \ln GDP_{it} + \beta_2 \ln GDP_{jt} + \beta_3 \ln PERCAP_{it} + \beta_4 \ln POP_{jt} + \beta_5 \ln POP_{it} + \beta_6 \ln RER_{ijt} + \beta_7 \ln PERCAP_{jt} + \beta_8 WD\,IST_{ijt} + \beta_9 PAVEROAD_{it} + U_{ijt} \quad (7)$$

Where

- ✓ X_{ijt} is the value of Ethiopian exports to her trading partner j (in USD million) at time t;
- ✓ GDP_{it} is the value of Ethiopia's GDP at current market prices (in USD million) at time t;
- ✓ GDP_{jt} is the value of GDP of country j at current market prices (in USD million) at time t;
- ✓ FDI_{it} represents FDI stock in Ethiopia (in USD million) at time t;
- ✓ POP_{it} represents the population of Ethiopia (in million) at time t;
- ✓ POP_{jt} represents the population of Ethiopia's trading partners (in million) at time t;
- ✓ PERCAPjt per capita GDPs in US dollars of countries I at time t;
- ✓ PERCAPit per capita GDPs in US dollars of countries j at time t;
- ✓ RER_{ijt} represents real exchange rate between country i and country j at time t;
- ✓ $WDIST_{ijt}$ represents the weighted distance between Ethiopia and her trading partner j at time t;
- ✓ $PAVEROAD_{it}$ represents the percentage of paved road in the total road network of country i in year t; and
- ✓ U_{ijt} represents the stochastic term - a log-normally distributed error with E ($\ln U_{ij}$) =0.

2.5. Hypotheses and Definition of Variables

1. Export (X_{ijt}): The annual values (in USD million) of Ethiopian exports to each of the 14 trading partners are mainly collected from EEPRI Data Base.

2. Gross Domestic Product (GDP_{it} and GDP_{jt}): Data on GDP of Ethiopia and its trading partners (in million US dollars) are collected from World Bank Data Base. Since exports are the difference between domestic supply and domestic demand, they should be affected by the growth in domestic income. It may be the GDP of the Ethiopia or its trade partner. GDP of Ethiopia (GDP_{it}) is source of power for increasing the export. Given this, the foreign GDP (GDP_{it}) also would result into increment in the export of coffee by being source of demand. Both of the two GDP are source of enlarging the export of Ethiopia, implies that two of the variables are expected to have positive contribution for the expansion of the export.

PERCAPjt and PERCAPit: represent the per capita GDPs in US dollars of countries i and j, respectively. Given that the per capita GDP is a variable that is indicative of the consumers' income level determining the purchasing power of the consumers in the respective countries, it is expected that $\beta 3 \geq 0$ and $\beta 7 \geq 0$, to confirm that the higher the income of consumers the more goods they can purchase, ceteris paribus.

3. Distance ($WDIST_{ijt}$): It is the distance between the two nations, which means the geographic distance between Ethiopia and the trade partner nations. Thus, having long distance between Ethiopia and its trading partner would directly result into high cost of transportation and then there will be reduction in the demand of foreigners to our products, which implies this variable is expected to have negative effect on the export. Data on the distance between Ethiopia and her trade partners are collected based on the distance between Addis Ababa and capital at Ethiopia's trading partners. These data are available from www.indo.com/distance. The weighted distance between Ethiopia and its trading partners for each year in the observation period is measured based on distance data and GDP.

4. Foreign Direct Investment (FDI_{it}): FDIit represents foreign direct investment stock in Ethiopia (in USD million) at time t. It is one way of increasing the economic capacity of a nation, which implies that successive attraction of foreign direct investment would result into enlargement of the exporting capacity.

5. Real Exchange Rate (RER_{ijt}) is the real bilateral exchange rate between country i and country j at time t measured by the formula: $BER_{ijt} = (TCN_{i/\$} / TCN_{j/\$}) \times (CPI_j / CPI_i)$ where TCN is the nominal exchange rate vis -à -vis the dollar and CPI is the price index, notably the GDP deflator. The data are available from EEPRI Data Base. The negative impact of the real bilateral exchange rate will be reflected in $\beta_6 < 0$.

6. Population (POP_{it} and POP_{jt}): The effect of exporter country population could be positive or negative depending on whether absorption effect or economies of scale effect is dominant. A large population may

indicate a big domestic market and large resource endowment, in which case larger absorption effect may lead to less export. If this is the case, a negative sign will be expected. On the other hand, a large domestic market may imply utilization of the economies of scales so that expected sign of the population coefficient would be positive. For similar reasons, the coefficient of importing country population is indeterminate where the absorption effects and economies of scale effects are expected to affect their imports positively and negatively, respectively.

7. Paved Road ($PAVEROAD_{it}$): Ethiopia's internal transport infrastructure (proxied by the percentage of paved road in the total road network of the country) in year t. Export is expected to be affected positively by internal transport infrastructure which is proxied by the percentage of paved road out of the total road network in the country. Better infrastructure eases the difficulties associated with moving the commodities to the departure place.

3. MODEL ESTIMATION AND EMPIRICAL RESULTS

3.1. Model Tests and Estimation Procedure

Estimation Procedure: Random effects and fixed effects are mainly adopted for analyzing panel data. They are highly related and one may apply them in an alternative way. Depending on the data type and the interest of the researcher there may be adoption of the one for analyzing a given data. If the interest of the researcher is only on time invariant variables, then he/she may apply the fixed effect model. According to Egger, selection between fixed and random effects models depends on the interests of the analysis, the sample country, the data properties and the underlying theoretical model used. Random effect models are needed to capture cross country and time effects, but notes that this model should be considered if they are adequately consistent and there is an interest in estimating time invariant effects (Konstantinos *et al*., 2010).

Hausman specification specification test was applied to select the appropriate model between fixed or random effects. The test result revealed that the error terms are correlated with country specific circumstances, which implies that the test statistics indicates that the chi-square value (0.9953) is insignificant to accept the null hypothesis. This implies that the appropriate model is the random effect one (see Table 1 below).

In addition, following Galmacci and Pannone (1990), Variable Inflation Factor (VIF) Analysis had applied to check for multicollinearity. The analysis indicated that the mean VIF value of less than 10, meaning there is no a problem of multicollinearity in the data (see Table A3 from the Appendex). However, the two important variables (GDPs of the two trade partners) which were used as proxies for marketing sizes of these countries are rejected due to collinearity problem.

Table 1; Hausman specification for fixed and random effects

Variables	Coefficients			
	Fixed (b)	Random (B)	Difference (b-B)	S.E. (sqrt(diag(V_b-V_B)))
$lnWDIST_{ijt}$	-5.159076	-5.138197	-0.020879	0.1125061
$lnRER_{ijt}$	-0.0865959	-0.0827301	-0.0038657	0.0087622
$lnPOP_{jt}$	1.144975	1.139018	0.0059574	0.0299322
$lnPERCAP_{jt}$	2.462844	2.451972	0.0108721	0.0439022

Prob>chi2 = 0.9953

Source: Model result, 2014

3.2. Model Results and Discussion

After having all the above tests the paper had adopted the random effect model for regressing and has the following result. The difference across units was assumed that of uncorraelated as of the corr (u_i, xi) value where it is zero. Since the probability value of the chi-square value is significant at one percent level of significance, then the model is significant or the variation in the dependent variable is fully explained by the variables considered as an explanatory.

The model result showed that six of the total variables (eight) are significant at different level of significance (see Table 2). The main independent variables of the basic gravity model as well as this model, the per capita GDPs of importer and exporter countries, population size of trading partners, and the distance between nations are significant and as to the expected sign. Since the coefficients of these variables are elastic type, which implies that a one unit change of these variables would automatically result into having a more than/or a less than one unite change in the dependent variable, export of Ethiopia.

The log of Per capita GDPs of the trading partners is statistically significant at 1% and positive coefficient. The estimated positive coefficient of foreign Per capita GDPs implies that the consumers' income level determines the purchasing power of the consumers in the respective countries. That is the higher the income of consumers the more goods they can purchase and hence, Ethiopia's export to this country increases.

From the estimated results, holding other things unchanged, it is evident that a 1% improvement in per capita GDP of the trading partners would increase their demand for Ethiopian exports by 2.45%.

For the per capita GDP of the exporting countries, the coefficient estimated was positive and statistically significant. There is strong empirical evidence that countries with higher per capita income tend to have higher trade volumes that is why richer countries trade more. On contrary, there is an argument that an increase in income of the producing country increased the domestic consumption of the product thereby reducing the quantity to be exported to the partner countries. However, the result confirmed that increase in per capita GDP of Ethiopia increases export.

Table 2: Random Effects Estimation Result (Dependent Variable: Bilateral Export)

Variables	Coefficient	Robust Std.Err.	Z	P>|z	[95% Conf. Interval]	
$lnWDIST_{ijt}$	-5.138197	0.5463997	-9.40	0.000*	-6.20912	-4.067273
$lnPOP_{jt}$	1.139018	0.1494821	7.62	0.000*	0.8460381	1.431997
$lnPOP_{it}$	8.145844	2.045063	3.98	0.000*	4.137595	12.15409
$lnIQ_{it}$	-0.2930794	0.6629665	-0.44	0.658	-1.59247	1.006311
$lnRER_{ijt}$	-0.0827301	0.0497329	-1.66	0.096***	-0.180204	0.014744
$lnPERCAP_{jt}$	2.451972	0.2056255	11.92	0.000*	2.048954	2.854991
$lnPERCAP_{it}$	4.661009	0.6247222	7.46	0.000*	3.436576	5.885443
$lnPAVEPROAD_{it}$	0.3482741	0.7831339	0.44	0.657	-1.18664	1.883188
_cons	-54.98743	6.489883	-8.47	0.000*	-67.70737	-42.2675

Number of Obs = 223 Wald chi2(8) = 294.11
Prob > chi2 = 0.0000 Corr(u_i, X) = 0 (assumed)
R-sq: Within = 0.4951
Between = 0.9375
Overall = 0.5784

Note: "ln" shows the natural logarithm of the variables, whereas "*" and "***" indicates the significance of the coefficients at 1% and 10% levels of significance, respectively.
Source: Model result, 2014

The variable that is considered as one indicator of supply side factor, which is percentage of paved roads out of the total roads result into having statistically insignificant, though it has expected positive sign. It is obvious that agricultural commodities are largely grown and harvested in the rural areas of the country considerably far from their place of departure. Thus, underdeveloped infrastructural facilities constrain the supply of these commodities while their improvements have expansionary effects on export.

As expected the estimated coefficient of distance (WDIST) is negative. The negative coefficient of this variable indicates that the distance between Ethiopia and its trading partners affects Ethiopian exports negatively. This implies that the farther the destination countries are from Ethiopia, the smaller the exports to these countries. This is because transportation costs are expected to increase with increase in geographical distance between two countries. From the estimated results, holding other things unchanged, it is evident that a 1% difference in distance will reduce Ethiopian exports by 5.14%.

Hypothetically, the effect of exporter country population could be positive or negative depending on whether absorption effect or economies of scale effect is dominant. A large population may indicate a big domestic market and large resource endowment, in which case larger absorption effect may lead to less export. If this is the case, a negative sign will be expected. On the other hand, a large domestic market may imply utilization of the economies of scales so that expected sign of the population coefficient would be positive. The result indicated that the population of Ethiopia has a positive coefficient which is significant at 1% level. This may indicate a large domestic market may imply utilization of the economies of scales rather than the dominance of absorption effect. However, the result revealed that the coefficient of importer country's population is positive and significant implies the more populous the country is, the higher its imports to satisfy large domestic demand. From the estimated results, holding other things unchanged, it is proved that a 1% increment in population of the trading partners would increase Ethiopian exports by 1.14%.

The estimation result demonstrates that real exchange rate is statistically significant, and the sign of the variable is negative which is against the hypothesis. The formulation of real exchange rate has been in terms of domestic currency per foreign currency multiplied by the ratio of foreign price to domestic price, its increase implies real depreciation while the decline indicates real appreciation. In the Ethiopian context, this explanation may not actually hold provided that the exports of the country are the highly confined to primary products which are hardly dependent on the imported goods. The negative effect of exchange rate is probably due to the attributes to price inelastic domestic export supply and/or low price elasticity of demand for primary commodities in the foreign markets.

4. CONCLUSION AND RECOMMENDATION

This study has attempted to analyze the factors that determine export performance of Ethiopia. Accordingly, bilateral exports to 14 main trading partners are considered for the period 1995-2010. The estimation of the model is made using random effects gravity model since it is an appropriate model according to Hausman specification test.

The results confirmed that per capita income of trading partners (which determines the purchasing power of the consumers in the respective countries), population size of trading partners, and the distance between nations are significant and as to the expected sig. Based on the result, successive enlargement of the foreign per capita GDP has a positive and significant demand effect, which means increment of it would directly result into increment in the export revenue of Ethiopia. In addition, coefficient of importer country's population size is positive and significant implies the more populous the country is, the higher its imports to satisfy large domestic demand. Whereas, the negative coefficient of distance variable indicated that the farther the destination countries are from Ethiopia, the smaller the exports to these countries.

The experience of a number of countries suggests that paved roads strongly contribute to the transformation of the composition of exports. In this paper, the estimated result indicates that paved road has no impact on Ethiopian export performance.

This analysis has been carried out at an aggregate level. The dependent variable (total exports to each trading partner) groups together exports of primary, mineral and manufactured products. Thus, in future research, it may be useful to conduct the analysis at a more disaggregated, sectoral level.

Since the supply capacity export potential macro economic variables considered in this research are not significant enough in affecting export of Ethiopia, it could not be sufficient enough to generalize and recommend about the whole supply capacity variables. Thus, for interested individuals for further study in connection with export performance of Ethiopia should provide attention to supply capacity micro economic variables.

5. REFERENCES

Anderson, J.E. (1979), "A Theoretical Foundation for the Gravity Equation", *The American Economic Review*, 69(1): 106-116.

Anderson, J.E. and Wincoop, van E. (2003), "Gravity with Gravitas: A Solution to the Border Puzzle", *The American Economic Review*, 93(1): 170-192.

Arene, C. J. (2008), "Agricultural Economics: A Functional Approach", Price Publishers, Pp 176-243.

Bacchetta, M. (2007), "Releasing Export Constraints: The Role of Governments, AERC Research Project on Export Supply Response Capacity Constraints in Africa", Paper No. ESWP_01.

Bergstrand, J.H. (1985) "The Gravity Equation in International Trade: Some Microeconomic Foundations and Empirical Evidence", *Review of Economics and Statistics*, 67(3): 474-481.

Biggs, T. (2007), "Assessing Export Supply Constraints: Methodology, Data, and Measurement, AERC Research Project on Export Supply Response Capacity Constraints in Africa", Paper No. ESWP_02.

Eaton, J. and Kortum, S. (2002), "Technology, Geography and Trade", *Econometrica*, 70(5): 1741-1779.

Egger, P. (2000), "A Note on the Proper Econometric Specification of the Gravity Equation", *Economic Letters*, 66, 25-31.

Eita, J.H. and Jordaan, A.C. (2007), "South Africa Exports of Metals and Articles of Base Metal: A gravity Model Approach", *Journal for Studies in Economics and Econometrics*, 31(3): 81-95.

Endoh, M. (1999), "Trade Creation and Trade Diversion in the EEC, the LAFTA and the CMEA: 1960-1994", *Applied Economics*, No.31, pp. 207–16.

Fugazza, M. (2004), "Export Performance and Its Determinants: Supply and Demand Constraints", Policy Issues in International Trade and Commodities Study Series No.26, UNCTAD.

Hatab, A. A., Romstad, E. and Huo, X. (2010), "Determinants of Egyptian Agricultural Exports: A Gravity Model Approach", Modern Economy, No.1, pp.134-143.

Helpman, E. and Krugman, P.R. (1985), "Market Structure and Foreign Trade: Increasing Returns, Integration Agreements: The Case of Southern African Economies", TIPS Annual Form at Glenburn Lodge, Muldersdrift.

Karagöz, K. and Saray, M.O. (2008), "Trade Potential of Turkey with Asia-Pacific Countries: Evidence from Panel Gravity Model", 7th APEF International Conference on "East and West Asia Economic Relations: Opportunities, Challenges and Outcomes", University of Esfahan, 3-5 November 2008, in Esfahan, Iran.

Kebede, B. (2011), "Does Real Exchange Rate Matter for Ethiopia's Exports? A Gravity Model Analysis", A Thesis Submitted to the School of Graduate Studies of Addis Ababa University.

Khalafalla, A.M and Omer, A.I. (2012), "Does Gravity Model Fit Sudan's Trade Patterns?" *International Journal of Economics and Finance.* Published: June 1, 2011.

Kiros, H. (2012), "Determinants of Export Growth Rate in Ethiopia 1980-2010: Co-Integration and Error Correction Model Analysis", A project Submitted to the School of Economics of Addis Ababa University.

Konstantinos K, Matthew G. K. and Dimitrios, T. (2010), "The Gravity Model Specification for Modeling International Trade Flows and Free Trade Agreement Effects: A 10-Year Review of Empirical Studies", *The Open Economics Journal,* , *3,* 1-13 National Technical University of Athens, 5 Iroon Polytechniou Str., Athens, 15773, Greece.

Martinez-Zarzoso, I. and Nowak-Lehmann, F. (2003), "Augmented Gravity Model: An Empirical Application to Mercosur-European Union Trade Flows", *Journal of Applied Economics*, Vol.6, No.2, pp. 291-316.

McCarthy, C. (2008), "Opportunities and Challenges Facing Africa in the Development of Key Export Sectors under the WTO Agreement- a Focus on Mining, Manufacturing and Services", Department of Economics, University of Stellenbosch.

Rahman, M. (2006), "A Panel Data Analysis of Bangladesh's Trade: The Gravity Model Approach", University of Sydney, NSW, Australia.

Redding, S. and Venables, A. (2004), "Geography and export performance: External market access and internal supply capacity", (Baldwin R and Winters A, eds), Challenges to Galmacci, Gianfranco, and Pannone, M. (1990), "SUSAM: A Teaching Tool for Multicollinearity Analysis", ICOTS 3.

United Nations Conference on Trade and Development (UNCTAD) (2005), "Determinants of Export Performance", Developing Countries in International Trade, Trade and Development Index 2, pp. 49-79.

United States Agency for International Development (USAID) (2010), "Strategic Review Feed the Future", USAID Report Paper October. PP 1-25.

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