Determinants and Potentials of Foreign Trade in Ethiopia: A Gravity Model Analysis

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Abstract

In this study, attempts are made to provide a theoretical justification for using the gravity model in analyzing the bilateral trade flows. The augmented gravity model was adopted to analyse Ethiopia's trade with its main trading partners using the panel data estimation technique. Estimations of the gravity model for export, import and total trade (sum of exports and imports) are carried on. The estimated results show that Ethiopia's export, import and total trade are positively determined by the size of the economies, per capita GDP differential and openness of the trading countries' economies. Specifically, the major determinants of Ethiopia's exports are: size of the economies(GDP's of Ethiopia and that of partner), partner countries' openness of economies, economic similarity and per capita GDP differential of the countries. All these factors affected Ethiopia's export positively except similarity indicator. The exchange rate, on the other hand, has no effect on Ethiopia's export trade. Ethiopia's imports are also determined by GDP's (of Ethiopia and the partner country), per capita income differentials and openness of the countries involved in trade. Transportation cost is found to be a significant factor in influencing Ethiopia's trade negatively. On the other hand, Ethiopia's export and import trade are not found to be influenced to by common border . The country specific effects show that Ethiopia could do better by trading more with Comesa member countries and newly emerging economies of Asia such as Hong Kong, Singapore and Yemen as well as European countries like Turkey and Russia.

***Key Words*:** Gravity Model, Panel Data, Fixed Effect Model, Random Effect Model, Hausman Tyalor Model, Ethiopia's Trade.

1. Introduction

The performance of foreign trade in Ethiopia has increased significantly in recent times. Available evidences shows that the value of both exports and imports improved tremendously since the implementation of the Plan for Accelerated and Sustained Development to End Poverty (PASDEP) in 2004/05.The Government has implemented many export incentive packages besides the reduction of tariff rate for import of raw materials and capital goods to the manufacturing sector. Nevertheless, according to the data of Ethiopian Revenue and Customs Authority (ERCA), during the period 2004 to 2012, the value of the country's export increased from USD 615.26 million to USD 2,772.12 million, while import rose from USD 3,040.84 to 11,556.14 million over the same period. As a result the fast growth of import compared to export, trade deficit of the country increased from USD 2,425.58 million to 8,784.02 million over the period. This merchandise trade deficit divergence has resulted to wider current account deficit in the country.

The trade deficit and its economic and social implications are matters of concern to both the public and private sectors. Thus, it is important for both parties to work together with respect to the contents and marketing strategies of export items. There is an urgent need to address the trade deficit not only from export side but also from the expenditure or import side by identifying products that can be locally produced to reduce foreign exchange out flows. At the same time, expanding the volume of trade and diversifying of export products and market destinations need to be investigated in detail to narrow the deficit.

As a matter of fact the export basket of the country is concentrated on few agricultural products such as coffee, oilseeds, pulses and semi processed leather. The export destination of the country's products are very limited as well. On the other hand, as a consequence of the grow of the domestic economy, the demand for consumer and capital goods as well as various other services is growing. Given such circumstances, the fiscal and non fiscal incentives will not be effective enough to bring solution for narrowing the trade deficit. It is rather important to supplement such incentives by other measures that give special priority for boosting export trade such as diversifying export baskets and destinations besides promoting import substituting projects. Firms relying on imported inputs and capital goods have been blaming the customs and logistics inefficiency as they are affected by delays in importing essential materials or/and machinery as well as the impossibility of importing

them altogether. Furthermore, the foreign exchange controls and procedures which have been established by the government in response to the shortage of foreign currency caused additional costs and delays for all firms in Ethiopia as it affected their dealing with foreign trade partners.

According to the Ministry of Foreign Affairs Foreign Trade Promotion Manual (MOF,2007) Ethiopia's foreign trade policy has three general objectives. The first is developing and ensuring broad international market for the country's agricultural products and the second one is generating sufficient foreign exchange which is essential for importing capital goods, intermediate inputs and other goods and services that are necessary for the growth and development of the economy. The third one is improving the efficiency and international competitiveness of domestic producers through participation in the international market. The core assumption of the country's Industrial Development Strategy (IDS) of 2002 was also the primacy of the free market, and government support is only to be provided on a temporary basis in order to help domestic industry become internationally competitive. In line with the overarching Agricultural Development Led Industrialization (ADLI) strategy the IDS focuses on labour intensive industrial inputs and consumption goods for agriculture and value added/processed goods, especially for exports. Although the IDS has undoubtedly contributed to Ethiopia's increasing exports, it is now clear that the export-led strategy must be complemented by other measures that help to address the widening trade deficit.

Product diversification that aims at moving away from a limited basket of exports in order to mitigate the economic risks of dependence upon few commodity exports is imperative. As export is concentrated in a few commodities, there has been serious short-run and long-run economic risks being experienced in Ethiopia. The short term economic risks are felt to the economy through volatility and instability of foreign exchange earning which could have adverse macroeconomic effects on growth, employment, investment planning, import and export capacity, foreign exchange cash flow, inflation, capital flight and undersupply of investments by risk averse investors and others. In the long term, secular and unpredictable declining terms of trade trends may exacerbate short run effects. Reducing dependence upon limited number of geographical destinations for the export sales can also be another way of reducing ,if not avoiding, the economic risks of less diversification.

Ethiopia is located in a strategically important place to the Asia and Europe markets with rich agro ecological zones suitable to fresh and organic agricultural products. Furthermore, the country has been given many special trade preferential arrangements such as AGOA in the United States Market and Everything but Arms(EBA) as well as Economic Partnership Agreement(EPA) with the European Union. Despite all these opportunities, the export performance of the country is below satisfactory. Dealing with the underperformance and constraints of the external trade sector especially the export sector is critical in to exploit country's trade potential and use the trophy of trade to the entire economy.

The trade potential is exploited when the maximum possible trade that could occur between any two countries that liberalized trade restrictions. It refers to the situation of trade in free trade with no restrictions that constitute optimum trade frontier. It predicts the trade that could be possible given the current level of trade, transport and institutional technologies. In other words, it is the maximum level of trade given the current level of determinants of trade as well as the least level of restrictions within the economic system. Given the potential gains o f trade, countries are interested to liberalize their economies to enjoy the benefits of trade and globalization through bilateral and multilateral process. It is important that each country may know its full trade potential with other countries or other regions in order to get the engagement process started.

The increasing volume and value of trade performance requires good trade policies based on reliable information. In this regard, although there have been some studies on trade issues of the country, they are not updated and some of them couldn't explain the major factors of trade in Ethiopia. In this paper investigation on the major determinants of trade (export, import and total trade) will have been made. Furthermore, the study is devoted to compute the trade potential based on the estimated augmented gravity model.

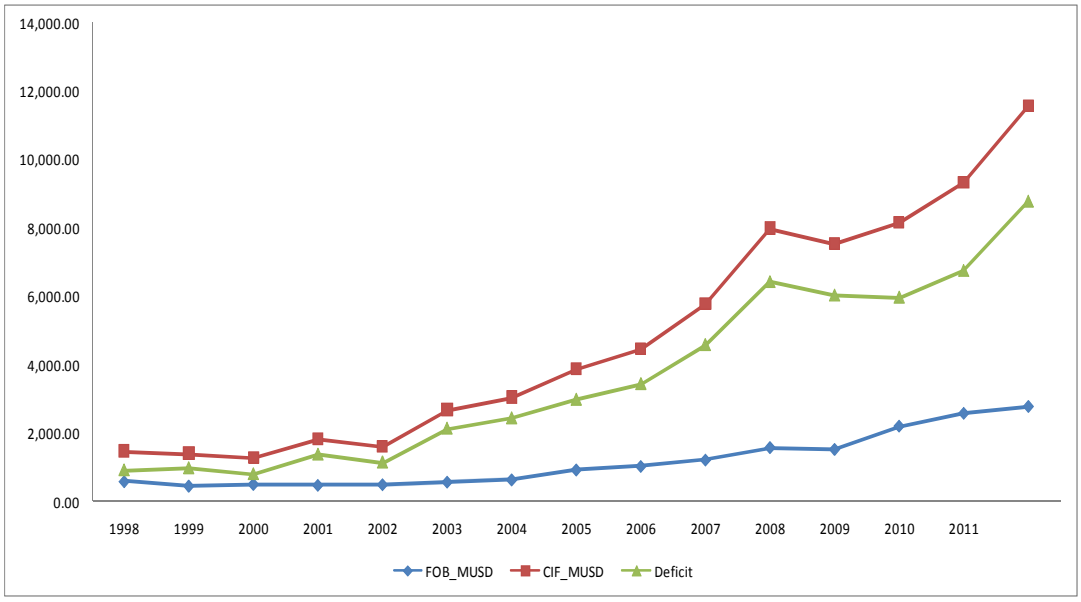
The organization of the paper is as follows. Section 2 provides a brief overview of the Ethiopia's bilateral trade flows. Section 3 deals with a brief review of related literature that existed in estimating potential trade in empirical research by using gravity equation analysis of trade. Furthermore, section 4 presents the data and the suggested methodology of gravity equation while results from the estimation are discussed in the section 5. Lastly, section 6 contains the overall conclusions and recommendations of this study.

2. Overview of Ethiopian Merchandise Trade

2.1 Merchandise Trade Balance

The merchandise trade deficit continued to widen since 2002 as shown below in Figure1. The deficit in 2012 increased to 30.08 per cent relative to that of 2011 (it increased from $6,753.04 million to $8,784.02 million). The deficit has exerted an upward pressure since 2006. The upward pressure of the deficit has reached to its peak and became more recognizable in 2012 after fall in 2009 and 2010.

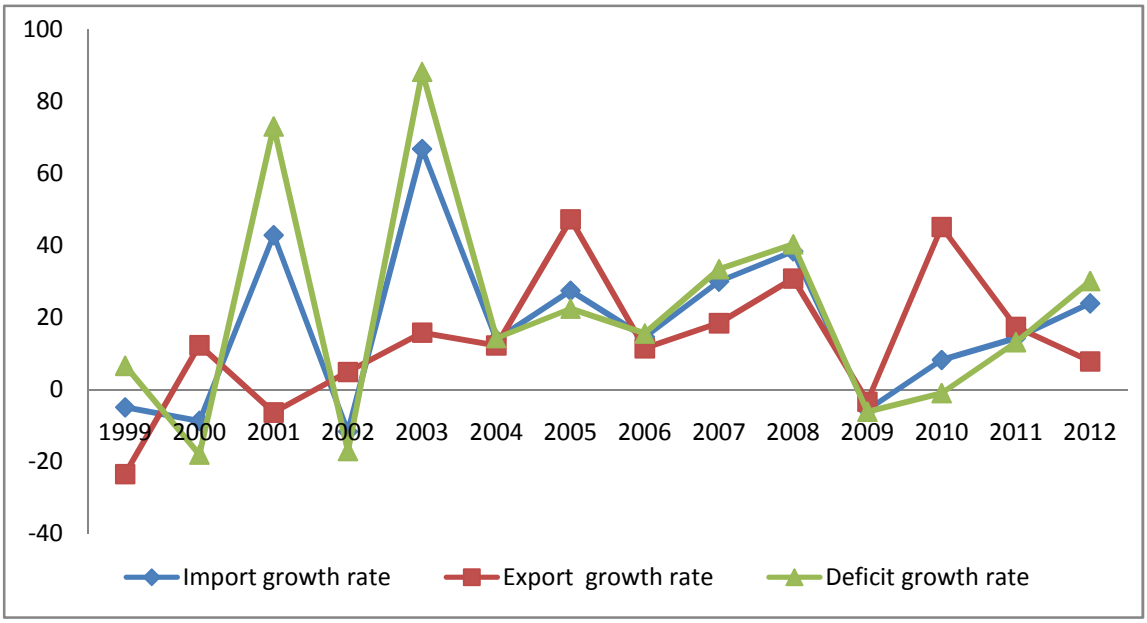
Figure 1:Trend in Merchandise Statistics in Million USD (1998- 2012)



Source: ARCA and Petroleum Enterprise

The year on year merchandise trade deficit was about 61.31 percent of the total merchandise trade in 2012 while it was about 13 percent in 2011. The capacity of export to finance merchandise import trade has been less than 30 percent of the total merchandise import payments over the last several years. It was only 24 percent of the import payment that could be financed by the export receipt during these years. The ratio of export revenue to import expenditure on merchandise trade reached at its lowest point in 2008 and the 2012 export-import ratio has been the third lower ratio in the last ten years profile of merchandise trade since 2005.

Figure 2:Trend in growth rate of merchandise trade(1999- 2012)



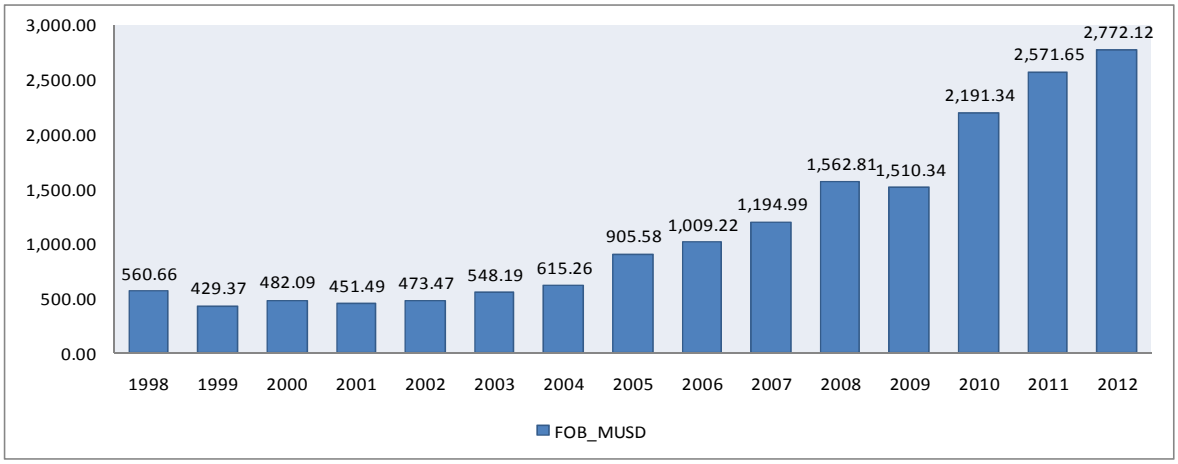
Source: ERCA and Petroleum enterprise

As shown in the above figure, the growth rate of merchandise trade deficit was less than that of export and import during the period of 2009 through 2011. During this period, the growth rate of export exceeded the growth rate of import. However in 2012 deficit has over took both export and import and it became the second largest deficit registered next to that of the deficit in 2008 over the last five years. This widened merchandise trade deficit is used to be the result of increased import expenditure mainly on capital goods and other consumer goods following the growth of the national economy. On the one hand, relatively less diversified export receipt could not be able to adequately respond in covering the growing import demand. Particularly the huge public investment being carried in the country has contributed a lot for the divergence of the import payments and export receipts. This caused import expenditure to grow by about 23.93 percent in 2012 while the export receipt grew only by about 7.8 per cent in the same year.

2.2 Merchandise Exports

The total value of exports in 2012 indicated a slight progress relative to the preceding years as shown in Figure 2.1 below. Accordingly, export receipt reached to $2,772.12 million in 2012 from $2,571.65 million in 2011 and $615.58 in 2004. The export receipt of 2012 has been about 7.80 per cent higher than the previous year.

Figure 3:Export Receipts from Merchandise Trade in million USD (1998-2012)



Source: ERCA

Comparison of FOB values with previous years revealed that there has been an impressive growth in the export performance especially since 2010 as shown in figure 2.1 above. However, the receipt has been highly dependent on agricultural raw materials whose price grows much lower than that of finished industrial goods.

2.2.1 Composition of Exports

The increase in export receipts in recent years was attributed to progresses in both prices and volumes of all commodities mainly the export of coffee, oilseeds, pulses, chat and gold. The increase in receipts from these export items moved up the overall export receipt of the year. The export revenue from coffee was remarkable and it has continued to be the major and reliable export crop of the country over the last previous years.

Generally, the fact that Ethiopia's export is mainly dependent on few primary commodities has worsened the vulnerability of receipt instability from merchandise export. The export receipt from five commodities, namely coffee, oilseeds, Pulses, Chat and Live Animals has accounted the lion share that any effect on these dominant commodities' price could adversely affect the entire external trade balance.

Table 1:Export receipt at commodity level in million USD (2005 -2012)

Classification	2005	2006	2007	2008	2009	2010	2011	2012
Live animals	22.73	30.93	40.38	46.63	60.05	126.50	189.46	181.15
Animal products	20.51	24.31	16.40	30.43	28.05	52.18	82.44	79.99
Flowers	12.48	37.47	88.25	125.17	148.24	161.80	190.99	187.21
Vegetable	6.21	6.63	13.37	7.59	8.00	14.82	25.52	28.80
Chat	68.16	87.18	105.70	117.74	169.64	242.94	243.72	252.14
Pulses	32.05	52.88	92.99	130.85	109.19	141.26	146.63	204.93
Coffee	**356.65**	**431.75**	**417.63**	**566.04**	**364.72**	**689.33**	**846.36**	**887.86**
Oil seeds	**175.80**	**128.29**	**157.04**	**258.39**	**385.40**	**349.45**	**366.80**	**492.17**
Fruits	2.13	2.15	2.01	3.12	2.84	4.56	4.00	4.53
Spices	9.77	6.87	11.10	11.16	11.89	26.59	38.82	31.34
Prepared Food	29.71	19.54	20.60	17.69	18.74	5.45	8.68	9.37
Beverage	2.96	1.25	1.89	1.93	1.99	2.74	5.08	5.41
Non Alcoholic bev.	1.59	0.80	1.46	1.18	0.99	0.99	1.47	1.07
Alcholicbev	1.38	0.45	0.43	0.75	1.00	1.75	3.61	4.34
Leather and Leather Prod	71.67	81.82	93.22	92.72	42.72	65.53	122.89	87.85
Textile and Textile Appar	11.87	18.34	31.10	26.84	24.73	39.40	71.34	67.69
Footwear	0.93	2.97	8.13	9.74	6.50	7.58	8.53	14.15
Articles	0.02	0.01	0.00	0.01	0.04	0.87	0.32	0.10
Gold	44.41	51.45	50.99	80.07	92.19	187.20	124.92	175.35
Exports nec	36.16	23.78	42.24	34.91	33.69	71.65	93.23	59.72
Animal &Animal prod. nec	1.36	1.60	1.96	1.78	1.71	1.50	1.91	2.36
Total	905.58	1,009.22	1,194.99	1,562.81	1,510.34	2,191.34	2,571.65	2,772.12

Source: ERCA

1.2.2 Direction of Ethiopian Exports

When we observe the relative sources of export receipts in terms of countries, China took the leading position followed by Germany in 2012 providing about $320.66 million and $307.68 million respectively. Somalia maintained the third position providing about $257.90 million out of the total export receipt in 2012. Saudi Arabia, Switzerland and Netherlands retained the fourth, fifth and sixth positions respectively as shown in table 2.2.1 below. Significant of the raw material export to China include oilseeds especially Sesame and semi processed leather. On the other hand Coffee, Footwear and other manufactured products are exported to Germany and Italy. In the same way the main products in Somalia and Djibouti is chat while gold export is sent to Switzerland. All these suggest that diversified manufacturing export market is available in Europe while the Asian market is the destination of agricultural raw materials.

Table 2:Top 20 Export Destinations, FOB Value (Million USD)

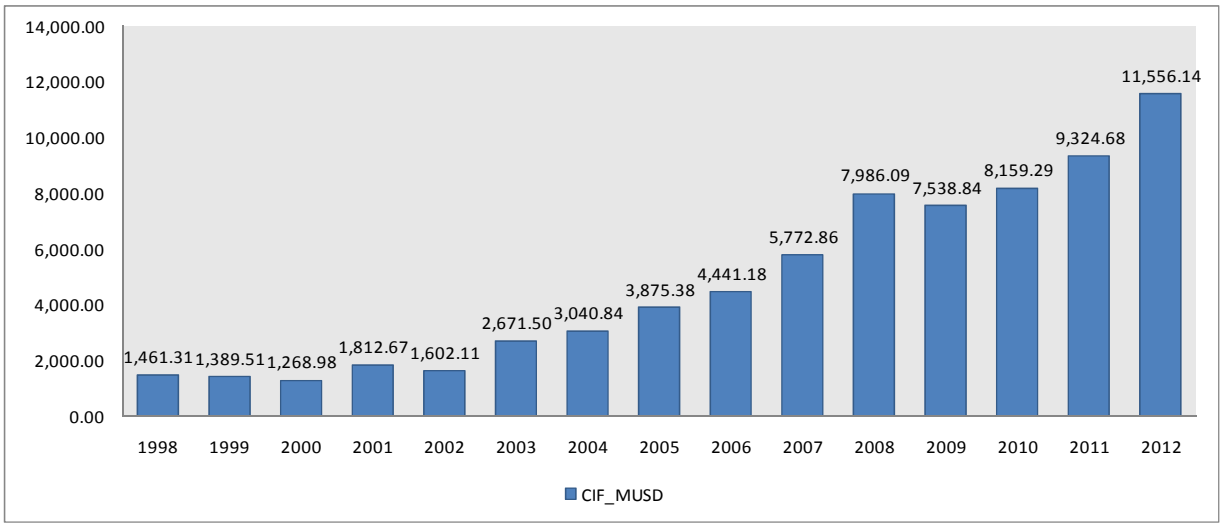
Rank in 2012 FOB value	country	2005	2006	2007	2008	2009	2010	2011	2012
1	China	79.68	72.40	68.20	81.22	149.80	238.11	282.66	320.66
2	Germany	127.14	130.90	120.85	166.72	106.16	259.61	315.80	307.68
3	Somalia	35.37	54.48	72.81	77.40	114.64	215.43	241.38	257.90
4	Saudi Arabia	59.18	70.78	86.36	122.49	89.67	143.07	166.63	190.92
5	Switzerland	61.41	57.08	57.79	98.24	100.70	127.83	129.47	176.49
6	Netherlands	35.53	45.12	78.93	118.11	113.34	151.39	180.34	171.47
7	Sudan	10.98	17.82	47.13	72.83	65.86	144.64	177.08	124.19
8	USA	44.29	51.82	68.66	113.73	52.55	98.39	95.81	108.69
9	Djibouti	58.13	60.30	56.56	49.29	50.73	54.16	69.05	86.84
10	UAE	31.09	30.87	32.84	67.21	57.75	78.75	76.28	78.30
11	Italy	51.78	63.06	81.50	82.58	41.28	53.20	110.58	78.04
12	Belgium	21.42	34.76	46.11	52.76	36.60	54.07	68.54	74.58
13	Japan	69.37	87.83	76.96	62.07	9.06	37.48	35.74	74.54
14	Israel	21.40	21.47	29.70	49.39	38.72	50.89	66.81	67.18
15	Turkey	14.38	13.29	28.21	39.58	26.33	33.13	45.31	50.39
16	France	17.38	26.76	17.92	23.11	14.97	35.43	49.76	49.34
17	UK	29.22	29.06	30.17	43.32	49.71	55.52	66.70	46.97
18	Pakistan	3.11	8.10	12.68	14.41	7.81	23.80	13.37	45.70
19	Egypt	16.04	8.92	7.35	13.34	13.44	44.74	45.90	43.45
20	India	8.08	9.61	15.70	14.59	22.11	28.09	33.64	42.42

Source: ERCA

2.3 Merchandise Imports

After a slight decrease in 2009, import expenditure has grown up continuously over the last three years. Import payment has been reached to the highest point in 2012 accounting $11,556.14 million as shown in Figure 4 below. The 2012 import payment was about 23.93 percent higher compared to the previous year's import expenditure(it was $9,324.68 million in 2011 and only $3,040.84 million in 2004).

Figure 4:Import cif Values in million USD (1998-2012)



Source: ERCA

2.3.1 Composition of Ethiopian Imports

Import expenditure on consumer goods in 2012 increased to **$**3,145.92 million (accounting to about 27.22 per cent of the total c.i.f value of the year). It grew by about 11.46 percent relative to the import expenditure on consumer good in 2011. The expenditure of consumer goods has accounted more than 25 percent of the total import expenditure. Expenditure on durable consumer goods accounted for about less than 10 percent of the total import bill while the import share on non-durable goods has continued to be about 20 per cent of the total import expenditure. Particularly the share of durable consumer goods has been 6.21 percent of the total import payment while spending on non-durable consumer goods accounted about 21.01 percent of the total import payments in 2012.

Similarly, the import expenditure share on Intermediate & Semi finished and Capital goods has been about 20 percent and 30 percent respectively. The import share of Intermediate & Semi finished has an upward trend while that of capital goods show a decreasing trend in recent times. Import hare of Machinery has continued to be in the range of 10-14 percent while the import share on ICT materials & Equipments import share has dropped in the last

two years as shown below. More specifically, import payment on Intermediate/Semi-Finished products accounted about 22.37 percent of the total import payment in 2012 where as it was about 18.40 percent in the previous year.

Table 3:Import share by commodity classification ,% of total import(EDRI Classification)

Classification	2005	2006	2007	2008	2009	2010	2011	2012
Consumer Goods	**30.37**	**27.07**	**24.44**	**27.74**	**26.57**	**28.88**	**30.26**	**27.22**
Durable consumer good	7.69	8.51	7.02	5.62	5.86	7.26	6.85	6.21
Non-durable consumer goods	22.68	18.55	17.44	22.11	20.71	21.61	23.41	21.01
Intermediate & Semi finished	**20.39**	**18.76**	**21.13**	**21.41**	**23.07**	**18.20**	**18.39**	**22.37**
Energy	**17.42**	**19.75**	**19.76**	**22.14**	**16.58**	**17.65**	**23.24**	**19.00**
Petroleum	16.62	19.18	18.76	21.10	15.49	16.51	21.66	17.98
Energy not elsewhere classified	0.80	0.54	1.00	1.04	1.09	1.14	1.58	1.03
Capital goods	**29.01**	**30.83**	**30.66**	**26.36**	**31.46**	**32.87**	**25.52**	**28.44**
Machinary	12.03	12.52	13.60	11.04	13.83	13.60	11.92	14.12
ICT materials &Equip	4.98	2.43	4.35	6.49	6.46	7.10	2.52	2.55
Other capital goods	11.97	15.90	12.70	8.83	11.17	12.17	11.09	11.76
Other Imports	**2.81**	**3.60**	**3.98**	**2.35**	**2.32**	**2.41**	**2.56**	**2.97**
Total Imports	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**

Source: ERCA and Petroleum Enterprise

In terms of growth import payment on non-durable consumer goods grew by about 11.22 percent while expenditure on durable consumer goods grew by about 12.36 (see table 4 below) in 2012 against 2011. Except in 2009 in all the other years, import payment on consumer goods has a positive growth. Following the decrease in export demand in most European market which created shortage of foreign currency as a consequence of the recent recession has caused a decline in import payment in 2009.

Table 4:Import payment growth rate by commodity classification ,(EDRI Classification)

Classification	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**
Durable consumer good	26.85	7.14	10.86	-1.56	33.94	7.94	12.36
Non-durable consumer goods	-6.26	22.21	75.37	-11.61	12.94	23.82	11.22
Energy	29.93	30.10	54.95	-29.30	15.20	50.49	1.34
Petroleum	32.30	27.11	55.59	-30.68	15.33	49.96	2.87
Machinery	19.31	41.19	12.36	18.25	6.42	0.18	46.76
ICT materials &Equip	-44.04	132.41	106.37	-5.98	18.89	-59.41	25.53
Other capital goods	52.16	3.82	-3.82	19.43	17.93	4.13	31.43
Other Imports	46.79	43.75	-18.26	-6.91	12.57	21.32	43.51
Total Imports	**14.61**	**29.99**	**38.33**	**-5.60**	**8.22**	**14.29**	**23.92**

Source: ERCA and Petroleum Enterprise

Import payment bill on energy in 2012 increased marginally by about 1.34 per cent against the prior year which might be partly due to a fall in price of petroleum in the international market over the last two years. Consequently, its share over the total import expenditure dropped down to 19.00 per cent in the 2012 from 23.24 per cent in 2011 of the total import payment. As a result, the import payments of the country in 2012 increased by about 23.93 per cent against the previous year.

23.2 Origins of Ethiopian Merchandise Imports

More than 20 percent of the import payment on merchandise goods in 2012 was originating from China followed by Saudi Arabia and India accounting about 14 per cent and 9 per cent of the total imports expenditure respectively. Kuwait and Turkey were the fourth and fifth largest merchandise import originating markets in 2012. Germany, the leading source for Ethiopian export receipt, supplied less than 2 per cent of the import demand of Ethiopian economy in 2012. The top 20 import trading partners accounted for the import expenditure of more than 90 percent (see table 5 below).

Table 5:Top 20 import partners of Ethiopian (shares %)

Rank in 2012 cif value	Country	2005	2006	2007	2008	2009	2010	2011	2012
1	China	14.5	14.92	19.77	20.45	23.87	23.82	19.01	20.5
2	Saudi Arabia	15.49	20.27	12.21	14.86	12.21	12.17	10.17	13.93
3	India	6.57	6.9	7.82	7.69	8.27	7.4	8.76	9.16
4	Kuwait	0.04	0.04	0.09	0.07	0.04	0.04	2.51	6.05
5	Turkey	3.23	2.24	2.73	1.97	3.36	2.73	3.97	4.22
6	Italy	5.07	7.59	7.41	5.58	5.09	4.4	3.95	4.18
7	Japan	6.14	7.5	6.81	4.12	4.04	5.27	4.85	3.72
8	Ukraine	2.08	1.39	1.32	1.72	1.22	1.03	1.6	3.04
9	USA	10.94	3.78	4.86	4.41	5.66	5.45	4.81	2.97
10	Indonesia	1.98	1.87	1.22	1.19	1.11	1.04	2.14	2.93
11	UAE	1.15	1.1	2.92	8.71	4.06	5.92	5.45	2.44
12	France	1.6	2.14	1.61	1.56	1.34	1.19	1.59	1.78
13	S.Korea	1.58	1.62	1.87	1.3	1.64	1.1	1.81	1.72
14	Morocco	0.02	0.03	0.02	0.2	0.3	1.07	0.35	1.68
15	Malaysia	1.03	1.15	1.57	2.47	2.83	2.75	3.11	1.59
16	Germany	3.15	2.95	3.21	2.81	2.31	2.36	2.03	1.57
17	Thailand	0.93	1	1.32	0.89	0.98	1.49	1.48	1.4
18	Belgium	1.33	1.31	1.3	0.82	0.66	1.04	0.98	1.26
19	Russian	0.66	1.56	0.66	1.27	2.28	1.17	3.05	1.23
20	Brazil	1.24	1.71	2.02	0.54	1.06	1.49	0.87	1.19

Source: ERCA

3. Review of a Gravity Model of International Trade

3.1 . Theoretical Review of the Gravity model

The gravity model of international trade was originated from Newtonian law of universal gravitation. The model has been successfully applied to study flows of various types such as migration, foreign direct investment and more specifically to international trade flows. This law in mechanics states that two bodies attract each other proportionally to the product of each body's mass divided by the square of the distance between their respective centres of gravity . The gravity model for trade is analogous to this law. The analogy is as follows: the trade flow between two countries is proportional to the product of each country's 'economic mass', measured their by GDPs (national incomes) and inversely proportional to the distance between the countries' respective 'economic centres of gravity', mostly their capitals. Timbergen (1962) and Pöyhönen (1963) were the first authors applying the gravity equation to analyse international trade flows. Since then, the gravity model has become a popular instrument in empirical foreign trade analysis.

The gravity model can be expressed mathematically as :

$$T_{ij} = k \frac{Y_i^{\beta_1} Y_j^{\beta_2}}{D_{ij}^{\beta_3}} \text{ ----------(1)}$$

where T_{ij} is the value of bilateral trade between country of origin and destination j, the Y_i Y_j are country i's and country j's GDP. The variable D_{ij} denotes the geographical distance between countries' capitals, **k** is the constant of proportionality and the $\beta's$ are response parameters. For the sake of simplicity, equation (1) could be transformed to a log linear form as follows:

$$\ln T_{ij} = \beta_0 + \beta_1 \ln Y_i + \beta_2 \ln Y_j + \beta_3 \ln D_{ij} \text{ ----------(2)}$$

where the $\beta's$ are the coefficients to be estimated. Equation (2) is the baseline model where bilateral trade flows are expected to be a positive function of incomes and negative function of distance. However, because of the existence of huge amount of variations in trade that cannot be explained by the traditional variables, the basic gravity model has later been augmented with many choice variables. Some models have generally been assumed to comprise supply and demand factors (GDPs and populations), as well as trade resistance and trade preference factors. Batra (2004) in the study of trade potential included additional variables to control for differences in geographic factors, historical ties and economic factors like the overall trade policy and exchange rate risk.

Assuming that we wish to test for N distinct effects, the gravity model can be written as:

$$\ln T_{ij} = \beta_0 + \beta_1 \ln Y_i + \beta_2 \ln Y_j + \beta_3 \ln D_{ij} + \sum_{s=1}^{N} \lambda_s G_s \text{ ----------(3)}$$

However, one should still underline that gravity equations perform a pretty well job at explaining trade with just the size of economies and their distances. Distance is a proxy for various factors that can influence trade such as transportation costs, time elapsed during shipment, synchronization costs, communication costs, transaction costs or cultural distance (Head, 2003)

Theoretical support of the research in this field was originally very poor, but since the second half of the 1970s several theoretical developments have appeared in support of the gravity model. Anderson (1979) was, perhaps, the first to give the gravity model a theoretical legitimacy. He derived the gravity equation from expenditure systems where goods are differentiated by origin (Armington preferences) and all transport costs are proxied by distance. That is, he made the first formal attempt to derive the gravity equation from a model that assumed product differentiation.

While Anderson's analysis is at the aggregate level, Bergstrand (1985, 1989) develops a microeconomic foundation to the gravity model. He stated that a gravity model is a reduced form of the equation of a general equilibrium of demand and supply systems. In such a model the equation of trade demand for each country is derived by maximizing a constant elasticity of substitution (CES) utility function subject to income constraints in importing countries. On the other hand, the equation of trade supply is derived from the firm's profit maximization procedure in the exporting country, with resource allocation determined by the constant elasticity of transformation (CET). The gravity model of trade flows, proxied by value, is then obtained under market equilibrium conditions, where demand for and supply of trade flows are equal.

Eaton and Kortum (1997) also derived the gravity equation from a Ricardian framework, while Helman(1987) derived it from an imperfect competition model. Helman and Krugman (1985) used a differentiated product framework with increasing returns to scale to justify the gravity model. More recently Deardorff (1995) derived it from the Heckscher-Ohlin model which confirmed that the gravity equation characterises many models and can be justified from standard trade theories.

Trade theories just explain why countries trade each other in different products but do not explain why some countries' trade volumes are more than others and why the level of trade

between countries tends to vary over time. This is the limitation of trade theories in explaining the size of trade flows. Though traditional trade theories cannot explain the extent of trade, the gravity model however, is successful in this regard. It allows more factors to be taken into account to explain the extent of trade as an aspect of international trade flows (Paas 2002).

Therefore, the gravity model is an internationally accepted and useful tool to investigate bilateral trade patterns and flows. Furthermore it can be used to test hypotheses about the impact of specific policies as well as geographical or cultural circumstances on the bilateral trade between trading partners.

3.2. Empirical Literature Survey

There are wide ranges of applied research where the gravity model is used to examine the bilateral trade patterns and trade relationships. These studies use the gravity model both for the aggregate bilateral trade and for product level trade. Both the cross -section and panel data approaches have been used by these studies.

Many of these works have tried to examine the trade potential, trade determinants, trade direction and trade enhancing impacts. Rahman(2003) for instance, examined the determinants of Bangladesh trade using panel data estimation technique and generalised gravity model. The author considers both economic and natural factors when estimating the gravity model. The study covers data of 35 countries for 28 years (1972-99). Batra (2006) considered augmented gravity model to estimate India's trade potential. The model is based on cross-section data of 2000. In a sample of 76 countries, Kalbasi (2001) examines the volume and direction of trade for Iran dividing the countries into developing and industrial countries. On this study the impact of the stage of development on bilateral trade is analysed. Using cross-section and panel data Frankel (1997) also applied the gravity model to examine roles of trading blocs, currency links, etc. Analysing the bilateral trade patterns worldwide Frankel and Wei (1993) examined the impact of currency blocs and exchange rate stability on trade. Anderson and Wincoop (2003) and Feenstra (2003) analyse the impact of multilateral factors on bilateral trade flows using the gravity model.

Rahman and Ara (2010) employed a dynamic gravity approach to estimate foreign trade potential for Bangladesh. The study was conducted based on bilateral trade flows between Bangladesh and its eighty major trading partners. For the purpose of estimating the gravity

model, a static panel dataset (1995–2007) with random effects was used. Estimation results reveal that economic size, distance, regional trade agreement and adjacency are among significant variables of the model. Having predicted the natural trade flows with an in-sample strategy, Rahman and Ara (2010) have identified partners with which Bangladesh has unexploited trade potential. Accordingly, the magnitude of Bangladesh trade potential was found very high with China, Japan, India, United States, Germany and Russia respectively.

Alemayehu (2009) examined the nature of the potential for intra-Africa trade and hence the prospects for advancing regional economic integration. His study used the gravity model on the panel data frame work. The model was estimated using a panel data of African countries and their major trade partners around the world (2000− 2006). The estimated coefficients of the model were used to simulate the potential for intra-Africa trade. The findings of his study notified the existence of a potential for intra-Africa trade (about 63% weighted average for Central and Western Africa region, and some 60% for Eastern and Southern Africa region).

More recently, Africa-China trade potential was assessed by Matias (2010), by applying a combination of methodologies—stochastic frontier gravity approach and trade complementarity index. For the former case, the study utilized a panel data of Chinese exports to the African countries over the period 2001–2008. Matias (2010) estimated using a stochastic gravity model, incorporating random disturbance and inefficiency terms. The estimated model was then used to calculate trade efficiency and potential of China with 52 African countries. Accordingly, China has realized on average only 13% of its export potential with African countries. Seychelles, Sao Tome and Principe, Comoros, Central Africa Republic, Chad and Equatorial Guinea are partners with which China had the lowest trade efficiency (high export potential).

Using a gravity framework Mulugeta (2009) investigated the determinants of Ethiopia's export and import flows. Based on the panel dataset of major trade partners, estimation was done with fixed effects model. The finding was that income and distance variables, infrastructure as well as institutional qualities were among the basic determinants. Hussein (2008) analyzed the impact of COMESA membership and other factors on the flow of Ethiopia's exports. The study takes in to account the flow of annual exports to twenty destinations over the period 1981–2006. He used a Tobit specification with random effects to estimate the gravity model. Estimation results demonstrate that most traditional variables are significant, while the impact of COMESA membership to create or divert exports was

negligible. The latter finding seems consistent with what Alemayehu and Haile (2007) have found—regional groupings in Africa had insignificant effect on the flow of bilateral trade.

Yishak (2009) dealt with the supply and demand side factors that contributed for the country's poor export performance. Employing an aggregate panel data with two stage least squares (random effects) estimation, among supply side factors that significantly affected Ethiopian exports were domestic income, internal infrastructure and institutional quality. The demand side factors, namely foreign income and distance, were also statistically significant at standard levels.

Abdulaziz (2009) tried to evaluate the export potential of Ethiopia with the Middle East. For that purpose, the author makes use of two distinct methodologies: an export similarity index and a gravity model approach. From a combined result of both strategies, it was found that Saudi Arabia, United Arab Emirates, Yemen and Israel showed the highest potential as a destination for Ethiopian exports.

Gebrehiwot (2011) utilised a dynamic gravity approach on a panel dataset of sample countries and estimated by GMM estimators to analyze the trade pattern of Ethiopia. He concluded that all the traditional gravity variables (GDP's and distance) are significant with expected signs. On the study it was found that considerable part of the country's potential trade has remained unrealized. The magnitude of trade potential was found the highest with Asian, European and the African countries as a continent.

In the recent times, the need to increase trade performance has been indispensable for a country to grow.A country must import required raw materials, intermediate and capital goods to increase and speed its production base as well as to foster export growth if these goods are not domestically available. Imports of consumer goods are also essential to meet the growing domestic demand that accompanied growing per capita incomes. On the other hand, export trade is crucial to meet the foreign exchange gap, to increase the import capacity of the country and to reduce dependence on foreign aid. An increase in import capacity speeds up industrialisation and overall economic activities, which, in turn, can ensure economic growth. Therefore, increased participation in world trade is considered as one of the most important key to rapid economic growth and development.

4. Data Sources and Model Specifications

4.1 Data and Sample Size

This study covers Ethiopia's top 39 countries trade partners around the globe. In 2005, Ethiopia's total trade with these countries comprises more than 85 percent of its total trade worldwide. Export to these countries comprises about 85 percent of its total export worldwide, and import from these countries together more than 80 percent of its total world import. The countries are chosen on the basis of importance of trading partnership with Ethiopia and availability of required data. Fifteen countries from Europe, fourteen countries from Asia, two countries from North America(USA and Canada), six countries from Africa and Australasia are included in the sample as Ethiopia's top 38 trading partners based on the 1998-2011 trade share.

The data are collected for the period of 1998 to 2011. All observations are annual. Data on partners GDP has been obtained from UN database. However, GDP of Ethiopia is taken from Ministry of Finance and Economic Development of Ethiopia. Data on Ethiopia's exports of merchandise goods (country i's exports) to all other countries (country j) and Ethiopia's imports of merchandise goods (country i's imports) from all other countries (country j) and hence Ethiopia's total trade of merchandise goods (exports plus imports) with all other countries included in the sample are obtained from Ethiopian Revenue and Customs Authority. Data on the distance (in kilometer) between Addis Ababa (capital of Ethiopia) and other capital cities of country j are obtained from the Website: *www.indo.com/distance*.

GDP, GDP per capita, Merchandise exports and imports are in constant 2005 US dollars. GDP's, GDP per capita, exports, imports and total trade of Ethiopia are measured in million US dollars.

4.2. Methodology

Classical gravity models generally use cross-section data to estimate trade effects and trade relationships for a particular time period. In reality, however, cross-section data observed over several time periods (panel data methodology) result in more useful information than cross-section data alone. The advantages of this method are: first, panels can capture the relevant relationships among variables over time; second, panels can monitor unobservable trading-partners' individual effects. If individual effects are correlated with the regressors, OLS estimates omitting individual effects will be biased. Therefore, in this paper we used panel data methodology for empirical gravity model of trade is used. Several estimation techniques have been used while using the panel data approach. In particular, the fixed effect and random effect models are the most prominent ones and they are going to be used in this paper as well.

4.2.1. The Fixed Effect Model (FEM)

In the formulation of the fixed effect model the intercept in the regression is allowed to differ among individual units in recognition of the fact that each cross-sectional unit might have some special characteristics of its own. That is, the model assumes that differences across units can be captured in differences in the constant term. The α_i are random variables that capture unobserved heterogeneity. The model allows each cross-sectional unit to have a different intercept term though all slopes are the same, so that

$$y_{it} = x'_{it}\beta + \alpha_i + \mu_{it} \text{ ---------- (4.a)}$$

where ε_{it} is iid over *i* and *t*.

The subscript *i* to the intercept term suggests that the intercepts across the individuals are different, but that each individual intercept does not vary over time. The FEM is appropriate in situations where the individual specific effect might be correlated with one or more regressors (Green, 2003, Gujirati,2003).

4.2.2 Random Effect Model (REM)

In contrast to the FEM, the REM assumes that the unobserved individual effect is a randomly draw from a much larger population with a constant mean (Gujrati, 2003). The individual

intercept is then expressed as a deviation from this constant mean value. The REM has an advantage over the FEM in that it is economical in terms of degrees of freedom, since we do not have to estimate N cross-sectional intercepts. The REM is appropriate in situations where the random intercept of each cross-sectional unit is uncorrelated with the regressors. The basic idea is to start with Equation (3.a). However, instead of treating β_{1i} as fixed, it is assumed to be a random variable with a mean value of β_1. Then the value of the intercept for

individual entity can be expressed as:

$\alpha_i = \alpha + \varepsilon_i$ where i=1, 2,3,...,n ----------(4.b)

The random error term is assumed to be distributed with a zero mean and constant variance:

Substituting (3.b) into (3.a), the model can be written as:

$$y_{it} = x'_{it}\beta + \alpha + \varepsilon_i + \mu_{it}$$

$$y_{it} = x'_{it}\beta + \alpha + \omega_i \quad \text{---------- (4.c)}$$

The composite error term w_{it} consists of two components: ε_{it} is the cross-sectional or individual-specific error component, and u_{it} is the combined time series and cross-sectional error component, given that $\varepsilon_i \sim (0, \sigma_\varepsilon^2)\, \mu_{it} \sim (0, \sigma_u^2)$ where ε_i is independent of the X_{it}(Gujrati, 2003).

Generally, the FEM is held to be a robust method of estimating gravity equations, but it has the disadvantage of not being able to evaluate time-invariant effects, which are sometimes as important as time-varying effects. Therefore, for the panel projection of potential bilateral trade, researchers have often concentrated on the REM, which requires that the explanatory variables be independent of the ε_{it} and the u_{it} for all cross-sections (i, j) and all time periods (Egger, 2002). If the intention is to estimate the impact of both time-variant and invariant variables in trade potential across different countries, then the REM is preferable to the FEM (Ozdeser, 2010).

4.2.3 The Hausman-Taylor (HT) approach.

When using the fixed effect estimation in the presence of endogenity, the variables that are time invariant will have been dropped. As a result, if the interest is to study the effects of

these time invariant independent variables, the fixed effect model could not be helpful. While using the random effect model estimators on the other hand leads to biased estimates.

According to Baltagi et al.(2003),when there is endogeneity among the right hand side regressors, the OLS and Random Effects estimator are substantially biased and both yield misleading inference. As an alternative solution the Hausman-Taylor (1981, thereafter HT) approach is typically applied. The HT estimator allows for a proper handling of data settings, when some of the regressors are correlated with the individual effects. The estimation strategy is basically based on Instrumental-Variable (IV) methods, where instruments are derived from internal data transformations of the variables in the model. One of the advantages of the HT model is that it avoids the 'all or nothing' assumption with respect to the correlation between right hand side regressors and error components, which is made in the standard FEM and REM approaches respectively. However, for the HT model to be operable, the researcher needs to classify variables as being correlated and uncorrelated with the individual effects, which is often not a trivial task.

4.3. Model Specifications

As stated in section 3, the gravity model in its most basic form explains bilateraltrade (T_{ij}) as being proportional to the product of GDP_i and GDP_j and inversely related to the distance between them. The static general basic gravity model that we want to apply in this paper has the following log linear form:

$$T_{it} = \beta_0 + \beta_1 LGDP_{it} + \beta_2 LGDP_{jt} + \beta_3 LDist + \varepsilon_{it} \text{ ----------(5)}$$

To account for other factors that may influence trade activities, other variables have been added to the basic model to form the augmented gravity equation.

4.3.1 Augmented gravity model

The augmented gravity model for that this paper used to estimate the determinants of trade and the basic elasticities from which the trade potential is going to be estimated looks like the following.

$$LT_{ijt} = \beta_0 + \beta L_1 GDP_{it} + \beta_2 LGDP_{jt} + \beta_3 LDist + \beta_4 LBRERI_{ijt} + \beta_5 LSIM_{ijt}$$
$$+\beta_6 LRLF_{ij} + \beta_7 Open_{it} + \beta_8 LOpen_{jt} + \beta_9 Bord + \beta_{10} Comesa + \beta_{11} Asia +$$
$$\beta_{12} EUR + \varepsilon_{it} \text{ ----------(6)}$$

where T_{ijt} is total trade between country i and j at time t, GDP_i and GDP_j represent GDP the trading partners , Dist stands for distance between capital cities of the trading countries,

BRERI is the bilateral real exchange rate index defined in such a way that an increase is appreciation, $Open_{it\,(j)}$ is openness index of country i(j) defined export plus import divided by GDP of country i(j),RLF and SIM are defined as:

$RFL_{ijt} = |(\frac{GDP_{it}}{POP_{it}}) - (\frac{GDP_{jt}}{POP_{jt}})|$ is the relative factor endowments in country i and j

SIM is defined as $1-(\frac{GDP_{it}}{GDP_{it}+GDP_{jt}})^2-(\frac{GDP_{jt}}{GDP_{it}+GDP_{jt}})^2$ is the similarity in absolute factor endowments between economies to test Debaere transformation of Helpman theorem, Border, Comesa, Asia and EUR are dummy variables for common border, membership of comesa, Asia and Europe respectively.

In this paper an attempt is made to have a model for export, import and total trade so as to identify the major determinants of the bilateral trade. Thus estimation is conducted for the three trade models as follows.

4.3.2 Specification of the Gravity Model for Ethiopian Export

The bilateral export flow can be modeled as:

$$LX_{ijt} = \beta_0 + \beta L_1 GDP_{it} + \beta_2 LGDP_{jt} + \beta_3 LDist + \beta_4 LBRERI_{ijt} + \beta_5 LSIM_{ijt} + \beta_6 LRLF_{ij} + \beta_7 Open_{it} + \beta_8 LOpen_{jt} + \beta_9 Bord + \beta_{10} Comesa + \beta_{11} Asia + \beta_{12} EUR + \varepsilon_{it} \quad ----------(7)$$

where all the variables are as defined above.

4.3.3 Specification of the Gravity Model for import

Similarly the bilateral import can also be modelled as

$$LM_{ijt} = \beta_0 + \beta L_1 GDP_{it} + \beta_2 LGDP_{jt} + \beta_3 LDist + \beta_4 LBRERI_{ijt} + \beta_5 LSIM_{ijt} + \beta_6 LRLF_{ij} + \beta_7 Open_{it} + \beta_8 LOpen_{jt} + \beta_9 Bord + \beta_{10} Comesa + \beta_{11} Asia + \beta_{12} EUR + \varepsilon_{it} \quad ----------(8)$$

where all the variables are as defined above.

4.3.4 Specification of the Gravity Model for the total trade (export plus import)

For the purpose of estimation we modelled the bilateral total trade as follows:

$$LT_{ijt} = \beta_0 + \beta L_1 GDP_{it} + \beta_2 LGDP_{jt} + \beta_3 LDist + \beta_4 LBRERI_{ijt} + \beta_5 LSIM_{ijt} + \beta_6 LRLF_{ij} + \beta_7 Open_{it} + \beta_8 LOpen_{jt} + \beta_9 Bord + \beta_{10} Comesa + \beta_{11} Asia + \beta_{12} EUR + \varepsilon_{it} \quad ----------(9)$$

where all the variables are as defined above.

5. Estimation Results and Discussion

5.1 Estimation Results and Discussion of Export Model

As the table below (table 7) shows, the traditional variables GDPs and distance are found to have the expected sign. Furthermore, domestic GDP and distance are statistically significant determinants of Ethiopian export based on all the estimated model (Random effect model, fixed effect model and Housman Taylor estimation model).According to the random effect model, as the GDP of Ethiopia increases by 1 per cent, the export revenue will increase nearly by 2.35 percent. While according to the fixed effect model as GDP increases by 1 percent export revenue increases by about 1.44 percent. Similarly based on the Hauseman Taylor model export revenue increases by about 1.95percent when GDP increases by about 1 percent.

The coefficient of the similarity index(SIM_{ij}) has been negative and statistically significant suggesting that Ethiopian export is more with dissimilar economies. This negative sign of the coefficient of SIM_{ij} contradicts Helpman's results and more generally, contradicts the gravity equation. However this gravity equation was on the assumption that countries are specialized in different goods but for counties who export basic agricultural goods or low-skilled commodities, there is a possibility that the coefficient is negative. As Ethiopian export basket is primary agricultural export its direction has been towards dissimilar economies. That is, one possible reason for why this has been so is that most of the exports are agricultural raw materials that can be used as inputs for firms in the developed economies. The relative factor endowment (RLF_{ij}) defined as the logarithm of difference in per capita GDP has been found statistically insignificant determinant t of export.

Foreign economies openness (Openj) has been the significant determinant of Ethiopian export. This indicates that through government negotiation with the trading partner countries there is a room to increase the export receipt. On the other hand, Ethiopian openness (Openi)

has no significant effect on export indicated by the coefficient of own openness being statistically insignificant.

Table 6:Export Model based on equation 7

	REM	REM_Rob	FEM	FEM_Rob	HT
LGDP of Eth	2.349***	2.349***	1.444***	1.444**	1.950***
	(-11.81)	(-8.63)	(-4.52)	(-3.31)	(-8.13)
LGDP of Partner	0.132	0.132	1.692**	1.692	0.616*
	(-1.25)	(-1.23)	(-3.00)	(-1.840)	(-2.480)
LDist	-1.988***	-1.988***	.	.	-2.086*
	(-5.90)	(-5.79)	.	.	(-2.29)
LSIMij	-0.969***	-0.969***	-0.406	-0.406	-0.804**
	(-6.28)	(-4.03)	(-1.24)	(-0.76)	(-3.04)
LRFEij	0.00197	0.00197	-0.351	-0.351	-0.329
	(-0.01)	(-0.01)	(-1.19)	(-1.18)	(-1.38)
LOpeni	0.34	0.34	-0.144	-0.144	-0.0264
	(-1.03)	(-0.95)	(-0.43)	(-0.34)	(-0.08)
LOpenj	0.564**	0.564	1.708***	1.708*	1.926***
	(-2.81)	(-1.32)	(-4.84)	(-2.64)	(-6.02)
LBRERI	-0.259	-0.259	-0.298	-0.298	-0.287
	(-1.17)	(-0.78)	(-1.25)	(-0.82)	(-1.27)
Border	2.023	2.023*	.	.	3.603
	(-1.75)	(-2.21)	.	.	(-1.09)
comesa	-3.168**	-3.168***	.	.	-4.074
	(-2.98)	(-9.93)	.	.	(-1.32)
Asia	-0.395	-0.395	.	.	-1.948
	(-0.67)	(-0.78)	.	.	(-1.19)
EU_Mart	-0.504	-0.504	.	.	-1.532
	(-0.85)	(-1.41)	.	.	(-0.92)
_cons	-9.935**	-9.935***	-35.78***	-35.78***	-11.15
	(-3.08)	(-3.64)	(-8.36)	(-3.70)	(-1.40)
N	532	532	532	532	532
r2			0.4736	0.4736	
r2_o	0.4967	0.4967	0.0307	0.0307	
r2_b	0.5444	0.5444	0.0126	0.0126	
r2_w	0.4442	0.4442	0.4736	0.4736	
sigma_u	0.8321	0.8321	4.1185	4.1185	2.599
sigma_e	0.9095	0.9095	0.9095	0.9095	0.9696
rho	0.4557	0.4557	0.9535	0.9535	0.8778

t statistics in parentheses

* p<0.05 ** p<0.01 *** p<0.001"

The sign of the bilateral real exchange rate has the expected signi.e, as exchange rate appreciates export revenue declines. However, it is not statistically different from zero which means devaluation of home currency has no noticeable effect on Ethiopian export. All dummy variables except the border dummy variable are negative in sign. They are

statistically insignificant except the Comesa dummy variable, which is statistically significant unlike the other dummy variables. The negative signs of these variables suggests that Ethiopia exports below what other countries export to the region. According to the random effect model, the coefficient of the comesa dummy variable of -3.168 suggests that Ethiopia exports to the Comesa market 95 percent less or about 4 percent(exp(-3.168)-1= -0.9579) of relative to what the rest of the word is trading.

5.2 Estimation Results and Discussion of Import Model

In a similar fashion, estimation of import trade with major trading partners shown below(Table 8) suggests that GDP's are significant determinants of import in Ethiopia. Both GDP's have positive impact on the import trade in Ethiopia. On the other hand, although the sign of distance variable is as expected it is not statistically significant determinant of the import trade in Ethiopia. The similarity index variable ($LSIM_{ij}$) and the relative resource variable ($LRFE_{ij}$) have negative sign suggesting that import trade in Ethiopia are originating from the developed economies due to the difference in technologies. The coefficients of similarity index (SIMij) and relative factor endowment (RLFij) are found to be negative supporting the factor endowment or Heckscher –Ohlin theory in contradiction to the Linder hypothesis.

Own openness and partners openness have positive effect on import trade implying that as the economies are open import trade increases. Partners openness is statistically significant determinant variable while own openness is not statistically significant. All the dummy variables retained negative sign indicating that import is below the potential to import. On the other hand bilateral real exchange rate has been insignificant determinant of import trade although the sign of the bilateral real exchange rate index (BRERI) is as expected.

Except the Comesa dummy variable, all the other dummy variables are insignificant with a negative coefficient. According to the robust random effect model (REM_Rob) model the Comesa dummy variable is statistically significant which implies that Ethiopia imports about 86.05 percent (exp(1.97) -1= -0.86054) less than the rest of the world imports.

Table 7:Import Model based on equation 8

	REM	REM_Rob	FEM	FEM_Rob	HT
LGDP of Eth	1.196***	1.196**	0.127	0.127	0.757**
	(-5.61)	(-2.63)	(-0.37)	(-0.11)	-3
LGDP of Partner	0.760***	0.760***	2.191***	2.191	1.098***
	(-6.29)	(-4.34)	(-3.61)	(-1.44)	(-4.40)
LDist	-0.910*	-0.91	.	.	-0.657
	(-2.35)	(-1.38)	.	.	(-0.73)
$LSIM_{ij}$	-0.494**	-0.494	0.661	0.661	0.0373
	(-2.83)	(-1.21)	-1.88	-0.51	-0.13
$LRFE_{ij}$	-0.610***	-0.610***	-0.644*	-0.644	-0.672**
	(-3.97)	(-3.90)	(-2.03)	(-1.06)	(-2.71)
$LOpen_i$	0.62	0.62	0.389	0.389	0.496
	(-1.77)	(-1.82)	(-1.07)	(-0.95)	(-1.42)
LOpenj	1.302***	1.302**	1.637***	1.637	1.830***
	(-5.8)	(-3.05)	(-4.32)	(-2.00)	(-5.36)
LBRERI	0.741**	0.741	0.493	0.493	0.580*
	(-3.15)	(-1.15)	(-1.93)	(-0.78)	(-2.40)
Border	-0.181	-0.181	.	.	0.714
	(-0.14)	(-0.19)	.	.	(-0.22)
comesa	-1.971	-1.971***	.	.	-2.658
	(-1.60)	(-3.55)	.	.	(-0.88)
Asia	-0.745	-0.745	.	.	-2.05
	(-1.10)	(-1.04)	.	.	(-1.27)
EU_Mart	-0.97	-0.97	.	.	-1.971
	(-1.42)	(-1.77)	.	.	(-1.20)
_cons	-15.90***	-15.90**	-27.76***	-27.76**	-16.11*
	(-4.38)	(-3.26)	(-6.04)	(-3.24)	(-2.05)
N	532	532	532	532	532
r2			0.3282	0.3282	
r2_o	0.6021	0.6021	0.3585	0.3585	
r2_b	0.7232	0.7232	0.4374	0.4374	
r2_w	0.3057	0.3057	0.3282	0.3282	
sigma_u	0.987	0.987	3.2877	3.2877	2.599
sigma_e	0.9766	0.9766	0.9766	0.9766	0.9696
rho	0.5053	0.5053	0.9189	0.9189	0.8778

t statistics in parentheses
* p<0.05 ** p<0.01 *** p<0.001"

5.3 Estimation Results and Discussion of Total Trade Model

As the table below shows(Table 9), real GDPs are found to be significantly factors of total trade (export plus import) and the signs are as expected in all the models. According to the random effect model, GDPs variables are statistically significant at 1 percent level of significance. Similarly, distance, similarity and relative factor endowments are statistically significant determinants of the Ethiopian trade at 1 percent level of significance. Openness of the partner country ($Open_j$) are statistically significant determinants of trade based on all the

model estimation. On the other hand, according to the fixed effect model estimation, Ethiopian openness and bilateral real exchange rate are insignificant in affecting trade with the positive sign.

Table 8:Total Trade Model based on equation 9

	REM	REM_Rob	FEM	FEM_Rob	HT
LGDP of Eth	1.782***	1.782***	1.040***	1.040*	1.437***
	(-12.37)	(-7.51)	(-4.62)	(-2.48)	(-8.41)
LGDP of Partner	0.475***	0.475***	1.568***	1.568*	0.834***
	(-5.71)	(-5.81)	(-3.95)	(-2.13)	(-4.58)
LDist	-1.319***	-1.319***	.	.	-1.27
	(-4.93)	(-3.44)	.	.	(-1.88)
LSIMij	-0.787***	-0.787***	-0.186	-0.186	-0.496**
	(-6.58)	(-3.97)	(-0.81)	(-0.38)	(-2.62)
LRFEij	-0.432***	-0.432***	-0.651**	-0.651*	-0.604***
	(-4.10)	(-3.60)	(-3.12)	(-2.54)	(-3.56)
LOpeni	0.458	0.458*	0.135	0.135	0.269
	(-1.95)	(-1.99)	(-0.57)	(-0.47)	(-1.17)
LOpenj	0.889***	0.889*	1.723***	1.723**	1.620***
	(-5.80)	(-2.18)	(-6.94)	(-2.74)	(-7.71)
LBRERI	0.0179	0.0179	-0.0615	-0.0615	-0.0358
	(-0.11)	(-0.06)	(-0.37)	(-0.19)	(-0.22)
Border	1.211	1.211	.	.	2.237
	(-1.31)	(-1.90)	.	.	(-0.91)
comesa	-1.794*	-1.794***	.	.	-2.492
	(-2.11)	(-5.57)	.	.	(-1.08)
Asia	-0.121	-0.121	.	.	-1.298
	(-0.26)	(-0.26)	.	.	(-1.07)
EU_Mart	-0.443	-0.443	.	.	-1.29
	(-0.94)	(-1.32)	.	.	(-1.05)
Cons	-11.35***	-11.35***	-27.40***	-27.40***	-11.91*
	(-4.55)	(-3.64)	(-9.09)	(-4.40)	(-2.01)
N	532	532	532	532	532
r2			0.5776	0.5776	
r2_o	0.5889	0.5889	0.2133	0.2133	
r2_b	0.6202	0.6202	0.2214	0.2214	
r2_w	0.5507	0.5507	0.5776	0.5776	
sigma_u	0.6681	0.6681	2.8862	2.8862	2.599
sigma_e	0.6402	0.6402	0.6402	0.6402	0.9696
rho	0.5213	0.5213	0.9531	0.9531	0.8778

Source: Own computation
t statistics in parentheses
* p<0.05 ** p<0.01 *** p<0.001

The hausman Taylor estimator has been found to support the result of the random effect model (with similar signs of slope estimates) which assures that GDPs, relative factor endowments (RLFij), similarity index (SIMij) and openness of trading partner(openj) are

statistically significant determinants of Ethiopian merchandise trade. Like the earlier estimators (REM and FEM), the Hausman Taylor (HT) estimator once again confirmed that own openness and real bilateral exchange rate age insignificant determinants of the Ethiopian merchandise trade although the coefficients are with expected signs.

As can be seen from the above table, except the comesa dummy variable none of the dummy variables are significant in affecting the merchandise trade of the country. The dummy variable Border has positive sign suggesting that there has been more trade with the neighbouring countries however, the border dummy variable is not statistically signifacant. While all the other dummy variables are have negative coefficient implying that Ethiopian merchandise trade with Asia and EU_Market is less than what the rest of the world is trading with these markets.

5.4 ESTIMATING TRADE POTENTIAL

5.4.1. Estimating Ethiopia's Export potential

After obtaining the elasticieties of the results of the gravity models for export trade flows, it is important to estimate export trade potential for Ethiopia. For the estimation of the trade potential, the estimated coefficients obtained in section 4.1 is used to predict Ethiopia's export trade with all the countries in our sample. Among the models estimated in the earlier section, the random effect model(REM) is used to predict the export trade potential. This is because of the fact that in the fixed effect model (FEM) some variables will wipe out.

Table 9:Elasticities for the estimation of potential Export

LX	Coef.	Std. Err.	z	P>z	[95% Conf.	Interval]
$Lgdp_i$	2.3488	0.1988	11.8100	0.0000	1.9592	2.7384
$Lgdp_j$	0.1318	0.1056	1.2500	0.2120	-0.0752	0.3387
LDist	-1.9883	0.3368	-5.9000	0.0000	-2.6485	-1.3282
$LSIM_{ij}$	-0.9686	0.1542	-6.2800	0.0000	-1.2709	-0.6663
$LRFE_{ij}$	0.0020	0.1359	0.0100	0.9880	-0.2645	0.2684
$LOpen_i$	0.3404	0.3307	1.0300	0.3030	-0.3078	0.9886
$LOpen_j$	0.5643	0.2009	2.8100	0.0050	0.1706	0.9581
LBRERI	-0.2586	0.2212	-1.1700	0.2420	-0.6921	0.1749
Border	2.0233	1.1542	1.7500	0.0800	-0.2389	4.2854
comesa	-3.1679	1.0619	-2.9800	0.0030	-5.2491	-1.0867
Asia	-0.3950	0.5886	-0.6700	0.5020	-1.5487	0.7586
EU_Mart	-0.5039	0.5897	-0.8500	0.3930	-1.6598	0.6520
cons	-9.9354	3.2250	-3.0800	0.0020	-16.2564	-3.6145

Source: own estimates (REM estimation)

The ratio of predicted export trade (P) obtained by the model and actual trade (A) i.e. (P/A) is then used to analyse the Ethiopia's global trade potential. Ethiopia ($country_i$) has trade

potential with country j if the value of (P_{ij}/A_{ij}) is greater than one. Under this situation, attempts for Ethiopia's trade expansion with country j are recommended.

To see the dynamics on export trade the writer calculated the potential for three different periods. These are first period since 2008 to see if there are changes on trading pattern after the global economic recession and since 2000 to examine trade patterns after the Ethio-Eritrean war. Finally trade potential is calculated for the whole period commencing 1998. Table 10 below shows that Ethiopia has high export trade potential with countries like Djibouti, Kenya, Spain, Russia, Portugal, Thailand, Indonesia, France, Hong Hong, Yemen, India and Singapore, Sweden, Greece, Finland, Japan, South Korea and USA. On the other hand export to the trading partners such as Switzerland, Somalia, Netherlands, Sudan, China, Belgium and Pakistan has been already exploited.

Ethiopia's export trade potentially attain eight times more than currently exported to Djibouti and Malaysia as to the recent(2008-2011 data) estimation result, seven times more trade with Kenya, five times more trade with Spain and Russia based on the latest trade profile of after 2008. Results on overall sample period, (1998-2011) confirm that Ethiopia has high export trade potential with countries such as Kenya, Turkey, Portugal, S.Korea, Russia and Spain. On the Contrary, Ethiopia's export trade has reached to its maturity level with countries like Belgium, Switzerland, Pakistan, Israel, Japan, Germany.

Table 10:Ethiopian Export Trade Potential

2008-20011		2000-20011		1998-20011	
Country	Potential	Country	Potential	Country	Potential
Djibouti	8.7729	Kenya	14.3599	Kenya	36.3519
Malaysia	8.3856	Spain	5.4095	Turkey	7.4256
Kenya	6.8172	Djibouti	4.4026	Portugal	5.4148
Spain	5.1503	Russia	4.3264	S.Korea	4.7170
Russia	4.6909	S.Korea	4.2126	Spain	4.6914
Portugal	4.4791	Malaysia	3.4675	Russia	3.6867
Thailand	3.5565	Portugal	3.3767	Sudan	3.6757
Indonesia	2.6793	Turkey	2.7959	Djibouti	3.5885
France	2.3472	Finland	2.7452	Thailand	2.9621
Hong Kong	2.3062	Thailand	2.4398	Malaysia	2.8144
Yemen	2.2812	France	1.9529	Hong Kong	2.5268
India	2.0280	Egypt	1.9458	Finland	2.3952
Singapore	1.6239	Indonesia	1.9098	Singapore	2.1501
Canada	1.6108	Hong Kong	1.7335	India	2.1490
Egypt	1.5971	India	1.6396	South Africa	1.7730
Greece	1.5412	Yemen	1.5628	France	1.6960
Sweden	1.5287	South Africa	1.5323	China	1.6463
S.Korea	1.4418	Somalia	1.5323	Indonesia	1.6197
Finland	1.4062	Greece	1.4662	Egypt	1.6186
Japan	1.3881	Sweden	1.3875	Yemen	1.5249
USA	1.2573	Singapore	1.3709	Greece	1.5101
Italy	1.1039	USA	1.3124	Sweden	1.3316
United Kingdom	1.0587	Australia	1.1784	USA	1.2412
Turkey	0.8595	United Kingdom	1.1114	Somalia	1.2137
Saudi Arabia	0.8333	Canada	1.1084	Australia	1.1224
U.Arab Emirates	0.7516	Sudan	1.0482	United Kingdom	1.0982
South Africa	0.6508	U.Arab Emirates	0.9398	U. Arab Emirates	1.0846
Germany	0.5954	Italy	0.8362	Canada	0.9413
Australia	0.5953	Saudi Arabia	0.8080	Italy	0.7644
Israel	0.4944	Netherlands	0.7187	Saudi Arabia	0.7184
Jordan	0.4925	Jordan	0.6540	Netherlands	0.6853
Pakistan	0.3777	Germany	0.6263	Jordan	0.6462
Belgium	0.3159	Japan	0.6212	Germany	0.5358
China	0.3099	China	0.5071	Japan	0.5080
Sudan	0.2502	Israel	0.4804	Israel	0.4625
Netherlands	0.2204	Pakistan	0.4240	Pakistan	0.3813
Switzerland	0.1321	Belgium	0.3358	Switzerland	0.3446
Somalia	0.0575	Switzerland	0.1461	Belgium	0.3048

Source: Model estimation

5.5.2. Estimating Ethiopia's Import Trade Potential

Like the case in the export trade potential estimation ,after obtaining the elasticities of the results of the gravity models for import trade, they are used to estimate import trade potential

for Ethiopia. In doing so, the elasticities used to estimate the potential are those obtained from the random effect model for the fact that time invariance variables will be dropped in using the fixed effect model. So the following table shows the elasticieties to be used in estimating the import trade potential.

Table 11:Elasticities for the estimation of potential Import

LM	Coef.	Std. Err.	z	P>z	[95% Conf.	Interval]
Lgdpi	1.1961	0.2134	5.6100	0.0000	0.7779	1.6143
Lgdpj	0.7602	0.1208	6.2900	0.0000	0.5235	0.9968
LDist	-0.9105	0.3878	-2.3500	0.0190	-1.6705	-0.1505
LSIMij	-0.4944	0.1744	-2.8300	0.0050	-0.8363	-0.1525
LRFEij	-0.6100	0.1536	-3.9700	0.0000	-0.9111	-0.3088
LOpeni	0.6198	0.3501	1.7700	0.0770	-0.0664	1.3060
LOpenj	1.3019	0.2244	5.8000	0.0000	0.8621	1.7417
LBRERI	0.7412	0.2353	3.1500	0.0020	0.2801	1.2024
Border	-0.1809	1.3344	-0.1400	0.8920	-2.7964	2.4346
comesa	-1.9711	1.2294	-1.6000	0.1090	-4.3807	0.4385
Asia	-0.7448	0.6790	-1.1000	0.2730	-2.0756	0.5861
EU_Mart	-0.9697	0.6817	-1.4200	0.1550	-2.3058	0.3663
cons	-15.9025	3.6337	-4.3800	0.0000	-23.0244	-8.7806

Source: Model estimation

once estimating the elasticities through the random effect model, they are going to be used in the process of estimating the potential import of merchandise trade in Ethiopia. The first task was to predict the import values from the model and comparing the predicted value and the actual import trade values as the case in the export trade calculations above. That is, the ratio of predicted import trade (P) obtained by the model and actual trade (A) can be used to estimate the potential i.e. (P/A). Ethiopia ($country_i$) has trade potential with country j if the value of (Pij/Aij) is greater than one.

According to the recent merchandise trade statistics(2008-2011) there is a great potential of import from countries such as Hong Kong, Singapore, Egypt, Somalia, Portugal, Yemen, Australia, United Kingdom, Germany, Finland, Israel and USA. On the other hand, import trade from countries such as Canada, Soudi Arabia, United Arab Emirates, Japan, Turkey, Malaysia, Italy, Pakistan, Sweden and China has already reached to its maturity stage that it cannot be increased much more. In the same way, the overall import trade potential of the country is on these countries that trade negotiation and marketing strategies to penetrate the markets in these countries should be promoted so as to reap the benefits of trade. This could help the domestic economy to import technology and diversify its import markets so that the problem of dependence on few markets.

Table 12:Ethiopian Import Trade Potential

2008-20011		2000-20011		1998-20011	
Country	Potential	Country	Potential	Country	Potential
Hong Kong	8.0536	Hong Kong	26.7479	Hong Kong	29.1603
Singapore	7.3978	Somalia	9.5490	Sudan	25.4135
Egypt	3.5632	Portugal	5.8802	Portugal	8.3373
Somalia	2.7643	Singapore	5.2177	Somalia	7.8351
Greece	2.5415	Egypt	2.8349	Pakistan	4.9950
Portugal	2.3925	Pakistan	2.7785	Singapore	4.5012
Yemen	2.3312	Yemen	2.4509	Russia	3.0198
Australia	2.1311	Spain	2.2844	Egypt	2.8623
United Kingdom	2.0180	Russia	2.2126	Spain	2.2267
Germany	1.9050	Australia	1.8441	Yemen	2.1005
Finland	1.7211	Greece	1.7889	Australia	1.7622
Israel	1.5703	Germany	1.6213	USA	1.6421
USA	1.5621	USA	1.4421	Thailand	1.5653
Spain	1.4578	Thailand	1.3883	Greece	1.5602
Netherlands	1.3231	United Kingdom	1.3198	Germany	1.4980
India	1.3180	Israel	1.2976	India	1.2193
Jordan	1.2563	India	1.2186	Israel	1.2021
France	1.1943	Netherlands	1.1366	Netherlands	1.1899
Russia	1.1462	France	1.1184	United Kingdom	1.1688
Thailand	0.9894	Jordan	1.0853	South Africa	1.0908
Switzerland	0.8515	Finland	0.9604	Finland	1.0841
S.Korea	0.8438	Malaysia	0.8895	France	1.0757
Belgium	0.8070	South Africa	0.8862	Malaysia	1.0636
South Africa	0.7341	Belgium	0.8465	Jordan	1.0339
Indonesia	0.6963	Switzerland	0.8186	China	0.9064
Kenya	0.6064	China	0.7420	Belgium	0.8754
China	0.5026	S.Korea	0.6560	Switzerland	0.7659
Sweden	0.4511	Indonesia	0.6354	Indonesia	0.6999
Pakistan	0.3996	Sudan	0.6036	S.Korea	0.5778
Italy	0.3425	Kenya	0.4143	Turkey	0.4431
Malaysia	0.3387	Turkey	0.3804	Kenya	0.3685
Turkey	0.2731	U. Arab Emirates	0.3551	Saudi Arabia	0.3490
Japan	0.2681	Sweden	0.3543	Italy	0.3484
U. Arab Emirates	0.2153	Italy	0.3374	U.Arab Emirates	0.3311
Saudi Arabia	0.1992	Japan	0.2367	Sweden	0.3308
Canada	0.1625	Saudi Arabia	0.2250	Japan	0.2331
Sudan	0.0991	Canada	0.1591	Canada	0.1648

Source: Model estimation

5.5.3. Estimating Ethiopia's Total Trade Potential

Similarly as in the case of export and import trade potential estimations, after obtaining the elasticieties from the estimated results of the gravity models for bilateral total trade flows the estimation process proceeded to quantify total trade potential for Ethiopia. In this section the

writer has used the estimated coefficients obtained in section 4.3 to predict Ethiopia's total trade with all the countries in our sample. The ratio of predicted total trade (P) obtained by the model and actual trade (A) i.e. (P/A) is then used to analyse the Ethiopia's global total trade potential. Ethiopia (country i) has trade potential with country j if the value of (Pij/Aij) is greater than one.

Table 13:Elasticities for the estimation of potential Import

LTij	Coef.	Std. Err.	z	P>z	[95% Conf.	Interval]
Lgdpi	1.7819	0.1441	12.3700	0.0000	1.4995	2.0642
Lgdpj	0.4747	0.0832	5.7100	0.0000	0.3116	0.6377
LDist	-1.3192	0.2677	-4.9300	0.0000	-1.8440	-0.7945
LSIMij	-0.7872	0.1197	-6.5800	0.0000	-1.0218	-0.5526
LRFEij	-0.4317	0.1054	-4.1000	0.0000	-0.6382	-0.2251
LOpeni	0.4579	0.2352	1.9500	0.0520	-0.0031	0.9190
LOpenj	0.8892	0.1533	5.8000	0.0000	0.5888	1.1897
LBRERI	0.0179	0.1583	0.1100	0.9100	-0.2924	0.3283
Border	1.2111	0.9227	1.3100	0.1890	-0.5974	3.0196
comesa	-1.7944	0.8505	-2.1100	0.0350	-3.4613	-0.1274
Asia	-0.1209	0.4691	-0.2600	0.7970	-1.0404	0.7986
EU_Mart	-0.4427	0.4713	-0.9400	0.3480	-1.3664	0.4811
Cons	-11.3503	2.4933	-4.5500	0.0000	-16.2371	-6.4635

Source: Model Estimation

Like the case for export and import trade to see the dynamics on trade the potential for three different periods were calculated. These are for the first period 2008-2011 to see if there are changes on trading pattern after the global economic recession and 2000-2011 to examine trade patterns after the Ethio-Eritrean war. Finally trade potential is calculated for the whole period since 1998.

Results for the three periods suggested that Ethiopia has the highest total trade potential with countries like Hong Kong, Djibouti, Singapore, Yemen Kenya, Spain, Russia, Portugal, United Kingdom, Egypt, France Finland, Germany, India . Ethiopia's total trade potential attain eight times more than what actually traded with Djibouti, six times more with Hong Kong four times more trade with Singapore and Yemen and more than twice with Spain ,Portugal, Greece and Kenya as of 2008.

Results on overall sample period, (since 1998) confirm that Ethiopia has the highest total trade potential with the above countries particularly Hong Kong, Sudan, Portugal, Djibouti, Spain, Yemen, Russia, Somalia, Singapore, and Pakistan.

Table 14:Total Merchandise Trade Potential

2008-20011		2000-20011		1998-20011	
Country	Potential	Country	Potential	Country	Potential
Djibouti	8.2229	Hong Kong	8.8731	Hong Kong	10.334
Hong Kong	6.4139	Djibouti	4.3228	Sudan	7.1829
Singapore	3.9759	Spain	3.2156	Portugal	5.2874
Yemen	3.8242	Somalia	3.1791	Djibouti	3.5768
Kenya	3.6395	Yemen	3.0050	Spain	2.9936
Portugal	2.7807	Singapore	2.8457	Yemen	2.5704
Greece	2.4208	Portugal	2.3786	Russia	2.5418
Spain	2.2080	Kenya	2.2880	Somalia	2.5215
United Kingdom	1.8988	Russia	2.2858	Singapore	2.4689
Egypt	1.8719	Sudan	2.0682	Pakistan	2.2203
France	1.7675	Greece	1.9199	Kenya	1.9863
Finland	1.5885	Pakistan	1.8510	Greece	1.7081
Russia	1.5417	France	1.6274	France	1.5157
Germany	1.4923	Egypt	1.5583	Egypt	1.5069
India	1.3955	Germany	1.4393	USA	1.4036
USA	1.3118	United Kingdom	1.4361	Thailand	1.3761
Indonesia	1.1499	India	1.3136	India	1.3267
Thailand	1.0497	USA	1.2737	United Kingdom	1.306
S.Korea	1.0277	Thailand	1.2235	Germany	1.2858
Australia	1.0231	Australia	1.1622	Australia	1.1165
Israel	0.8649	Finland	1.0142	South Africa	1.0964
Canada	0.7927	Indonesia	0.9294	Finland	1.0571
Jordan	0.7904	S.Korea	0.8990	Indonesia	0.9139
Sweden	0.7723	South Africa	0.8901	Netherlands	0.8727
South Africa	0.6856	Jordan	0.8397	Jordan	0.8523
Netherlands	0.6618	Netherlands	0.8257	China	0.8247
Belgium	0.5900	Israel	0.7388	S.Korea	0.7987
Italy	0.5707	China	0.6680	Malaysia	0.7478
Sudan	0.5043	Malaysia	0.6633	Israel	0.7181
Turkey	0.4813	Belgium	0.6338	Turkey	0.704
China	0.4803	Canada	0.6285	Belgium	0.617
Japan	0.4285	Turkey	0.6167	Canada	0.5804
Pakistan	0.4256	Italy	0.5441	Italy	0.5424
Switzerland	0.3424	Sweden	0.5266	Sweden	0.4761
Saudi Arabia	0.3063	U. Arab Emirates	0.4702	U.Arab Emirates	0.4665
Malaysia	0.3051	Switzerland	0.3800	Saudi Arabia	0.4389
U. Arab Emirates	0.2738	Japan	0.3595	Switzerland	0.3987
Somalia	0.1106	Saudi Arabia	0.3576	Japan	0.3468

Source: Model Estimation

6. Conclusions and Recommendations

6.1 Conclusions

The performance of the foreign trade in Ethiopia has shown a tremendous progress. over the last ten years. The export receipt of the country is so small that it cannot finance import payments of the country. For this reason, trade deficit is widening very much as the export basket and destinations are limited and the import demand is growing following the growing income of consumers. It is therefore important to identify the factors that can help to develop the export receipt. In doing so, the gravity model of trade was developed for export, import and total trade of the country.

The study shows that traditional variables of the gravity model(GDP's) are significant determinants of the trade in the country. Similarly, the distance variable which is the proxied variable for transport and logistics related factors is also significant determinant of the trade. Openness of trading partner country is found to be significant determinant of trade while exchange rate is not found to be affecting trade although the sign is as expected. The similarity index is also found to be significant factors of trade with negative sign suggesting trade in Ethiopia is with dissimilar economies which is in contradiction of Helpman's theorem. This shows that Ethiopia's trade is due to difference in technology and the trade in not intera industry trade that existed in Ethiopia. The relative factor endowment variable($LRFE_{ij}$) which stands for change in resource endowments or relative difference in wealth is affecting the volume of trade in Ethiopia. Accordingly, as the difference in wealth increased the trade flow continued to grow. The dummy variable for the Comesa maket is statistically significant and negative in sign indicating that trade in the Comesa market is less than which it should have to be. According to the estimated gravity models, Ethiopia trade to the Comesa member countries less than 5 percent of its potential.

From the gravity model using the estimated elasticieties, trade values for countries are predicted. Using the predicted values, attempts have been made to estimate trade potential for countries. According to the estimated results, Ethiopia has unexploited export potential with Djibouti and Malaysia, Kenya, Spain and Russia. Results on overall sample period, (1998-2011) confirm that Ethiopia has high export trade potential with countries such as Kenya,

Turkey, Portugal, S.Korea, Russia and Spain. On the Contrary, Ethiopia's export trade has reached to its maturity level with countries like Belgium, Switzerland, Pakistan, Israel, Japan, Germany. Similarly, there is a great potential of import from countries such as Hong Kong, Singapore, Egypt, Somalia, Portugal, Yemen, Australia, United Kingdom, Germany, Finland, Israel and USA. On the other hand, import trade from countries such as Canada, Saudi Arabia, United Arab Emirates, Japan, Turkey, Malaysia, Italy, Pakistan, Sweden and China has already reached to its maturity.

6.2 Recommendations

Trade deficit has continued to be one of the sources of macroeconomic instability in Ethiopia. Openness of the partner economies are one of the determinants of the export as well as import trade in Ethiopia. Ethiopia's trade is directed/originated to few destination countries. It is important to expand export destinations. One possible destinations could be the Comesa member countries .There are countries in which trade(export and import) potentials are unexploited. Therefore, it is crucial to do the following policy options to expand export receipt and narrow trade deficit.

1. Government needs to aggressively engage a bilateral trade negotiations with countries that Ethiopia has a potential.
2. Government should encourage the private sectors to develop market innovations with which Ethiopia has export potential through various incentive packages.
3. By identifying countries with which Ethiopia has export potential, government should help the private sector in market innovation by opening business missionaries that conduct and provide up-to-date information to the exporters and make promotional works to the export trade sector .
4. The trade record in Ethiopia shows that most export destinations are European markets and imports origin from Asia particularly China and Saudi Arabia as well as United Arab Emirates .The country needs to maximize its share from the American market (AGO opportunities) through creating value addition and by working on quality of products to exported.