IMPACT OF TRADE COSTS ON EXPORT PERFORMANCE OF ETHIOPIA – A PPML PANEL GRAVITY EQUATION APPROACH

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Abstract

Purpose– the purpose of this study is to examine the impact of trade costs on exportperformance of Ethiopia for the period of 2010 -2015.
Design/Methodology/Approach- Whilst two types of panel data models: pooled model and importers and exporter fixed effects model have been used, the Poisson Pseudo Maximum Likelihood (PPML) estimation procedure has been employed in their estimation.
Findings- The results indicate that trade costs such as distance had a significant negative impact on exports of Ethiopia. In contrast, tariff rate and GDP of Ethiopia had no impact on exports. The empirical results also revealed that Ethiopia trades more with landlocked countries than with coastal countries.
Research Limitations/Implications- It is suggested that the country would be better off if it exports to its neighbouring countries and participates in regional linkages with its neighbouring countries. The study also recommends that focusing on trade facilitation measures such as making trade information available, harmonization and simplification of documents help reduce trade costs.
Originality/Value- The main contribution of the paper compared to other studies on Ethiopia lies in its approach in addressing the impact of trade costs on exports and using PPML gravity equation estimation.
Key Words: Ethiopia; Exports; Gravity Model; PPML Estimation; Trade Costs
JEL Classification: B41, C13, C33, C50, F19
Paper Type- Research paper

I INTRODUCTION

Developing countries including Ethiopia have been striving hard to promote economic development and alleviate poverty. Liberalized international trade in the form of encouraging exports is seen asone of the important factors for promoting growth in these countries. Ethiopia is also following liberal trade policies to promote exports. As a result, Ethiopia's external trade performance has been increasing substantially. The value of both exports and imports have improved significantly since the implementation of Plan for Accelerated and Sustained Development to End Poverty (PASDEP) in 2004/05 (Kebede, 2014). According to the World Bank (2014) Ethiopia has been one of the world's fastest growing economies over the past

decade. The report also mentioned that positive external conditions and the rise of its exports contributed to this growth.

However, with such increase in the volume of exported goods the costs that are related to sending goods abroad have become one of the major concerns for Ethiopia. These costs are termed as trade costs. Trade costs are broadly defined to include all costs incurred in getting a good to a final user other than the production cost of the good itself (Anderson and Wincoop, 2004).

Moreover, the effect of trade costs becomes much larger for countries that are landlocked than coastal countries. As Ethiopia is a landlocked country and relies heavily on neighbouring countries particularly Djibouti and Kenya for accessing the sea, it suffers from considerably high trade costs in exporting its products as well as importing key inputs (Aschenaki, 2004). According to the World Bank (2016) Ethiopia's cost of export per container was $2380 in 2014.[1] This could possibly be one of the factors for the low competitiveness of Ethiopia's products in the world market.

Contrary to this, there are some studies that show the reduction of trade costs globally. According to WTO (2008) there have been considerably large reductions in the cost of transportation and communication which makes trade between countries very simple.[2]In this regard, given the net benefit of trade remains positive, the question of whether the rising costs of trade actually matter for countries export or not could be raised. In line with these, this paper explores whether trade costs have been a setback for Ethiopia's export or not. In particular, in order to address the objective of the study, this paper assesses the following research questions; what determines exports of Ethiopia? And do trade costs have any effect on the export performance of Ethiopia?

[1]This figure is much higher compared to other neighbouring countries. For instance, export cost of Eritrea was $1850 while it was only $885 for Djibouti in the same period.

[2]More efficient telecommunications, from telephone to internet interaction have allowed companies to exchange goods more efficiently and exchange information between potential buyers and sellers which lowered the costs of international integration (WTO, 2008).

The rest of the paper is organized as follows: Review of theoretical and empirical evidences has been presented in section II followed bymodel specification and data sources in section III.Data analysis and empirical findings are presented in section IV.Finally, conclusion, policy implications and suggestion are presented in section V.

II REVIEW OFTHEORETICAL AND EMPIRICAL EVIDENCES

Many studies on trade are due toAnderson and Van Wincoop (2001, 2003, and 2004). Theyhave broadly defined trade costs as "all costs incurred in getting a good to a final user other than the production cost of the good itself. Among others this includes transportation costs (both freight costs and time costs), policy barriers(tariffs and non-tariff barriers), information costs, contract enforcement costs, costs associated with the use of different currencies, legal and regulatory costs, and local distribution costs (wholesale and retail)" (Anderson and Wincoon, 2004). Similarly, Ali (2015) defined trade costs to include all factors that drive a wedge between producers' price in the country of origin and consumers' price in the country of destination.Trade costs (in the absence of information) are also narrowly defined to include costs related to border procedures, transportation and logistics (WTO, 2015).

Trade costs can be classified in to two: border costs and non-border trade costs. Border costs are costs related to national borders and generate trade costs that involve real resources, such as gathering information about foreign regulations, hiring lawyers familiar with foreign laws, learning foreign languages, and adjusting product designs to make them consistent with foreign customs and regulationswhile non-border costs are largely natural trade costs that arise from distance and geological irregularity interacting with the most efficient transport and communication technology (Anderson and Wincoon, 2001).

Trade costs matter because they have significant effect both on consumers and producers welfare. From consumer's side, the high price of goods due to high trade costs hampers their ability to take advantages of comparatively low priced goods from abroad. Fromproducer's side, trade costs matter because they obstruct production by denying firms the access to high quality of foreign inputs (Portugal & Wilson, 2008). On top of that, although trade costs may not guarantee why some countries are poor, in combination with other factors like corruption,

underdeveloped institutions, constraints on business competition, and weak governance make international trade (export) and investment very costly (Porturgal & Wilson, 2008).

There are several empirical evidences available on the effect of trade costs on exports of goods. McCallum (1995) estimated the loss of trade volume when goods are shipped from US to Canada and makes a comparison to the losses incurred when products cross the provincial borders within Canada. The study finds that beyond the border trade costs are higher than behind the border trade costs even for countries that are highly integrated through the North American Free Trade Agreement (NAFTA). The study raised numerous questions with regard to trade costs and the empirical measures used. Subsequently, Anderson and Van Wincoop (2003) have tried to solve the 'border puzzle' using McCallum's data via gravity model by includingother multilateral resistance factors. The authors managed to explain larger border puzzle and reduced McCallum's unexplained border effects to 44 percent.

Similarly, Suresh and Aswal (2014) have studied the determinants of India's manufactured exports to its southern (developing countries) and northern (developed countries) markets using an augmented gravity model. Their findings confirmed that India's exports were explained by total GDP, GDP similarity and difference in per capita income. The study finds that trade costs such as distance had more negatively affected India's exports to norththan the southern marketas proximity to the southern market wascrucial.

On the other hand, some studies show the reduction of trade costs lead to increase in exports of countries products. For instance, Khan and Kalirajan (2011) used gravity model to examine the impact of trade costs in Pakistan. The study includes tariff rate and bilateral exchange rates in addition to the traditional gravity model variables. Their findings confirmed that the growth of exports in Pakistan between 1994 and 2004 was mainly due to the reduction of trade costs in its partner countries. Similarly, De (2007) finds that trade in Asia is gaining high momentum partly because of low level of trade costs. The author confirmed thatthe reduction of tariff and transport costs by 10 percent, each would increase bilateral trade by about 2 and 6 percent, respectively. Likewise,Bernard et al. (2006) examined the response of U.S. manufacturing industries and plants to changes in trade costs on industry-level tariff rates and transportation. Their results indicate that industries that experience relatively large declines in trade costs exhibited relatively strong productivity growth and the tendency of high export.

In Ethiopian context, Mohammed (2008) studied the impact of Ethiopia's COMESA membership on its export using gravity model. In this study trade costs (proxied by distance between Ethiopia and its trading partners) has been incorporated. The estimation result revealsa negative sign for distance implying that Ethiopia would be better off if it exports to neighbouring countries. Similarly, Bekele (2011) has studied the impact of real exchange rate on exports of Ethiopia. The result confirms that real exchange rates are not in a position to exert significant effect on bilateral exports of the country. On the other hand, internal transport, infrastructure and trade policy of importing countries have been found to be the important determinants of supply side factorsof Ethiopia's exports.

Studying the bilateral trade of Ethiopia and east African community countries, Tebekew (2014) analysed the determinants of Ethiopia's export using an augmented gravity model over the nine years panel data (2004 -2012). The author finds that trade costs such as distance and nominal exchange rate had significant negative impact on Ethiopia's bilateral trade. The study also findsa negative relationship between Ethiopian export and trade agreement for preferential trades.

From the above discussion, it can be concluded that the empirical evidence has been rather mixed. While some studies find the negative effect of trade costs on export, others found that the increase of volume of exports due to reduced trade costs specifically transportation and communications costs. This is probably due to difference in estimation techniques, choice of variables, study periods, and level of development of the country under study. By the same token, the costs of exports to a certain country may be significantly higher than others due to specific bilateral factors like lack of infrastructure, road and communication network or they may be lower due to preferential trade agreements and regional integration. Therefore, it is important to empirically assess the impact of trade costs on export of Ethiopia in order to reach a wider consensus.

On the other hand, theexisting empirical literature in the context of Ethiopia did not address the effect of trade costs in a specific wayrather they are related to export growth or determinants of exports which includes trade cost variables in the analysis. Therefore, the present study is the first attempt to specifically address the impact of trade costs on exports of Ethiopia using advanced and more relevant PPML estimation method.

III MODEL SPECIFICATION AND DATA

The determinants of international trade of a country in relation to its partners are usually explored using the gravity equation approach.Although, the traditional approach is based on multi-country models or bilateral trade which usually studies a huge trade panel data sets, this study aims atthe analysis of one-way trade flow of home country so that the relationships in the gravity model can be studied in a more specific way. Defining Ethiopia as a single 'home country', the analysis is based on an econometric estimation of export function from home country to its trading partners.To measure the parameter estimates of the model, we used Poisson Pseudo Maximum Likelihood (PPML) estimation method which is more relevant compared to the methods that have been used in the earlier studies on Ethiopia.

We have used panel data for 10 major trading partners of Ethiopia (China, Japan, Germany, Saudi Arabia, United Arab Emirates, United Kingdom, Italy, India, Sudan and Switzerland) over the period of 2010-2015 based on their importance in exports and availability of data on the variables for the model estimation. The countries are chosen on the basis of their share in Ethiopia's trade.The time period is also chosen based on availability of data for the included countries.

Model Specification

The model used in this study emanates from the basic gravity model. The concept of gravity model was originally introduced by Tinbergen in 1962 analogous to Newton's law of gravity.[3]In this traditional gravity model, trade (exports) between two countries is directly related to their economic sizes (GDP/GNP) and is inversely related to the distance between them. This formsthe basis of gravity model and would typically take the following form:

Eq. (1) $Xij = \beta(GDPi.GDPj)/Disij$

Where X_{ij}= trade (export) from country i to j, β = constant, GDP_i/GDP_j= Gross Domestic product of the respective countries, Dis_{ij}= distance between country i &j.An intuitive gravity model follows from the above mentioned equation in a linear outline

Eq. (2) $logXij = \beta 0 + \beta 1 logGDPi + \beta 2 logGDPj + \beta 3 logDisij + \varepsilon ij$

[3]Just like Newton's law of gravity that states the gravitational attraction between any two objects is proportional to the product of their masses and diminishes with distance, trade between any two countries is proportional to the product of their GDPs and diminishes with distance (Krugman et.al. 2012).

However, distance is found to be a poor proxy of trade costs because trade encompasses several costs in terms of policy and environmental facilities. Consequently, various researchers tried to explain trade costs by including other variables.Anderson and Wincoop (2003)included two additional variables, namely, outward and inward multilateral resistance[4]. Likewise, most studies estimatethe gravity model by adding a number of dummy variables like being a member of a trade agreement, sharing a common land border, speaking the same language and so on to test for specific effects.

Econometric Strategy

The empirical analysis of gravity equation has traditionally been analysed using cross- sectional data which can not sufficiently account for heterogeneity among countries which in turncan lead to an estimation bias (Kareem, 2013). To alleviate this problem, researchers have turned towardspanel data, which allows taking into consideration of more general types of heterogeneity and makes it easier to identify the specific time or country effects like institutional, economic, cultural or population-invariant factors. Moreover, the problem of potentialmulticollinearity that sometimes arises from cross- section data might be avoided with panel data (Baltagi, 1995, Hsiao, 2014).

However, the logarithmic transformation of the model still causes problems even with panel data estimation methods. This is because the estimation results based on the logarithmic transformed model could be significantly misleading in the presence of heterodscedasticity because of Jensen's inequality[5](Silva& Tenreyero, 2016).

This can be explained as follows:

Eq. (3) $\ln(Xij) = ln\beta 0 + \beta 1\ln(GDPi) + \beta 2\ln(GDPj) + \beta 3\ln(Disij) + \ln(\varepsilon ij)$

The expected value of the above log-linearized equation would be:

Eq. (4) $E[lnXij] = E[ln\beta 0 + \beta 1 lnGDPi + \beta 2 lnGDPj + \beta 3 lnDisij + ln\varepsilon ij] =$

Eq. (5) $E[lnXij] = E[(ln\beta 0)] + \beta 1E[\ln(GDPi)] + \beta 2E[\ln(GDPj)] + \beta 3E[\ln(Disij)] + E[(ln\varepsilon ij)]$

[4]According to these authors the inward multilateral resistance emanates from the existing infrastructural and institutional inefficiencies and rigidities in home country and the outward resistance arises from tariffs and exchange rate on which home country does not have any control.

[5]Jensen's inequality states that the expected value of a logarithm of random variables does not equal to the logarithm of expected value.

Since lnE[εij] ≠ E[ln(ε_{ij})] (which is Jensen's inequality), the conditional distribution of X_{ij} is misrepresented and estimation through OLS will result in misleading and inconsistent estimates.[6]On the other hand, the data of export may involve zero or missing values due to the nature of the data itself. The logarithmic transformation in this case is then improper because logarithm of zero is undefined[7](Westerlund&Wilhelmsson, 2009).

Due to the above facts, log- linearized model is not an appropriate model. The alternative approach to the estimation of log- linearized model then lies in the direct estimation of the multiplicative form of the gravity equation using Poison Pseudo Maximum Likelihood (PPML).

Eq. (6) $X_{ijt} = \beta_0 GDP_{it}^{\beta 1} GDP_{jt}^{\beta 2} Dis_{ij}^{\beta 3} DGDPPC_{ijt}^{\beta 4} TR_{jt}^{\beta 5} e^{\vartheta j} e^{\vartheta i} \varepsilon_{ijt}$

Silva and Tenreyro (2006) underlined that this is the most natural method without any further information on the pattern of heteroscedasticity.Since there is no need of undertaking the logarithmic transformation of the dependent variable and it is measured in level, the problem of handling zero trade flows is no more an issue in this process.

Thus in this study, a panel data model has been used for the estimation of gravity equation taking in to account of the above justifications. To get the parameter estimates of the model, this paper applies the Poisson Pseudo Maximum Likelihood (PPML) estimator. The equation can be written as in the following function:

Eq. (7) $Xijt = \beta 0 + \beta 1 \ln(GDPit) + \beta 2 \ln(GDPjt) + \beta 3 \ln(Disij) + \beta 4 \ln(DGDPPCijt) + \beta 5 \ln(TRjt) + Contig + Landlock + Comlang\_off + \varepsilon ij$

[6]"the log linearization of the empirical model in the presence of heteroskedasticity leads to inconsistent estimates because the expected value of the random variable depends on higher- order moments of its distribution" (Silva & Tenreyro, 2006, p.653).

[7]To solve the problem of zero- valued trade flows, adding some small positive values to all observations or get rid of the zero-valued observations from the trade matrix have been suggested in the literature (Mohammed, 2008).However, in the case of adding some small value, the resulting estimation varies highly with the chosen of such a small number (Flowerdew & Aitkin, 1982). On the other hand, omitting the observations causes serious problems as well like losing of information that are encompassed in the deleted data (Eichengreen & Irwin, 1996). Besides, according to Burger et al. (2009) the estimation will very likely suffer from a sample selection bias caused by omitted zero-valued trade flows observations which are probably non-randomly distributed.

Table 1: Definition of Variables

Variables	*Definition*	*Expected sign*	*Source*
X_{ijt}	Denotes the total value of exports from country i (Ethiopia) to country j at time t.		Ethiopian Revenues and Customs Authority
GDP_{ijt}	Denotes GDP of exporting and importing countries. (GDP_{it}) and (GDP_{jt}) are used to control for the supply and demand side respectively.	+	World Bank, WDI database
Distance (Dis_{ij})	Measures the distance between trading partners.	-	www.distancecalculator.net
$DGDPPC_{ijt}$	The per capita GDP differential between two countries.	+/ -	World Bank, WDI database
TR_{jt}	Denotes the tariff rate of importing countries at time t.	-	World Bank data base
Contig	*Contig*is a dummy variable signifying whether country i and j share a common border or not.	+	
Comlang_off	*Comlang_off* is a dummy variable that signifies whether country i and j share a common language or not.	+	
Landlocked	*Landlocked* is another dummy showing whether the importing country j is landlocked or not.	-	

IVMODEL ESTIMATION ANDFINDINGS

Panel Unit Root Test

It is very important to test the existence of unit root and examine the order of integration for each variable beforehand, so as to avoid the spurious correlation problems, if any. We have employed the Levin- Lin- Chu (2002) panel unit root test to examine whether the series contains a unit root.As the output below indicates, all variables are found to be stationary in levels.

Table 2: Test Results for Panel Unit Root

Ho: panel data has unit root(not stationary) Ha: panel data has not unit root (stationary)			
Variables	**Summary Statistic**	**p-values**	**Test for unit root in level**
ln_Export	-72.1493	0.000	I(0)
ln_GDPi	-51.4163	0.000	I(0)
ln_GDPj	-3.4963	0.000	I(0)
ln_DGDPPC	-3. 894	0.000	I(0)
ln_TR	-2.531	0.000	I(0)

Source: Computed

Choosing between Fixed and Random Effects Models

Hausman (1978) test has been used in this study in order to choose between fixed and random effectsmodels which are based on the null hypothesis that random effects model is appropriate and the alternative hypothesis that fixed effects model is appropriate.

Table 3: Test for Choosing between Fixed and Random Effects Models

Test summary	
Chi-sq statistic (4)	31.06
Prob.	0.0000
Appropriate model	Fixed effect model

Source: Computed

We reject the null hypothesissince the probability is less than 0.05 and conclude that fixed effects model is the appropriate model.

Diagnostic Tests

i) Test For Cross Sectional Dependence

Wetest the cross sectional dependence to assess whether the residuals are correlated across entities or not. Cross sectional dependence can lead to bias in test results (also called contemporaneous correlation). The null hypothesis is that residuals are not correlated. We used Pesaran CD test (2004) to test whether there is cross sectional dependence or not.

Pesaran's test of cross sectional independence = 0.600, Pr = 0.5483

Average absolute value of the off-diagonal elements = 0.339

The probability for this test is 0.5483 which means we cannot reject the null hypothesis. Therefore, we conclude that there is no cross sectional dependence.

ii) Test for Multicollinearity

In order to measure the correlation between explanatory variables and to avoid the double effect of independent variables, a correlation matrix has been computed. As indicated by table 4 there is no evidence of multicollinearity among explanatoryvariables.According to Hailer et al. (2006) correlation coefficient below 0.9 may not cause serious multicollinearity problem.

Table 4: Correlation Matrix

e(V)	ln_GDPi	ln_GDPj	ln_Dis	ln_DGD~C	ln_TR	Contig	Comlan~f	Landlock	_cons
ln_GDPi	1.0000								
ln_GDPj	-0.4826	1.0000							
ln_Dis	0.4976	-0.8583	1.0000						
ln_DGDPPC	0.1832	-0.0979	0.1694	1.0000					
ln_TR	0.4896	-0.0979	0.4115	0.5530	1.0000				
Contig	-0.2031	0.3340	-0.0741	0.3684	-0.0797	1.0000			
Comlang_off	-0.0805	0.1334	-0.1807	0.3932	0.0267	0.2999	1.0000		
Landlock	-0.2713	0.5850	-0.5375	-0.2641	-0.1659	0.1147	0.1106	1.0000	
_cons	-0.5960	-0.1821	-0.1790	-0.4643	-0.5988	-0.3506	-0.0853	-0.0309	1.0000

Source: Computed

iii)Test for Heteroscedasticity

We have tested for heteroskedaticity using Breuch - Pagan test. The null hypothesis is homoskedasticity (or constant variance of error) and the alternative hypothesis is that there is heteroskedasticiy. The test result indicates that there is an evidence for homoscedasticity.

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
Ho: Constant variance
Variables: fitted values of ln_export
chi2 (1) = 0.07
Prob.chi2 = 0.7979

IV) Test for Autocorrelation

We have conducted Wooldridge test for autocorrelation to verify whether the residuals are serially correlated.

H0: no first-order autocorrelation

F (1, 9) = 3.861

Prob.> F = 0.0810

As the significance level of F statistic is greater than 0.05 we cannot reject the null hypothesis that there is no autocorrelation.

Estimation Results and Interpretation

The econometric model of gravity equation contains many time invariant or nearly time-invariant variables. For instance, in our model some important variables such as distance, common border, common languages and land locked which manifest no within variation in the data sets. Therefore, using the traditional fixed effects method of estimation would result in omitting those variables during the regression. To solve this problem, wehave useda dummy variable regression as fixed effects model with importers and exporter effects as a possible appropriate estimator.This procedure is based on the concept that the fixed effects of partner's countries could be proxied by a bunch of country specific dummy variables. With this assumption, we have estimated the gravity equation using PPML.

To compare the correct specification of fixed effects and pooled models, we perform the traditional RESET (Ramsey Regression Equation Specification Error Test) test. In this test we first predict the fitted values for eachspecification and then we include a higher order of fitted values into the regression. If the model is correctly specified, the fitted values term would be confirmed as insignificant. We test this hypothesis using X^2test.

Pooled Model Estimation using PPML

Table 5: Regression Result of Pooled Model Using PPML

Number of parameters: 9
Number of observations: 60
Number of observations dropped: 0
Pseudo log-likelihood: -558660.61
R-squared: .78607811

(Std. Err. adjusted for 10 clusters in Dis)

Variables	Coefficients	S.E	Z –test	Prob.
ln_GDPi	.1358125	.2091069	0.46	0.647
ln_GDPj	1.582369*	.3270501	4.69	0.000
ln_Disij	-3.005792*	.4243438	-4.65	0.000
ln_DGDPPCij	.2938851	.2967988	1.25	0.210
ln_TRj	.2858186	.1687998	0.66	0.511
Contig	.2858186**	.7584001	2.21	0.027
Landlocked	1.851038*	.457262	4.24	0.000
Comlang_off	-.5198697	.0565518	-1.52	0.129
Cons	-14.06297	10.04258	-1.40	0.161

Source: Computed

Note: The *, ** Indicates one and five per cent statistical significant respectively

As we can see in the above table the coefficient of importers GDP hasa positive sign and is significant at 1 per cent level. The interpretationgoes as: a 1 percent increase in the importers GDP increases exports of Ethiopia by 1.5 per cent.On the other hand, GDP of Ethiopia is insignificant in explaining its exports.

The Distance coefficient on the other handis negative and significant at 1 percent level. Thus, a 1 percent increase in distance between Ethiopia and its trading partner decreases exportsby about 3 percent. The coefficient on common border is also statistically significant and affects exports of Ethiopia positively. The effects of GDPPC difference, tariff rate and common language are found to be insignificant in explaining exports of Ethiopia. However, the variable Landlocked is

able to impact Ethiopia's exports, as it has a statistically significant positive impact. This means that countries that are landlocked trade more than those that are coastal.

RESET Test

The RESET test used to verify whether the model is correctly specified or not. The Prob. of chi2 = 0.52 implyingthat adding other variables to the model is irrelevant.

chi2 (1) = 0.41

Prob. chi2 = 0.5238

Addingimporters and exporter fixed effect intothe model has been attempted. And the results are presented in table 6.These resultsare better than the previous results as all the coefficients of the variables except tariff rate, GDP of Ethiopia and common border have become significant at 1 per cent level. Furthermore, the coefficient of Common official language becomes positive and significant at 1 per cent level as per our expectation.

Exporter and Importers Fixed Effect Model Estimation using PPML

Table 6: Regression Result of Exporter and Importers Fixed Effect Model Using PPML

Number of parameters: 14
Number of observations: 60
Number of observations dropped: 0
Pseudo log-likelihood: -179579.2
R-squared: .92051004

(Std. Err. adjusted for 10 clusters in Dis)

Variable	Coefficients	S.E	Z –test	Prob.
ln_GDPi	.3186194	.2091069	1.52	0.128
ln_GDPj	2.036159*	.3270501	6.23	0.000
ln_Disij	-2.00359*	.4243438	-4.72	0.000
ln_DGDPPCij	-1.632555*	.2967988	-5.50	0.000
ln_TRj	.3127604	.1687998	1.85	0.064
Contig	-1.36363	.7584001	-1.80	0.072
Landlocked	4.607744*	.457262	10.08	0.000
Comlang_off	.1996714*	.0565518	3.53	0.000
Cons	-20.42435	4.191719	-4.87	0.000

Source: Computed

Note: The * and ** Indicates one and five per cent statistical significant respectively

RESET Test

chi2 (1) = 1.25

Prob. chi2 = 0.2640

The RESET test for the PPML with importers and exporters fixed effect shows that the model is correctlyspecified. Therefore, including additional variables to the model is not relevant.

V CONCLUSION, POLICY IMPLICATIONS AND SUGGESTION

Conclusion

Trade costs play a key role in determining the level of trade that occurs between countries. In spite of its importance, less attention has been paid on its impact on exports in the literature with regard to Ethiopia. It is in this context, the present study is pursued to specifically address the impact of trade costs on exports of Ethiopia using panel data for the period of 2010 – 2015.The paper addressed the following research questions; what determines the exports of Ethiopia? And do trade costs have any impact on the export performance of Ethiopia? Based on the Hausman test, fixed effect model has been found to be appropriate and the study has provided estimation of two types of panel data models: pooled model and importer and exporter fixed effects model usingthe Poisson pseudo maximum likelihood (PPML) estimation technique.

The empirical results indicate thatGDP of importing countries is statistically significant and affects exports of Ethiopia positively whereas, GDP of Ethiopia is found to be statistically insignificant in explaining its exports. The Distance variable affects exports of Ethiopia negatively in both models. Similarly, landlocked variableis found to be statistically significant in both models apart from its unexpected sign. On the other hand, Tariff rate is found to be statistically insignificant in explaining exports of Ethiopia. The other variables; common border, GDPPC difference among the trading partners and common languages have inconsistent outcomes in terms of sign and significance.

Policy Implications

The analysis that is carried out in this paper has providedevidence that trade costs have significant influence on exports of Ethiopia. The distance component of trade costs has an absolute significant negative effect on exports of Ethiopia. This could be due to the fact that most of the trading partners of Ethiopia are countries from Europe and Asia which are relatively distant. Therefore it is better for Ethiopia to trade with its neighbouring countries so as to reduce the negative effect of transportations and other related hindrances.

Besides, the country should participate in regional linkages to shift from landlocked to land-linked economy along with its neighbouring countries in order to ship goods more smoothly. Since the purpose of Regional trade agreements is to reduce tariffs and trade costs among their members, Ethiopia will be better off if it joins regional trade unions and exports its products to those unions.

Furthermore, it is important to focus on the most significant trade facilitation measures that help reduce trade costs such as making trade information available, harmonization and simplification of documents. Improving infrastructures that are necessary to ship products abroad might also reduce trade costs.

Finally, trade policies should be transparent in their regulations and procedures, and consistent, predictable and non-discriminatory in their applications.Most of all, good governance and impartiality helps reduce trade costs to a greater extent.

Suggestion

The landlocked variable is positive and statistically significant in explaining exports of Ethiopia implying that the country trades more with countries that are landlocked than coastal countries. This might be due to the fact that the landlocked countries included in the sample have low tariff rates compared to other countries. Therefore, even though being landlocked increases the cost of trade in the form of transportation costs, the low tariff rate may compensate this and still encourages Ethiopia to send its products to this country. Nevertheless, this is the area where further research is needed.

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