Determinants of Export Performances of Major Spices (Turmeric and *Korarima*) in Ethiopia

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Abstract

Background: Ethiopia has comparative advantages in the production of exportable spices due to existing rich genetic resources, diverse agro-ecological condition and abundant arable land and labour. However, despite their high potential and opportunities for export, most spices including turmeric and korarima are not fully utilized.

Objective: This study was intended to analyze the determinants of export performance of major spices (turmeric and *Korarima*) in Ethiopia.

Material and Methods: The random effect GLS gravity model was selected as an analytical tool to estimate the determinant of major spices export performance between Ethiopia and nine sampled spices trade partners using annual panel data collected for a period of 2005 to 2015/2016.

Results: The results indicated that Ethiopia's population, foreign direct investment, real exchange rate and institutional quality, the importers' GDP, GDP per capita and population, geographical distance and the dummy variables (COMESA membership and sharing common borders) had significantly affected turmeric and *Korarima* export performances, at different level of significance level, with their expected sign or effect. However, the variables intuitional quality and being COMESA membership were found to have unexpected negative influences on the export performance of major spices (turmeric and *Korarima*).

Conclusion: The finding of the study implied that there is a need to formulate policies and strategies that would promote institutional quality, improve supply capacity, attracting foreign direct investment, strengthen trade liberalization, deepening economic integration and targeting export destination that could reduce transportation costs in order to improve the export performance of those spices.

Keywords: Export; Gravity model; Panel data; Random effect; Fixed Effect Model

1. Introduction

It is common to see fluctuations in the export income of countries mainly depending on the export of primary agricultural commodities. The problem is severe for countries like Ethiopia that obtain a big share of their export income from a few agricultural commodities such as coffee, oilseeds, pulses, khat (Catha edulis Forsk) and live animals in which coffee alone accounted for about 34 percent of the value of all exports in 2017/2018 (Eyayu, 2017). Different empirical studies have shown that diversifying export bases towards high-value crops in general and spices, in particular, could increase export earnings and reduce economic risks depending on limited export items (Moti, 2007; Alekaw, 2016). Despite its poor implementation, the agricultural commercialization strategy of Ethiopia has realized underutilization of spices and the need for diversifying export thereby focusing on increasing production and productivity of spices (Derese, 2009; MoFED, 2010; MOFED, 2016: Eyayu, 2017). This implies that the spice subsector is within the framework of national agricultural policy which could facilitate further development of the subsector.

Spices are considered as high value and low volume agricultural commodities primarily used for flavor, color, aroma and preservation of food and beverages. The bulk of spices are exported in whole dried form, while only 15-20 percent of spices are sold in processed/grounded form as mixtures of ground spices and as essential oils and oleoresins characterizing them as a high-value product per unit weight. Generally, in addition to household consumption, spices are becoming an important ingredient in food and beverage processing, pharmaceutical, and cosmetic and textile industries (Nitesh, 2016; Sharma *et al*., 2017). Ethiopia has comparative advantages in the production of exportable spices due to its rich genetic resources, diverse agro-ecological condition and abundant arable land and labour. Among 109 spices identified by the international organization for standardization (ISO) about 50 valuable spices can be produced in Ethiopia, particularly in the southwestern parts of the country. Ginger, turmeric, *Korarima*, red pepper, chili/hot peppers, black cumin, cardamom, and long pepper are the most widely grown spices in the country (Addisu, 2014; Girma *et al.,* 2015; Herms, 2015; MOFED, 2016).

The areas under spices crop cultivation have increased from 330,000 ha in 2005/2006 to 500,000 ha in the year 2013/2014. In the same years, the average

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spice production has also improved from 238,000 to 418,000 tons in their dried weigh. According to Ethiopian Investment Commission (EIC, 2015), about five million smallholder farmers are already involved in spice production, and currently, the government is promoting and encouraging investment opportunities in the spice subsector.

Due to their multiple uses, there is a continuing and expanding international demand for spices in Asia, Middle East, Africa, Europe and the USA (Addisu, 2014). Particularly, the recognition of the medicinal properties of spices has spurred the demand for organic spices. According to Addisu (2014), the global imports of spices is growing at an average annual growth rate of 10.2 percent and estimated at 85 billion USD in 2012. In this regard, Ethiopia's proximity and strategic location to most of these spice importing countries would create a wide global market opportunity for spices trade. Ethiopia is exporting dried spices such as turmeric, *Korarima*, red and black pepper, cumin (black & white) and coriander to more than 38 destination markets thereby generating foreign currencies (Addisu. 2014). According to some source, for example, the country has exported about 15,518 and 23,518 tons of dried spices with export values of 18.5 and 32 million USD in 2010 and 2012 respectively. Despite their high economic potential and recent attention of the government in promoting the production and export of spices, the share of export revenue is yet one of the lowest in the total export earnings. On average spices, export constitutes 1.25 percent of the total export value of Ethiopia. But, there has been a tendency of positive growth in the export of this commodity with an average rate of 53.9 percent for the period of 2010-2014 (Herms, 2015; Alekaw, 2016; Abdu *et al*., 2017). This indicates that compared to other agricultural commodities the export potential of t spices has not been fully exploited.

Ethiopia's export performance is said to be constrained by the real exchange rate, the distance between Ethiopia and its partners, supply-side factors like real GDP, Ethiopian institutional quality and trade policy and demand-side factors: such as population, partners' real GDP, and openness to trade (Yishak, 2009 and Tesfaye, 2014). The spices subsector is an important area for research since the production of high-value products is an emerging but poorly understood economic activity in Ethiopia. Most of the studies conducted previously have focused on the determinants of aggregated export performance in which the commodity-specific factors could not be identified (Abdulaziz, 2009; Alelign, 2014; Alekaw, 2016; Gebrehiwot, 2011; Yishak, 2009;). Analysis of export at a disaggregated level could enable policymakers to identify which sectors/commodities/products severely faced the supply capacity and foreign market access conditions. However, no empirical analysis has been undertaken regarding factors determining the export performance of spices separately in Ethiopia.

The core objective of this study was, therefore, to analyze the main determinant factors of supply-and demand-side of the two major spices Ethiopia's spices (turmeric and *Korarima*) export performance using dynamic gravity models. The trade gravity model is the econometric model that often uses for ex-post analyses of international trade flows as a baseline model for estimating the impact of a variety of policy issues. It is based on the idea that overall trade volumes between the two nations depend on the size of the two nations and the distance they are apart. There are a couple of reasons for the central role played by the gravity model. The first has to do with its high explanatory power of on bilateral trade flows and enables us to incorporate dynamic effects among economies. The second reason is that it provides an easy method to test the role that other variables play in affecting trade (Alemayehu, 2009).

The importance of this paper is to fill the gap in the literature, as the issue of spices export performance has not been studied. Therefore, understanding the performances of major spice export flows would help in guiding appropriate trade policies that could foster bilateral spice trade flows between Ethiopia and its partners.

2. Methodology

2.1. Theoretical Framework

The trade gravity model is the econometric model that often use for ex-post analyses of international trade flows as a baseline model for estimating the impact of a variety of policy issues. It is based on the idea that overall trade volumes between the two nations depend on the size of the two nations and the distance they are apart. Tinbergen and Poyhonen were the first authors to developed Gravity models of international trade. There are a couple of reasons for the central role played by the gravity model. The first has to do with its high explanatory power of on bilateral trade flows and enables us to incorporate dynamic effects among economies. The second reason is that it provides an easy method to test the role that other variables play in affecting trade (Eyayu, 2017).

The basic formulation of the gravity model explains bilateral trade flows in analogy to Isaac Newton's law of gravity, by the attraction of two countries' masses (measured by GDP and/or population), reduced by the distance which is a proxy of transport costs and other factors. Some studies contributed to the refinement of the traditional explanatory variables and to the addition of new ones, and the others improve the econometric specification of the model (Nguyen, 2010).

Some criticism about the gravity model for its lack of theoretical foundations has emerged. Indeed, the former theoretical foundation of the gravity model derivation centered on constant elasticity of

substitution preferences and goods that are differentiated by region of origin. Subsequent extensions of it used the differentiated product framework with increasing return to scale, encompass factor endowments and taste variables that explain the microeconomic foundations for the gravity equation based on monopolistic competition or Heckscher-Ohlin structure that includes only the main variables such as GDPs, population and distance. Particularly, the gravity model can incorporate additional variables to control for the differences in factor endowments that could aid or impede exports between countries (Alemayehu, 2009).

2.2. Conceptual Framework

The measurement of the export performance has evolved significantly over time in two directions: multidimensional and one-dimensional measures. Export performance can be labeled either as one-dimension/single-proxy measures (that is covering one dimension with one proxy), as one-dimension/multiple-proxy measures, or as multi-dimensional/multiple-proxy measures. The decision to use one-dimensional/ single-proxy measures results in testing every relationship hypothesized separately with each export performance measure in the design. It also explained the reason that one dimension of export performance relates in different manners to the determinants. And it should not be forced into a single composite measure for one dimension and must be tested separately(Nguyen, 2010). Accordingly, the study used an approach so-called as one dimension with one proxy which enables us to measure the coffee export sales (USD values) as a proxy for the ECE performance.

2.3. Data and Sampling

This study used annual panel data of Ethiopia's major spices export and its nine trade partners over the period of 2005–2015. The panel data has better efficiency than other data types and offers more variability, more degree of freedom and reduce the multicollinearity among explanatory variables, improve the reliability of the regression results(Grote and Winter, 2009).

In this paper, panel data were used to investigate the determinants of Ethiopia's spices export performance. The data were collected from the top nine Ethiopia's spices trade partners or destinations namely; India, Yemen, Jordan, Saudi Arabia, United Arab Emirates, Israel, United States, Kenya and Sudan. The selection of these countries was based on the availability of data and the distribution of spices exports by destination. Among 38 spices importing partners, these top nine countries constituting about 85 percent of Ethiopia's spices export value were sampled for this study.

The annual values of major spices export to each of the nine importer countries were collected from Ethiopian Revenue And Custom Authority(ERCA), while the data on most of the independent variables such as annual gross domestic products of Ethiopia and trade partners (GDP_{ij}), Ethiopia's Foreign Direct Investment (FDI), bilateral exchange rate (ER), population size and internal transport infrastructure were obtained from the WDI (World Development Index), IMF (International Monetary Fund)and UNCTADSTAT databases. Moreover, data on the institutional quality index and the distance between Ethiopia's Capital (Addis Ababa) and capital cities of the trade partners in kilometers were accessed from www.indo's website and World Bank's(WB) worldwide governance indicators respectively.

2.4. Model Specification and Variables Description

The basic gravity model postulates trade between the two countries depends upon their Gross Domestic Product (GDP), population size and distance between them. The underlying rationale of the model is that the volume of trade between the two countries depends on each country's trade potential and the trade attraction forces between them. The model is referred to as gravity simply to capture factors that would induce countries to trade with each other. However, because of the existence of a huge amount of variations in the trade that cannot be explained by the traditional variables, other explanatory variables have been included(Grote and Winter, 2009).

In most studies, the gravity approach is denoted as a rather simple but robust approach to estimate bilateral trade flows due to its simple application to different aspects of the trade, it is very attractive for researchers. Since the theoretical foundations of the gravity model are better understood and developed the application is also justified by the economic theory. The advantage of the gravity model was that, first, the panel can capture the relevant relationships among variables over time; and second, the panel can examine unobservable trading partners' individual effect (Roy and Rayhan, 2012). They argue that panel data methods are the most proper for separating time-invariant and country-specific effects. Several empirical studies have employed the augmented gravity model to investigate the determinants of bilateral trade between different countries and found important results (Yishak, 2009;Alekaw, 2016; Potelwa *et al.*, 2017).

Therefore, in this paper, gravity models were adopted as an analytical tool to estimate the determinant of spices export performance between Ethiopia and sampled trade partners. This model is tested using panel data representing internal supply capacity and foreign market access. Thus, the value of spices (turmeric and *korarima*) exports from Ethiopia to its major trading partners is defined as follows:

$$EXV_{ij} = \alpha(GDP_{it})^{\beta_1}(POPit)^{\beta 2}(FDI_i)^{\beta_3}(INF_i)^{\beta 4}(FER_i)^{\beta_5}(IQ_i)^{\beta 6}(GDP_{ji})^{\beta 7}(POPJt)^{\beta 8}$$
$$[(FTP_j)^{\beta_9}(WD_{ij})^{\beta_{10}}]^{1-\sigma}U_{ij} \quad (1)$$

Except for dummies (COMES and border), all the variables were transformed to natural logarithms since the gravity equation has multiplicative features. The log transformation allows estimating a linear regression and interpreting the estimated parameters as the elasticity of the volume of trade. After making adjustments and modifications the model is constructed as follows:

$$\ln(EXV_{ij}) = \alpha + \beta_1 \ln(GDP_{it}) + \beta_2 \ln(POP_{it}) + \beta_3 \ln(FDI_{it}) + \beta_4 \ln(INF_{it}) + \beta_5 \ln(IQ_{it}) + \beta_6 \ln(RER_{ijt}) + \beta_7 \ln(GDP_{jt}) + \beta_8 \ln(POP_{jt}) + \beta_9 \ln(FTP_{jt}) + \beta_{10} \ln(WDIST_{ijt}) + \beta_{11} DM_{ij} + e_{ijt} \quad (2)$$

Where;

EXV_{ijt} is export value of spices in year t; RER_{ijt} is the average bilateral exchange rate ; GDP_{it} is the USD value of Ethiopia's Gross domestic product in year t; P_{it} is Ethiopia's' Population in year t; GDP_{jt} is the USD value of Gross domestic product of country j; Population of Partner Country j; FDI_{it} is foreign direct investment in year t; INF_{it} indicate the quality of Ethiopia's internal transport infrastructure in year t; IQ_{it} is the institutional quality index of Ethiopia; FTP_{jt} is the foreign trade policy index of country j; $WDIST_{ijt}$ is the weighted distance between Ethiopia and trade partners; $DM_{ij}$is dummy variables and e_{ijt} is the stochastic term.

Panel data involves different models such as pooled OLS, fixed effects and random effects that can be estimated. The main problem of the pooled OLS model is that it does not allow for heterogeneity of countries. It does not estimate country-specific effects and assumes that all countries are homogenous (Abu *et al.,* 2010). The random-effects estimator is appropriate when the unobserved effect is thought to be uncorrelated with all the explanatory variables in which it can be left in the error term, and the resulting serial correlation over time can be handled by generalized least squares estimation. On the other hand, the fixed effects estimator is efficient when the idiosyncratic errors are serially uncorrelated and we make no assumptions about the correlation between the unobserved effect and the explanatory variables. The fixed-effects model is simply a linear regression model in which the intercept terms vary over the individual units which is constant in the case of the random-effects model (Wooldridge, 2012).

Hence, in order to test the null hypothesis that the repressors and individual effects are not correlated or not systematic, the Hausman specification test was employed. The test distinguishes an efficient estimation model between random and fixed effects. If the null hypothesis of the Hausman test is rejected the random effects is not appropriate, instead; the fixed effects model would be preferred and vice-versa.

2.5. Definition of Variables and Hypothesis

Ethiopia' spices export performance which is captured by the annual USD values of spices exports to each of the trading partners countries are hypothesized to be affected by both supply-side and demand-side factors such as Ethiopia's Gross Domestic Product (GDP), Ethiopia's Foreign Direct Investment (FDI), Population of both exporters and importers, internal transport infrastructure, Real bilateral exchange rate, foreign trade policy, importing country's Gross Domestic Product (GDP), the distance between Ethiopia and her trading partners and institutional environment of Ethiopia.

Exporting country' (Ethiopia's) GDP: GDP is considered as a proxy of economic mass, which is a basic variable of the gravity model. Most empirical papers around the world support the idea that GDP has a positive impact on exports. In his paper, Eita (2008) found out that an increase in Namibia's GDP caused exports to increase during the examination period of 1998 2006. In a more recent study, Aslanov *et al.* (2010) also found out that an increase in GDP led to higher exports, and vice versa, of three countries in South Caucacus, including Azerbaijan, Georgia and Armenia. Thus it is hypothesized that there is a positive relationship between the GDP of a country and its exports.

Ethiopia' foreign direct investment (FDI): There has never been a single conclusion about the effect of FDI on export from previous studies because they showed different results. Gunawardana and Sharma (2009) and Pemasiri and Sharma (2010) pointed out that inward FDI has a significant positive influence on Australian manufacturing exports in the long-term. In this research, FDI represents a measure of product development in the export sector and it can be expected to contribute to the enhancing of a country's competitiveness on international markets by increasing the technological content of exports. FDI is included in this study as stock since FDI stock measures its productive capacity. As it is believed that the transformation of the composition of exports increases with FDI, the sign of this variable is expected to be positive.

Real bilateral exchange rate: The exchange rate is a fundamental determinant of a country's trade. Therefore, there are numerous empirical studies being conducted on how this variable would affect a country's exports. In fact, some studies show a positive impact of national currency depreciation on its export while others show no impact. There are various results from previous research papers. Aljebrin (2012),

supported the idea that a fall in currency value makes costs of domestically produced goods lowered, which consequently enhances competitiveness in export in China and Saudi Arabia, respectively. Therefore, it is hypothesized that while an appreciation of the real exchange rate affects spices exports negatively, depreciation affects exports positively.

Internal transport infrastructure: Internal transport infrastructure is captured by the percentage of paved roads out of the total roads. A higher rating indicates a better infrastructure. Better infrastructure should lead to higher trade and therefore more exports from Ethiopia. Thus, the coefficient of internal transport infrastructure is expected to be positive. Fugazza (2004) found that the internal transport infrastructure has a significant and positive impact on raising exports.

Foreign trade policy (FTP): Trade policy is a measure of the degree of tariff and non-tariff barriers that trading partners apply. Trade policy in this study is peroxide by a trade policy index, which is taken from the Index of Economic Freedom created by the Heritage Foundation. The index ranges from 0 to 100. A country with zero tariffs and non-tariff barriers will have a trade freedom score of 100. This is to means that a score of 100 signifies an environment that is most conducive to trade. Therefore, given that more freedom encourages trade, the sign of the index variable is expected to be positive.

Importing country's GDP: The import demand of foreign countries is determined by their income. The higher the income of the importing country is, the greater the demand for Ethiopia's exports. Hence, the coefficients of Ethiopia's trading partner GDP are expected to have positive signs. In most researches applying the gravity model, the results revealed that an increase in the importing country's GDP would lead to an increase in the export volume of the exporting country. According to a study conducted by Yishak (2009 the importing country's GDP has a positive relationship with exports.

Population (POPit and POPjt): The effect of exporter country population could be positive or negative depending on whether the absorption effect or economies of scale effect is dominant. A large population may indicate a big domestic market and large resource endowment, in which case a larger absorption effect may lead to less export. If this is the case, a negative sign will be expected. On the other hand, a large domestic market may imply the utilization of the economies of scales so that the expected sign of the population coefficient would be positive. For similar reasons, the coefficient of importing country population is indeterminate where the absorption effects and economies of scale effects are expected to affect their imports positively and negatively, respectively. The larger the market the more it trades, so the market size is expected to turn out with positive signs (Ebaidalla and Abdalla, 2016).

Distances: Distance between an exporter and its importers are used as a proxy for transportation costs. This is the basic variable of the gravity model. It is normally stated that as countries stay far from each other, the transportation costs between them are higher. Consequently, they tend to trade less. Based on distance data and GDP, the weighted distance between Ethiopia and its trading partners for each year in the observation period is calculated. Hatab *et al.* (2010) found in their research that transportation costs, proxies by distance, influenced Egyptian agricultural exports negatively, based on time-series data from 1994-2008. Orindi (2011) also found out that exports reduced as the distance between them and their importers got larger in Ethiopia and Kenya, respectively. The coefficient of distance is expected to be negative, as the larger the physical distance between two countries' economic centers, the higher is the cost of transporting goods. The high such cost, the lower trade should be. (Beleska-Spasova, 2014)

Institutional quality (IQ): The institutional environment encompasses macroeconomic stability and openness to trade, as well as the enabling environment for markets consisting notably of the legal and judiciary system, the financial system, taxation, labour relations, investment procedures, and customs administration. The World Bank's Worldwide Governance Indicators (WGI) project (Kaufmann *et al.*, 2009) estimates the institutional quality of a particular country in terms of rule of law, government effectiveness, regulatory quality and control of corruption. The rank (out of 100) is given for each component. The aggregate value of the four components as a proxy for Ethiopia's institutional quality is taken. A higher aggregate value is associated with better institutional quality. Hence, the sign of this variable is expected to be positive. The description, measurement and expected effects of each variable on the export potential of spices are summarized in Table 1.

Table 1. Summary of variable description and hypothesized effects on spices export flows.

Variables and measurement	Measurement	Expected sign
Ethiopia's GDP	Continuous (measured in USD)	Positive
Ethiopia's GDP per capita	Continuous (measured in USD)	Positive
Foreign Direct Investment	Continuous (measured in USD)	Positive
Real exchange rate	Continuous (measured in km)	Negative
Internal infrastructure	Continuous (Percentage of paved road)	Positive
Ethiopia's Institutional quality	Continuous (index ranging 1-100)	Positive
Foreign trade policy	Continuous (index ranging; 0-100)	Positive
Trading partners" GDP	Continuous (measured in USD)	Positive
Partners" GDP Per Capita	Continuous (measured in USD)	Positive
Weighted Distance	Continuous (Measured in Millions)	Negative
Ethiopian Population	Continuous(Measured in Millions)	Positive
Partners' Population	Continuous (Measured in Millions)	Positive
COMESA Membership	Dummy (1, if belongs to membership)	Positive
Common border	Dummy (1, if they shared common border)	Positive

3. Empirical Results and Discussion

Before the estimation of the model, an inspection has been performed for testing the normality of all the variables used in the estimation. For most of the variables, it was observed that the null hypothesis of a normally distributed random variable is rejected. Thus, the natural log-transformed variables were used for analysis to remove normality problems. A diagnostic test was also been conducted in order to examine which estimation technique generated the data.

Accordingly, the Hausman specification test was executed to identify the appropriate gravity model between fixed and random effects. The test result confirmed that the error terms are not correlated with country-specific circumstances as the probability of chi-square value (0.9387) is higher indicating there are no significant differences between fixed effect and random model coefficients. Thus, the random effect model is appropriate and efficient for the estimation.

Table 2. Summary of Haussmann specification test for random or fixed effects.

Variables	Coefficients		(b-B) difference	Sqrt (diag (V_b-V_B)) S.E
	(b) fixed effect	(B) random effects		
lnGDPETH	-1.066895	-1.390727	0.3238317	0.3076521
GDPETH2	-0.0006	-0.0003	-0.0003	0.0002
lnFDIETH	3.9032	4.9346	-1.0314	1.2917
lnFDIETHsqr	-0.3405	-0.4261	0.0856	0.1095
lnRERij	-0.5871	-0.5396	-0.0474	0.4376
lpavdroad	0.1533	0.0894	0.0638	0.3900
lnIQETH	-1.3425	-1.4212	0.0787	0.3939
lnFTPpart	-0.7971	-0.6670	-0.1301	0.8576
lnGDPpart	1.1556	0.2699	0.8858	2.0738
lnGDPPCpart	-1.5148	1.2528	-2.7676	2.3313
PopETH	0.2082	0.1521	0.0561	0.0364
POPpart	0.0102	0.0041	0.0061	0.0075

chi2 (11) = (b-B)'[(V_b-V_B)^(-1)](b-B) = 4.07; Prob>chi2 = 0.9387

Source: Model result, 2016.

Moreover, Breusch and Pagan test for heteroscedasticity were applied and the null hypothesis of homoscedasticity disturbances is rejected at a one percent significance level suggesting that the variance is not constant. Thus, the robust command was applied to remove the problem of heteroscedasticity. The estimation results also indicate that the model has an overall R-square of 0.626, confirming that the variables included in the random-effects model explain 62.6% of the variations in spices trade flow. The Wald statistic of 138.99 with a p-value of 0.0000 shows that the variables included in the random-effects model are jointly significant at less than one percent significance level as indicated in Table 2.

Table 3. Random effects GLS model estimation results for determinants of spices export.

Variables	Symbol	Coefficient	Robust Std. Err.	z	P>z
Ethiopia's Annual GDP	lnGDPETH	-1.3907	1.5922	0.8700	0.3820
Ethiopia's GDP square	GDPETH2	-0.0003	0.0007	0.4200	0.6740
Foreign Direct Investment	lnFDIETH	4.9346*	2.9360	1.6800	0.0930
Foreign direct investment sqre	lnFDIETHsqr	-0.4261*	0.2505	1.7000	0.0890
Bilateral real exchange rate	lnRERij	-0.5396***	0.0639	8.4400	0.0000
Percentage of paved road	Lpavdroad	0.0894	1.0545	0.0800	0.9320
Ethiopia's Institutional quality	lnIQETH	-1.4212*	0.8115	1.7500	0.0800
Foreign trade policy index;	lnFTPpart	-0.6670	0.5275	1.2600	0.2060
Trading partners" GDP	lnGDPpart	0.2699***	0.0863	3.1300	0.0020
Partners" GDP Per Capita	lnGDPPCpart	1.2528***	0.2531	4.9500	0.0000
Weighted Distance	lnDistij	-2.1592***	0.3025	7.1400	0.0000
Ethiopian Population	PopETH	0.1521*	0.0814	1.8700	0.0620
Population of Trade Partner	POPpart	0.0041***	0.0006	6.4500	0.0000
COMESA Membership	COMESA	-5.8719***	0.8743	6.7200	0.0000
Sharing common border	Border	1.5129***	0.5797	2.6100	0.0090
Constant	_cons	6.6398	10.5897	0.6300	0.5310
Number of obs	99	Wald chi2(15) = 138.99			
Number of groups	9	Prob> chi2 = 0.0000			
R-sq: within = 0.1278	0.1278				
between = 0.9945	0.9945	corr (u_i, X) = 0 (assumed)			
overall = 0.6261	0.6261				

*Note: ***, **and * indicate the significance of the coefficients at 1%, 5%, and 10% levels of significance, respectively Source: Authors computation from the survey (2016).*

Among the determinants of spices trade performance, internal supply capacity; the log of foreign direct investment (FDI), Ethiopia's population (POPETH), the log of the real bilateral exchange rate (RER) and log of institutional quality were found to be statistically significant. The result showed that the log of foreign direct investment (FDI) significantly affected the performance of spices trade with an expected positive sign (Addisu, 2014; Alelign, Adame 2014; Alekaw, 2016) also found that FDI has a significant positive influence on Australian manufacturing exports in the long-term. Similarly, the study by Waleed and Shelaby (2011) on modeling and estimating the export potential of the Egyptian spices subsector found a positive effect of FDI on trade performance. The result also indicated that Ethiopia's population has a significant and positive influence at a 10 percent significance level. This may indicate a large domestic market may imply utilization of the economies of scales rather than the dominance of absorption effect. Controlling for other things unchanged, it is confirmed that a percent growth in population of the trading partner would increase the exports of spices by 0.152 percent.

The estimated coefficient also indicates that the real exchange rate is negative and statistically significant at less than one percent suggesting as the exchange rate appreciates spices export revenue declines thereby devaluation of domestic currency has a noticeable positive contribution to Ethiopia's spices (turmeric and *Korarima*) export. The real exchange rate of the exporting country affects the price of goods that are imposed to the importing country. If the real exchange rate of exporting countries increases or appreciates, the export price will increase and the importing country will pay higher to import the things from the exporting country. The estimated coefficient implies that a percent increase in the real exchange rate would lead to a decline in spices (turmeric and *Korarima*) export value by 0.540 percent, assuming other variables kept unchanged. Similar results were obtained by other researchers regarding the effect of the bilateral exchange rate on export values (Aljebrin, 2012; Inayah *et al*., 2016). The result was also consistent with the (Negussie and Dessalegn, 2014) that investigated determinants of bilateral trade between Ethiopia and its major trading partners' and they found that bilateral real exchange rate had a negative impact on Ethiopia's total export performance.

The model output also depicts that the institutional quality (IQ) has a significant negative effect on spices export value contrary to the hypothesis. The negative sign might be due lack of modern marketing institutions that properly guide the production and regulate the marketing of spices as this commodity is not in the system of Ethiopian commodity exchange (ECX), unlike other agricultural export. It implies that poor institutional quality (poor market regulatory system) will discourage spices export flows by 1.421 percent. Ebaidalla and Abdallat(2016) found that inefficient institutions resulted in low investment and productivity thereby leads to low export flows.

Except for foreign trade policy, all external demand side determents of export performances were found to

be significant. The trade partners' log of GDP used as a proxy for importers demand/market size was the statistically significant and negative influence on spices trade performance. The result suggests that a higher importers' GDP means a higher absorption capacity, implying the partner country is able to import more spices. Hence, a percent increase in importer's log of GDP will increase spices export value by 0.272 percent. This is line with the theory behind the conventional gravity model that states the size of the economies enhances the amount of trade between trading partners.

Ethiopia's major spices (turmeric and *Korarima*) export performance was significantly and positively affected by importers; log of GDP per capita, too. The estimated positive coefficient implies that the levels of income determine the purchasing power of consumers at export destinations; the higher the income of consumers the more products they could purchase and hence rising spices export performances. The positive value is consistent with the theoretical expectation of gravity trade that expects that trade capacity increase with an increase in a partner's economic size. So, holding other things unchanged, it is evident that a percent improvement in log per capita GDP of the partners will increase their demand for spices export by 0.270 percent. This result is consistent with the demand theory and other empirical studies on trade (Inayah *et al.*, 2016; Baker and Yuya, 2020). This finding also corroborates the findings of Karamuriro and Karukuza (2015) who use the gravity model, discovered that the real GDP of importing countries had a positive effect on the value of bilateral trade between considered in the study for the years 1980–2012.

Moreover, a variable population proxy for importers market sizes was statistically significant and positive as a hypothesis. It means that a percent growth in importer's population would lead to a 0.004 percent improvement in the spices export earnings, assuming that other things remain the same. Some of the past studies agreed on the positive relationship between export flows and the total population of importing countries (Elshehawy *et al.*, 2014).

The weighted distance (WDIST) between Ethiopia and trade partners has affected the performance of spices trade flows significantly and negatively. The results provide strong support for the hypothesis that transportation costs are an important foreign market access determinant affecting spices trade performance .i.e. distance is a proxy for various factors such as transportation costs, delay during shipment, synchronization costs, communication costs, and transaction costs that could influence trade flows (Alemayehu, 2009). From the estimated results, it is evident that a percent difference in distance will reduce spices export value by 2.159 percent in line with the economic theory of gravity model. This result is also consistent with the following empirical studies on export determinants (Yishak, 2009; Alelign, 2014; Inayah *et al.*, 2016). The dependence of spices exports on transport costs implies that besides emphasizing large economies in the world as the major destination markets, the government needs also to pay adequate attention to destination markets with cheaper transport costs. Access to such markets should be facilitated by relevant policies to take advantage of the geographical location in strengthening spices exports' competitiveness.

Contrary to the hypothesized effect and the existing empirical evidence, the variable COMESA membership has found statistically significant and negatively affecting spices export value. The negative coefficient of this variable may suggest that Ethiopia exports below what other countries export to COMESA, might be due to lack of large-scale private sector participation in production to benefit from economies of scale. Equivalently, this to mean that with continued such trade underperformance, being Ethiopia a membership of COMESA would reduce spice export value by 5.872 percent. The other possible justification for the unexpected negative sign might be associated with the fact that; as the majority of trade partners are also spices exporters they may appear to be competitors with Ethiopia's spices (for instances, India and China are the large producers and exporters of turmeric) thus adversely affecting the performance of spices export. This result is consistent with a study conducted by Alkekaw (2016) on the determinants of foreign trade in Ethiopia.

The common border variable is significant and has a positive sign suggesting that there have been more spices trade with the neighboring countries than relatively distant countries. The positive coefficient on "common border" indicates that the immediate proximity of the two countries increases their tendency to trade. As most of Ethiopia's spices, export destinations are neighboring countries spices trade could easily flow due to the country's urgent need for foreign currencies. Thus, being a trade partner share a common border will increase the spices export value by 1.513 percent. The empirical analysis of Pakistan's trade conducted by Khan *et al.* (2013) indicate similar positive results regarding the relationship between export and shared border.

4. Conclusions

The results have demonstrated that there is a significant and positive relationship between direct investments (FDI) and spices export performance. This variable contributes to the improvement of the country's export in general and spices export in particular. Thus, the government and other relevant stakeholders should continue to exert its efforts to attract foreign investment by taking various measures. The results also indicated that there was a strong negative and significant relationship between the exchange rate and

spices export value. In line with this, the government has to ensure a stable exchange rate policy in order to avoid the exchange rate risk attached to the import prices and profit considerations of direct investors that could contribute to export growth by investing in the spices subsector. It can also be suggested that depreciation of the real exchange rate would cause again in the competitiveness of the country thereby encouraging the spices export flows.

Both GDP and GDP per capita of importing countries were confirmed to have a significant and positive relationship with spics export value of Ethiopia. It implied that an improvement in these macroeconomic variables in each destination country would create demand for Ethiopia's spices. Therefore, the country should target spices export to partners with larger economies. The population of importing countries is another significant variable affecting the spices exports. Thus, there is a foreign market demand for spices that the country could be benefited from. Moreover, the policymaker should design policies that promote economic growth. Distance is also an important variable influencing spices trade flows between Ethiopia and each destination country (Alemayehu, 2009). Since the distance between countries is associated with transportation costs a more distant would worsen spices export flows. The dependence of spices exports on transport costs implies that besides emphasizing large economies in the world as the major destination markets, the government has to pay adequate attention to the destinations that relatively reducing transport costs.

Membership of COMESA was negatively related to spices export value which might depict the country doesn't benefit from spices export to these common markets. The strong and negative relationship between this common market and spices trade performance may also suggest Ethiopia exports below what other countries export. The current and future spices demand and supply prospects need to be assessed in such regional market. Addressing supply constraints and the competitiveness of COMESA exports is important. Furthermore, sharing a common border with a partner affected the spices export performance significantly with its expected positive sign. In order to expand bilateral trade flows, it is appeared to be more desirable for Ethiopia to promote exports to countries in close proximity.

Some future research can also be suggested in order to broaden the existing pool of knowledge on the subject: First due to lack of data on spices products in the form of oleoresin &essential oils and powdered mixes were not included in estimating the spices export value in this study. Secondly, the study is confined to evaluate factors influencing the export performance of the two spices within the on-going value chain research. Therefore, there is a scope for further studies to consider all types of spices and their emerging value-added products (essential oil and spices mixes) in analyzing the spices export performances and its determinants in Ethiopia.

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