Ethiopia's Bilateral Trade Relation with China, India and Eu: Analysis of Trends and Determinants

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ABSTRACT

The study analyses trends and determinants of Ethiopia's trade relation with emerging Asia giants China, India and its traditional partner- EU for its total trade flows. It uses secondary data of two decades (1997-2016) from official sources with the purpose of examining the growing difference in the level of importance between its emerging and traditional partners and identifying major governing factors for the strategic relationship between the bilateral pairs. Gravity Model and fixed effects estimation technique is used for the analysis. Major explanatory variables for Ethio-India trade include: GDP size of a foreign partner and Per-capita of Ethiopia governing the relationship positively whereas the increase internet access in Ethiopia resulted in declining trade with India. Ethio-China trade was explained positively by per-capita of Ethiopia, foreign partner's population size and Ethiopia's GDP growth rate and negatively by terms of trade between the partners and the debt service expenditure amount in Ethiopia. In the way, Ethio-EU trade is explained positively by GDP of a foreign partner, GDP of Ethiopia, the terms of trade and government expenditure and negatively by increase in the population size of a foreign partner (EU) in this case. Hence, gravity model variables such as GDP and population size have affected the trade flow between partners.

Key Words: Bilateral trade, determinants, EU, emerging giants, gravity model, trends

Introduction

The Global economic scenarios have put their own impact in the trade partnership and performance of developing economies especially with the emergence of the Asian giants, China and India. This study tries to identify the patterns of trade flows and determinants of Ethiopia's bilateral trade with its three major partners viz- China, India and EU with the objective of examining emerging trends and governing factors in trade flows over the last 2 decades of former regime in Ethiopia (1997-2016). With faster growth of Ethiopian economy for the two decades, there was an increasing flow of trade, more than ever but the importance of different bilateral trade partners was changing over time.

The revitalized Ethiopia's strategic partnership with China and India had its impact on the traditional development partners engaged in the country for relatively longer period of time. This study focuses on the trade flows from emerging partners China and India and a typical of traditional partners, EU to Ethiopia during the past 2 decades of the past regime and showing the changing landscape of economic actors' role in the Ethiopia's context.

Methodology of the study

Gravity model is commonly used in bilateral trade analysis (Green Econometrics, 2002; Peter, 2000; Davidová, 2012; Eichengreen & Irwin, 1998). Estimation techniques for bilateral Trade and FDI flows applicable to a panel data frame include: Pooled OLS, Fixed Effect Estimators, Random Effect Estimation, Hausman Test, OLS Estimation of Double log etc., can be used as an estimation technique (Davidová, 2012).

This study analysed trends and determinants of the economic relation between Ethiopia and its three major partners namely- China, India and EU using descriptive and econometric methods. The econometric analysis used the Gravity model and its commonly accepted estimation techniques such as fixed effects on a panel data frame work. Major

explanatory variables in the standard gravity model including GDP and population size of the partner countries and other relevant variables were regressed to identify major explanatory variables for the trade relationship. The study bases itself on secondary data for a period of 2 decades (1997-2016) obtained from Government offices & major institutions such as World Bank, IMF, UNCTAD, UNCOMTRADE, etc, The statistical regressions was done using STATA software.

1.1. Descriptive Analysis on Trade Flows
A.   Trends in total trade flow

Table 1 below compares the total trade flows between Ethiopia and the three partners China, India and EU. The table shows how the trade flows were changing across the 2 decade periods and how the three actors were behaving during this period.

Ethiopia's trade with India grew by 20% on average for 20 years. Overall flow between the two partners reached at $ 1.4 billion in 2016 & an average flow of $ 532.3 million every year.

Ethio-China trade flows showed persistent increase across the years. The average growth rate for 2 decades was 30%. Ethio-Chinese trade averaged at a flow of $1.77 billion & the total flow was $5.4 billion in 2016.

Ethiopia's trade flow with EU started at nearly a billion dollar in 1997 and has reached 3 billion USD in 2016; with the average growth rate at 7.7% which is quite lower than the emerging partners (China and India) trade flows for the same period. The initial years showed negative growth and the EU trade all together added 2 billion USD only in 20 years period, whereas Ethio-China trade added 2 billion in single year between 2013 and 2014 that can be seen from table 1 below. The average flow for Ethiopia-EU trade was $1.4billion for the period under study. There is more fluctuation in the flow for Ethio-EU trade across the years.

Table 1: Comparison of Ethiopia's bilateral trade from India, China and EU, in US Dollars, 1997-2016

Year	Ethio-India	Growth	Ethio-China	Growth	Ethio-EU	Growth
1997	62,784,663		55,266,554		909,978,910	
1998	81,953,062	31	68,321,262	24	850,712,960	-6.5
1999	64,923,910	-21	77,797,482	14	711,959,699	-16.3
2000	74,113,215	14	97,727,568	26	646,126,464	-9.2
2001	116,995,551	58	141,353,874	45	537,360,810	-16.8
2002	113,056,072	-3	152,863,348	8	545,660,577	1.5
2003	183,016,622	62	320,521,920	110	727,553,922	33.3
2004	199,949,128	9	382,649,760	19	767,302,667	5.5
2005	257,906,696	29	595,882,605	56	1,080,908,456	40.9
2006	323,647,069	25	711,226,707	19	1,123,171,557	3.9
2007	436,868,096	35	1,206,409,545	70	1,417,272,472	26.2
2008	644,865,555	48	1,831,054,517	52	1,585,827,337	11.9
2009	648,721,772	1	2,131,524,847	16	1,515,320,402	-4.4
2010	644,732,819	-1	2,290,298,528	7	1,639,167,916	8.2
2011	800,666,714	24	1,998,306,081	-13	2,292,578,706	39.9
2012	1,114,961,538	39	2,748,734,678	38	2,330,470,760	1.7
2013	1,260,183,940	13	3,261,319,185	19	2,330,377,907	0.0
2014	1,109,234,876	-12	5,474,580,081	68	2,456,136,932	5.4
2015	1,216,407,420	10	6,378,002,519	17	2,811,888,541	14.5
2016	1,370,287,325	13	5,444,103,219	-15	3,004,196,820	6.8
Tot.	10,725,276,043	373	35,367,944,280	578	29,283,973,815	146.3

| Avrg | 536,263,802 | 20 | 1,768,397,214 | 30 | 1,464,198,691 | 7.70 |

Source: Own analysis from Ministry of Trade Ethiopia data.

Table 2 below shows **comparison on import trade** for the three partners across 2 decades bilateral trade relation with Ethiopia.

Table 2: Comparison: Ethiopia's Import Trade from India, China & EU, 1997-2016

Year	Imports from India	Growth	Import from China	Growth	Imports from EU	Growth
1997	61,180,190		54,543,854		568,494,644	
1998	81,643,210	33	67,519,156	24	513,117,152	-9.7
1999	63,229,387	-23	76,844,904	14	517,628,539	0.9
2000	65,823,586	4	96,672,856	26	413,962,984	-20.0
2001	99,005,822	50	134,812,000	39	377,240,984	-8.9
2002	103,068,339	4	144,846,000	7	360,101,465	-4.5
2003	175,005,711	70	313,414,000	116	512,237,268	42.2
2004	190,376,879	9	367,772,000	17	522,023,967	1.9
2005	249,903,429	31	516,952,000	41	733,527,275	40.5
2006	314,125,781	26	639,539,000	24	765,392,925	4.3
2007	421,298,888	34	1,138,770,000	78	967,339,324	26.4
2008	630,449,504	50	1,750,435,000	54	1,029,821,554	6.5
2009	629,920,641	0	1,920,404,000	10	981,087,365	-4.7
2010	617,222,985	-2	2,062,085,000	7	992,072,810	1.1
2011	767,686,475	24	1,718,111,000	-17	1,318,107,913	32.9
2012	1,072,742,091	40	2,432,872,000	42	1,504,280,849	14.1
2013	1,224,650,153	14	2,952,993,000	21	1,607,346,204	6.9
2014	1,056,107,230	-14	5,018,119,000	70	1,697,228,000	5.6
2015	1,151,498,728	9	6,073,161,000	21	2,023,042,149	19.2
2016	1,301,909,764	13	5,088,933,000	-16	2,315,315,796	14.4
Tot	**10,276,848,793**	**373**	**32,568,798,770**	**578**	**19,719,369,167**	**169**
Avrg	**513842439.7**	**20**	**1628439939**	**30**	**985968458.4**	**8.9**

Source: Own analysis from Ministry of Trade data, Ethiopia

Ethiopia's import trade from India grew at 20%. Average import value for 20 years was $ 513.8 million and the largest flow was registered in the year 2016 at $1.3billion.

The import trade with China grew at 30% on average for the period. Average import trade flow from China stood at $ 1.6 billion every year. This value is 3 times larger than the value of Ethiopia's imports from India for the last 2 decades.

Ethio-EU import trade for the same period grew at 8.9% on average and the average value of flow for the period was $989.9 million every year. The China's import trade in 2016 registered $5 billion, which is more than double of the EU import trade with Ethiopia.

Another important component of trade flows is **export trade between Ethiopia and the three partners,** the comparison for which is indicated below in Table 3.

Export trade of Ethiopia to India grew at 56% and average flow of export to India for the period under study was $22.4 million and the largest transaction being $68.4 million in 2016. The overall flow of exports to India was more or less constantly growing across years.

Ethiopia's export to China registered 71% growth for 2 decades and its less than 1 million dollars flow grew to a level of $355 million in 2016. The largest export trade flow was registered in 2014 at $456 million. The average flow of Ethiopia's export to China registered at $139.9 million which is a value larger 6 times that for Ethio-India export trade.

Ethio-EU export trade was one of the largest of the three partners' flows for the 2 decades. It started at pretty high level from $341 million in 1997 to reach at $688.9 million in 2016, but the rate of growth on average stood at 6.4% only. From the tables 3 we can see that Ethiopia's export to EU was doubled in 20 years period but the export trade from Ethiopia to China increased 491 times and to India it has increased 42.6 times from its 1997's status. This shows that export trade to China is increasing significantly followed by export flows to India, but the export flows to EU was stagnating across the years. However, EU remains to be the largest destination to Ethiopia's export trade with its every year's flow at $478 million on average, which is 3.4 times larger than the export flow to China.

Table 3: Comparison: Ethiopia's Export Trade from India, China & EU, 1997-2016

Year	Et-export to India	Growth	Et- export to China	Growth	Et-export to EU	Growth
1997	1,604,473		722,700		341,484,266	
1998	309,852	-81	802,106	11	337,595,808	-1.1
1999	1,694,523	447	952,578	19	194,331,159	-42.4
2000	8,289,628	389	1,054,712	11	232,163,480	19.5
2001	17,989,729	117	6,541,874	520	160,119,826	-31.0
2002	9,987,732	-44	8,017,348	23	185,559,112	15.9
2003	8,010,911	-20	7,107,920	-11	215,316,654	16.0
2004	9,572,249	19	14,877,760	109	245,278,700	13.9
2005	8,003,268	-16	78,930,605	431	347,381,181	41.6
2006	9,521,289	19	71,687,707	-9	357,778,632	3.0
2007	15,569,207	64	67,639,545	-6	449,933,148	25.8
2008	14,416,051	-7	80,619,517	19	556,005,783	23.6
2009	18,801,131	30	211,120,847	162	534,233,037	-3.9
2010	27,509,833	46	228,213,528	8	647,095,106	21.1
2011	32,980,239	20	280,195,081	23	974,470,793	50.6
2012	42,219,447	28	315,862,678	13	826,189,911	-15.2
2013	35,533,787	-16	308,326,185	-2	723,031,703	-12.5
2014	53,127,646	50	456,461,081	48	758,908,932	5.0
2015	64,908,691	22	304,841,519	-33	788,846,392	3.9
2016	68,377,562	5	355,170,219	17	688,881,024	-12.7
Tot	448,427,248	1,072	2,799,145,510	1,351	9,564,604,647	121.0
Avrg	22,421,362.4	56	139,957,275.5	71	478,230,232.4	6.4

Source: Own analysis from Ministry of trade data, Ethiopia

With the above trends in Ethiopia's trade relation with partners, the balance of trade became a serious challenge to Ethiopia, the trend of which is negative regardless of the partner and the year of flow. The analysis on balance of trade is shown in **Table 4** below.

Trade balance with India showed a deficit of 36.7% on average and the deficit was $ 491.4 million on average for a flow every year for the 2 decades.

The trade balance with China was the largest of all the partners deficit with it value on average at $1.49 billion and its largest deficit registered in 2015 at $5.77 billion indicating that China is the country with the largest deficit all across the years with Ethiopia. (Table 4 here).

Table 4:Comparison: Ethiopia's Trade Deficit with India, China and EU 1997-2016

Year	Deficit from India	Growth	deficit from China	Growth	Deficit from EU	Growth
1997	-59,575,717		-53,821,154		-227,010,378	
1998	-81,333,358	36.5	-66,717,050	24.0	-175,521,344	-22.7
1999	-61,534,864	-24.3	-75,892,326	13.8	-323,297,380	84.2
2000	-57,533,958	-6.5	-95,618,144	26.0	-181,799,504	-43.8
2001	-81,016,093	40.8	-128,270,126	34.1	-217,121,158	19.4
2002	-93,080,607	14.9	-136,828,652	6.7	-174,542,353	-19.6
2003	-166,994,800	79.4	-306,306,080	123.9	-296,920,614	70.1
2004	-180,804,630	8.3	-352,894,240	15.2	-276,745,267	-6.8
2005	-241,900,161	33.8	-438,021,395	24.1	-386,146,094	39.5
2006	-304,604,492	25.9	-567,851,293	29.6	-407,614,293	5.6
2007	-405,729,681	33.2	-1,071,130,455	88.6	-517,406,176	26.9
2008	-616,033,453	51.8	-1,669,815,483	55.9	-473,815,771	-8.4
2009	-611,119,510	-0.8	-1,709,283,153	2.4	-446,854,328	-5.7
2010	-589,713,152	-3.5	-1,833,871,472	7.3	-344,977,704	-22.8
2011	-734,706,236	24.6	-1,437,915,919	-21.6	-343,637,120	-0.4
2012	-1,030,522,644	40.3	-2,117,009,322	47.2	-678,090,938	97.3
2013	-1,189,116,366	15.4	-2,644,666,815	24.9	-884,314,501	30.4
2014	-1,002,979,584	-15.7	-4,561,657,919	72.5	-938,319,068	6.1
2015	-1,086,590,037	8.3	-5,768,319,481	26.5	-1,234,195,757	31.5
2016	-1,233,532,202	13.5	-4,733,762,781	-17.9	-1,626,434,772	31.8
Tot	-9,828,421,545	697	-29,769,653,260	583.1	-10,154,764,520	312.8
Avrg	-491421077.3	36.7	-1488482663	30.7	-507738226	16.5

Source: Own analysis

A similar analysis of the figures for balance of trade with EU shows that Ethiopia's deficit with EU registered $507.7 million on average for 20 years and it grew at 16.5% on average. The overall analysis from table 4 above reveals that China played the leading of all the partners both in its trade and its deficit with Ethiopia. EU and India showed similar magnitude in trade deficit with Ethiopia while EU marginally leading India in this regard.

### B. Graphical analysis of the three important partners' Trade

Comparing the trade patterns from the three pairs of bilateral countries, China, India and EU graphically would reveal the actual movement of the trade flows in vivid manner. **Graph 1** below shows the trade flows for the three partners during the 2 decades (1997-2016). From the graph we can see that EU trade was highest of the all the trade lines till 2007, after which it was excelled by China's trade up to nearly 2011 followed by some break in China's trade, the EU's flows overtook but it was too brief to continue with for EU. China with its greater leaps overtook the leadership at an extraordinary rate.India and China were at the same level till 2002/03 but India has shown a rising trend marginally, China's rate was incomparable to catch up with. From 2004 onwards, China overtook India, before it finally overtook EU as well.

Graph 1: Ethiopia's Bilateral Trade with India, China & EU; 1997-2016
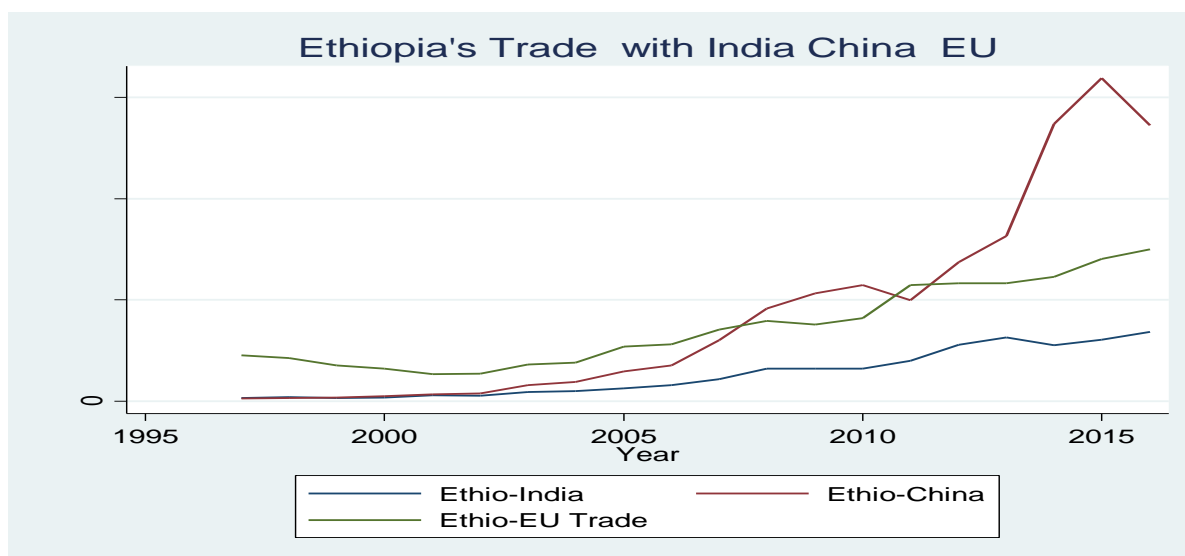
Source: own analysis

The graph depicts that India's and EU's trade flow followed similar patterns at seemingly parallel levels to one another. The move was shown to be normal and sustainable all over the 20 years, continuously rising but all move at marginal level. The China's trend was a kind of leaps and jumps till it turns its arrow of the line downwards after 2015.

The second graph –Graph 2 below shows similar comparison for the three set of countries for their **import** flows. The graph line depicts that China is exceeding both India and EU turn by turn from a similar position with India but from a lower position for EU. The graph reveals that India and EU again showed similar path in their growth patterns but with narrower gap between the two this time.

Graph 2: Ethiopia's Import Trade with India, China & EU; 1997-2016
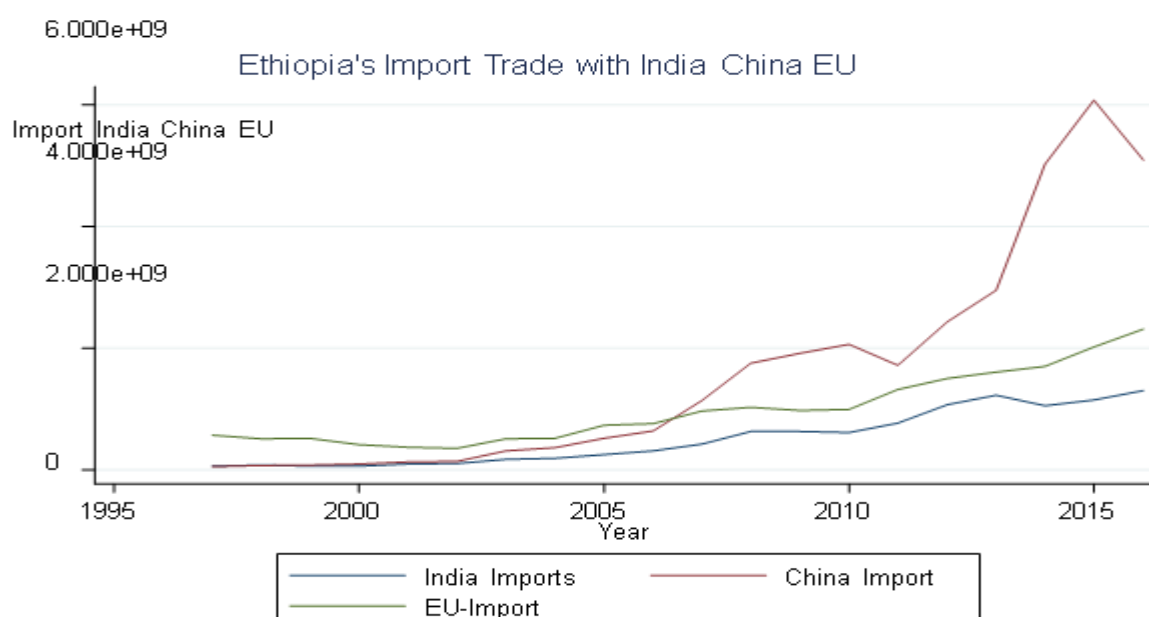
Source: own analysis

Graph 3 below depicts **export** trade of Ethiopia with the three partners EU, China and India. In export trade, EU's share was incomparable with both China and India all over the period.

**Graph 3: Ethiopia's Export Trade with India, China & EU; 1997-2016**

Source: own analysis

The graph lines show similar beginnings for China and India during which the EU's share was the highest but was declining and stagnating. It reveals that the rising up of the China's and EU's graph line began at the same time but at different levels. It can be seen that the overall increase followed same pattern for EU and China except that EU reached its maximum before the China's pick. India's export contribution seemed limited and was only marginal unlike its contribution for the import trade. It was a flow only at constant and marginally increasing patterns for the two decade period.

 Graph 4 below shows the level of trade deficit for Ethiopia with is three partners.

Graph 4: Ethiopia's Trade deficit with India, China & EU; 1997-2016
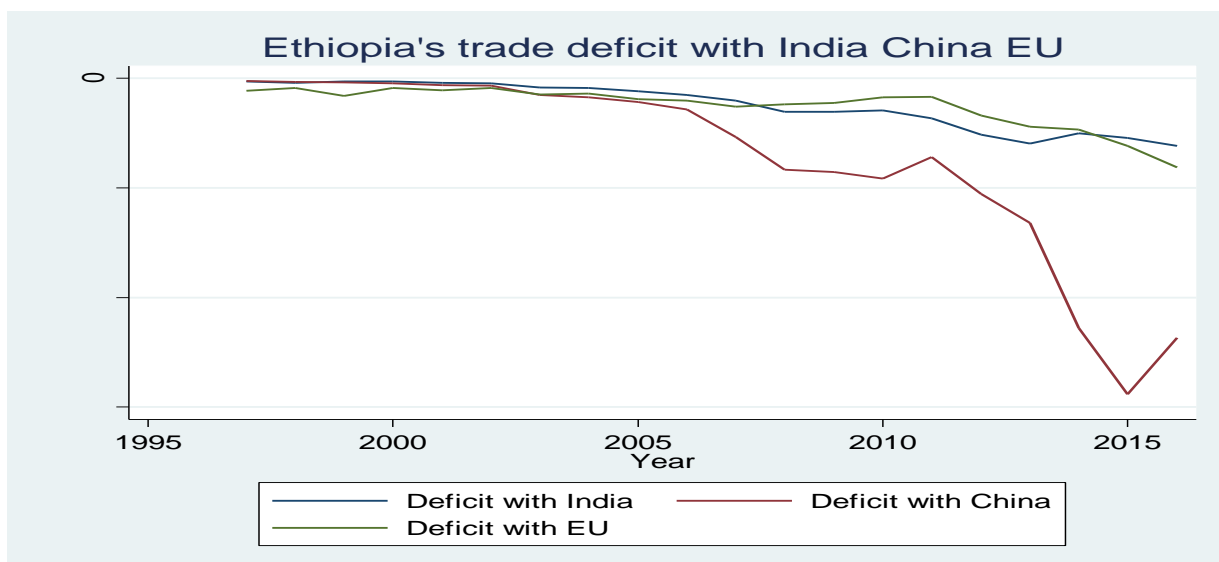
 Source: own analysis

Ethiopia's trade deficit with china grew faster and deeper to negative values compared with the other two. Initially, all of the three were at similar status in their contribution for the deficit. After 2005, Ethiopia's trade started registering largest deficit figures in its trade balance with China and this was not comparable with Ethiopia's deficit size with EU and India. Both India and EU followed similar move, slower increase in their deficit with Ethiopia across the years.

Econometric Analysis of Trade Flows

A gravity model based estimation techniques such as Fixed Effects is employed to examine the determinants of trade flows between the three bilateral pairs (China, India, EU) and Ethiopia. The results of the estimation and discussions are indicated for each bilateral pair country below.

Ethio-India Trade Analysis

Ethio-India trade relation is analyzed to examine the determinants that govern the bilateral trade between the two countries for the last two decades. Table 5 below shows a fixed effects estimation result of Ethio-India trade flows for years 1997-2016. A log value of Ethio-India bilateral trade (which is the sum of the logs of export and import) is taken as a dependent variable and regressed over a large set of variables but only few of them were found relevant in explaining the relationship. The estimation took the following form for fixed Effects:

$$Y_{it}= \beta_1 i + \beta_2 X_{it} + ... + \beta_N X_{it} + U_{it} ....(1)$$

Where Y_{it}- represents the bilateral trade flows between the country pairs

$\beta_1 i$=a unit intercept that does not vary over time, $\qquad$ X_{it}= Explanatory variables

β= coefficient of explanatory variables that do not vary across a cross section or overtime,

The four explanatory variables identified through several regression attempts include: Ethiopia's GDP growth rate, Internet access in Ethiopia, Per-capita of Ethiopia and GDP of a foreign partner, India in this case. Of the four explanatory variables, three were found significant, namely, GDP of a partner country, Per-capita of Ethiopia and Internet access and all are regressed in log forms. The overall R-square was 97%, meaning that the independent variables explain 97% of the variation in Ethio-India trade for the two decade period of trade flows.

Table 5: Fixed Effects Regression Ethio-India trade 1997-2016

letindiatrade	Coef.	St.Err	t-value	p-value	Sig.
letgrowth	-0.208	0.247	-0.84	0.415	
linternet	-0.444	0.101	-4.38	0.001	***
lpcet	1.213	0.690	1.76	0.102	*
lgdpfn	3.094	0.716	4.32	0.001	***
Constant	-49.892	16.272	-3.07	0.009	***

Mean dependent var	36.254	SD dependent var	2.127	
R-squared	0.970	Number of obs	18.000	
F-test	105.570	Prob > F	0.000	
Akaike crit. (AIC)	24.021	Bayesian crit. (BIC)	28.473	

*** p<0.01, ** p<0.05, * p<0.1
Source: own analysis

The result of fixed effects estimation and Beta values for log of Ethio-India trade as dependent variable is indicated below:

Letindiatrade= $\beta_1 i + \beta_2 lnetgrowth + \beta_3 lninternet + \beta_4 lnpcet + \beta_5 lngdpfn + Uit$……….............(7)

Where; letindiatrade= Log of Ethio-India bilateral trade flows

Letgrowth=log of Ethiopia's GDP growth rate

Linternet=log of internet users number in Ethiopia

Lpcet= log of the per-capita of Ethiopia

Lgdpfn= log of GDP of a foreign partner country

Uit= the error term

$\beta_1 i$= the country specific constant term and the β values are slope of the explanatory variables

Following the estimated elasticity values, the model can be put as:

Letindiatrade= - 49.9 - 0.21lnetgrowth - 0.44lninternet + 1.21lnpcet + 3.09lngdpfn + Uit… (8)

Accordingly, log of internet access showed significance at 1% level in explaining the trade relationship between Ethiopia and India during the period under investigation. The direction of influence is found negative, meaning that the more people have access for internet in Ethiopia, the lesser is the trade flow between Ethiopia and India. With increased access in internet, people would have multiple choices for commodities and go for different export and import origins.

From the table 5 above, a 1% increase in the access for internet users in Ethiopia would decrease the trade flows between Ethiopia and India by 0.44%.

Another important explanatory variable in Ethio-India trade is India's GDP size. This variable explained the lion share of the variation in Ethio-India 2 decade's trade flow. It is significant at 1% level and the Beta value shows that a 1% increase in India's GDP would result in 3.09% increase in Ethio-India trade. This is a threefold increase in trade flows with one percent change in India's GDP.

The third marginally important variable in explaining Ethio-India trade is per-capita of Ethiopia, which is found significant at 10% level for the fixed effects estimation. A 1% increase in the PC of Ethiopia would lead to 1.2% increase in the value of Ethiopia's trade with India. Generally, variability in trade flows between India and Ethiopia is governed by GDP increase in India and PC GDP increase in Ethiopia.

Ethio-China Trade Analysis

Ethio-China relation is analyzed to examine factors that could explain the bilateral trade relation between the two economies for the last two decades. Based on gravity model frame work and a panel data base, fixed effects estimation technique is employed by taking log of Ethio-China bilateral trade flows as dependent variable.

The log of Ethiopia's total trade with China, which is the sum of log of Ethiopia's imports and log of Ethiopia's exports to China, is regressed over a set of commonly identified independent variables. The estimation took several explanatory variables as regressors in the process, but only 7 were selected for final estimation. Of the seven selected variables, 5 were found significant at different levels in explaining Ethio-China trade.

The estimation took the following empirical form for fixed effects regression:

Lettrade= $\beta_1 i + \beta_2 lpcet + \beta_3 lhomepopn + \beta_4 ltermstr + \beta_5 ldebtserv + \beta_6 letgrowth + Uit$………..(1)

Where; Lettrade=log of Ethiopia's total trade; lpcet=log of the per-capita of Ethiopia; lhomepopn= log of the partner's population sze; ltermstr = log of the trade terms between the partners; ldebserv= log of the debt service expenditure of

Ethiopia; letgrowth= log of the growth of GDP of Ethiopia; Uit= the error term; β₁i= Countery specific constant term; β= the slope of the explanatory variables.

The five variables found significant in Ethio-China trade analysis include: Per-capita of Ethiopia (pcet), Population size of a foreign partner (homepop), terms of trade (termstr), debt service ratio (debtserv) and Ethiopia's GDP growth(etgrowth) all in their log form. **Table 6** below shows the Fixed Effects regression output.

Table 6: Ethio-China Trade (1997-2016): Fixed Effects Regression

lettrade	Coef.	St.Err	t-value	p-value	Sig.
lpcet	0.873	0.184	4.75	0.001	***
lhomepopn	28.033	2.749	10.20	0.000	***
ltermstr	-0.319	0.163	-1.96	0.078	*
ldebtserv	-0.208	0.061	-3.39	0.007	***
lgovexpamt	0.170	0.174	0.98	0.349	
letgrowth	0.175	0.064	2.71	0.022	**
ltradeopness	0.230	0.143	1.61	0.139	
Constant	-575.751	56.804	-10.14	0.000	***

Mean dependent var	20.561	SD dependent var		1.577
R-squared	0.997	Number of obs		18.000
F-test	487.100	Prob > F		0.000
Akaike crit. (AIC)	-22.582	Bayesian crit. (BIC)		-15.459

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

Out of the five significant variables, three of them (pcet, homepopn, debtservice ratio) were found significant at 1% level; Ethiopia's GDP growth rate was significant at 5% level and terms of trade was significant only marginally at 10% level. The selected regressor variables explained 99.7% of the variation in the dependent variable.

After estimation beta values are obtained, the relationship can be stated as follows:

Lettrade= -575.6+ 0.873 lpcet +28 lhomepop - 0.319 ltermstr - 0.21 ldebtserv + 0.175 letgrowth+Uit

Where, lpcet= log of percapita of Ethiopia; lhomepop= log of population of a foreign partner, China here; ltermstr= log of terms of trade; ldebtserv= log of debt service ratio of Ethiopian government; and letgrowth= log of Ethiopia's GDP growth; Uit= the error term.

From the estimation, we can see that log of pcet is significant at 1% level and has positive influence on Ethio-China trade flow. The beta value indicates that a 1% increase in per-capita of Ethiopia would result in 0.87% increase in Ethio-China trade flows. As income of individuals increase, the trade flows between countries would increase because individuals' income is the source of demand for market goods and services. This is the right prediction forecasted in gravity model estimations.

Another explanatory variable of significance is in trade flows is a foreign partner's population size, i.e., China's population size in this case. This again has a positive sign in its influence on trade flow and is significant at 1% level, with largest possible magnitude of impact in explaining the flow of trade. It is shown from the beta value that a 1% increase in China's population size would lead to 28% rise in Ethio-China trade value, other factors remaining constant. Countries with larger population size trade more from their economies. This finding is also in line with the prior predictions in gravity model estimations.

The debt service ratio, showed significance at 1% level but is influencing negatively on trade flows between Ethiopia and China. The beta value shows that a 1% increase in debt servicing by Ethiopian Government would result in a 0.21% decline in trade flows. This sign of influence is as per the prediction, meaning that is if a country in debt trap and has to pay increasingly significant sum from its GDP or export income every year, it would mean that resources to support external trade and the private actors engaged in trade services would be minimal (Possibility of crowding out effect), resulting in overall reduction in trade flows. Moreover, the government expenditure on purchases would decline due to budget shortages and this would lead to reduction in trade transaction as the government sector is the biggest spender in the economy for emerging economies like Ethiopia. Hence, debt servicing would have a negative directional influence in overall trade flows especially when the payments are for foreign Governments and institutions.

The growth rate of Ethiopia's GDP is found significant at 5% level and positively governing the flow of trade. From the beta values again, we can infer that a 1% increase in Ethiopia's GDP growth rate would result in 0.175% increase in trade flows. This result is as per the prediction, meaning that as and when the economy grows faster, its trade transactions with partner countries would increase with an increase in the country's GDP.

The terms of trade index, has negative direction of influence and significance only marginally at 10% level. Its estimated beta value shows that a 1% increase in terms of trade index would result in 0.32% decline in trade flows, which would mean that foreign exporters might not be interested in exporting with increased trade terms which is favourable for domestic exports not for foreign exports (Domestic imports). This is so because increased terms of trade index would mean export of a domestic country is in favourable terms compared to import of a foreign product.

However the sign of terms of trade index is not predictable easily as it would have its influence differently with country pairs exchanging their trade, which is not uniform.

Ethio-EU Trade Analysis

Ethio-EU trade flows for years 1997-2016 is analyzed using fixed effects estimation to identify factors governing the trade relation between the two partners. Log of Ethio-EU trade as a dependent variable is regressed over GDP of a foreign partner (Home country), Government Expenditure of Ethiopia, and GDP of Ethiopia, Population size of Ethiopia and terms of trade.

The specification for fixed effects can be set as:

Lettrade= $\beta_1 i + \beta_2$ lgdpforeign + β_3 lgdpet + β_4 lhomepopn + β_5 lgovexp + β_6 ltermstr +Uit... (1)

Table 7: EU Ethiopia trade fixed effects Regression

lettrade	Coef.	St.Err	t-value	p-value	Sig.
lgdpfn	2.402	0.423	5.67	0.000	***
lgdpet	1.072	0.414	2.59	0.021	**
lhomepop	-45.068	18.732	-2.41	0.031	**
lactualexp	0.510	0.267	1.91	0.077	*
ltermstr	0.691	0.255	2.71	0.017	**
Constant	830.509	361.360	2.30	0.037	**

Mean dependent var	40.390	SD dependent var	1.130
R-squared	0.980	Number of obs	20.000
F-test	137.704	Prob > F	0.000
Akaike crit. (AIC)	-5.695	Bayesian crit. (BIC)	0.280

*** p<0.01, ** p<0.05, * p<0.1 ; Source: Own analysis

Five of the explanatory variables in their log form were found significant at different levels in explaining the variation in total trade flows across years. The altogether explained 98% of the variation in the dependent variable. To examine each regressors one by one:

Log of GDP of a foreign partner, EU in our case here, is found significant at 1% level and influencing the trade flow positively. From the estimated beta value on the table 7 above, we can see that a 1% increase in the GDP of a foreign partner would result in 2.4% increase in Ethio-EU trade flow. The sign and significance observed here is as per the gravity model prediction. The larger the GDP size, the greater is the flow of trade between the bilateral pairs.

GDP of Ethiopia is also another significant variable in our estimation that can explain the trade relation between the two partners. It is found significant at 5% level and its beta value shows that a 1% increase in the GDP of Ethiopia can lead to a 1.07% increase in trade flows with EU, other factors remaining constant. It has a positive and significant role in explaining trade flows and the direction of influence as per the gravity model predictions.

The population size of a partner country is found significant at 5% level and influencing negatively on the trade flows in this case. A 1% increase in the size of the foreign partner's population would result is 45% decline in Ethiopia's trade flow with EU. This means that when the demand at home grows with an increase in the size of the population, the external sector trade flows would decline significantly. With increased demand, domestic markets would get served prior to external demand. But the long term impact of the growing population might not be predictable, as the increased population would start contributing to production at large.

Ethiopia's government expenditure in the economy is significant only at marginal level, i.e, at 10%. From the Beta value we can see that a 1% increase in Ethiopian Government expenditure would increase EU-Ethiopia trade by 0.5%. This would imply that Government, being the major actor in the economy, its outlays would definitely increase the trade flows. This is a variable explaining trade flows negatively in case of China and India trade flows taken up earlier. The change in the sign is an indicative of the nature of trade flows the country is making with EU, specifically; items traded with EU may not seem to be reduced with increased Government expenditure in the economy. EU's imports are not substitutable with prevailing domestic investments at least in short term.

The last variable of significance at 5% level in explaining the flow of trade between EU and Ethiopia is terms of trade index. This again is a positively influencing variable of significance in the trade flows. Increase in terms of trade would be favourable for export trade as it is taken as a ratio of export trade to import trade for a country. The beta value here shows that a 1% increase in terms of trade index would result in 0.69% increase in trade flows for Ethiopia-EU trade in the last 2 decades.

In the following section, the three important components of trade flows and their explanatory factors are compared for the three bilateral partners of Ethiopia.

1.2. Comparison of Determinants for Ethiopia's Trade Relation with China, India & EU

In order to identify explanatory variables of significance in total trade, relationship between Ethiopia and its three partners, gravity model based estimation was employed with specific country pairs taking especially India, China and EU as cases. The following section of the study compares similarity in explanatory variables of trade components among the country pairs for a period of 2 decades.

Table 8: shows the total trade explanatory variables for the three bilateral pairs.

<u>**Table 8: Comparing trade determinants**</u>

No	Explanatory Variables	Ethio-India	Ethio-China	Ethio-EU
1	lgdpforeign	3.094(1%)		2.4(1%)
2	pcgdpet	1.213(10%)	0.873(1%)	
3	linternet	-0.444(1%)		

4	lactualexp			0.51(10%)
5	lhomepop		28.03(1%)	-45.1(5%)
6	ldebtservice		-0.21(1%)	
7	letgrowth		0.175(5%)	
8	ltermstrade		-0.32(1%)	0.69(5%)
9	lgdpet			1.07(5%)
	R-Square	97%	99.7%	96.2%

Source: Own estimation analysis

From the table 8, we can see that only one of these five variables is shared by both India and EU i.e, foreign partners GDP. China has only one variable in common with India, viz- PCGDP of Ethiopia. China shares two explanatory variables with EU, viz- foreign partners' population size and terms of trade variables.

Each of the three bilateral countries has at least two specific variables explaining them uniquely in their trade relation with Ethiopia. For example, EU has variables such as government expenditure and GDP of Ethiopia, China has Ethiopia's GDP growth and debt service expenditure and India has internet access explaining its trade relation uniquely with Ethiopia.

SUMMARY AND CONCLUSIONS

The following major points can be summarized and concluded from the analysis:

Ethio-India trade grew by 20% every year on average by an amount equal to $532 million. Factors governing the trade flow between India and Ethiopia are size of GDP of India (+ve), PC-GDP of Ethiopia (+ve), and the internet access in Ethiopia (-ve). India shares one explanatory variable with China (Per capita GDP of Ethiopia) one variable with EU (GDP of a foreign partner).

Ethio-China trade grew by 30% every year, on average, by an amount equal to $1.77 billion. China's trade flow with Ethiopia was the largest of all flows on average for the last 2 decades. Factors governing Ethiopia-Chinese trade include per capita GDP of Ethiopia (+ve), Size of China's population (+ve), debt service expenditure (-ve), Ethiopia's growth (+ve), and the terms of trade (-ve). China's trade flow shares one explanatory variable (per capita GDP of Ethiopia) with India, two variables (foreign partners' population and terms of trade) with EU. Ethio-EU trade grew by 7.7% for 2 decades and averaged at $1.46 billion every year. Factors governing EU total trade flows with Ethiopia were; GDP of s foreign partner (+ve), government expenditure (+ve), home or foreign partners' population size (-ve), terms of trade (+ve), and GDP of Ethiopia (+ve). Of the five variables, one variable (gdp foreign) is shared with India; two variables (government expenditure and terms of trade) are shared with China

Ethiopia's trade with China has the largest deficit compared to other partners and EU and India had similar magnitudes in deficit with Ethiopia which was by far less than the values for China. Figuratively, it was nearly $1.5 billion on average for China but was $507 million for EU and $491 million for India on average for 20 years.

In conclusion: analysis of Ethiopia's economic relation with the traditional partner EU and the emerging giant actors from Asia (China and India), has shown that there was a declining and stagnant economic flows from EU whereas the flow from the emerging actors was vibrant in their bilateral relation with Ethiopia.

EU and India more or less shared similar patterns in their relationship with Ethiopia, but China's approach in trade flow patterns differ significantly in its nature and size. All the bilateral relations shared only few of the variables commonly explaining their flows in 2 decades period.

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