AN ECONOMETRIC ANALYSIS OF ZIMBABWE'S EXPORT COMPETITIVENESS

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ABSTRACT

The purpose of this article is to analyze the impact of real effective exchange rate (REER), terms of trade (ToT), labour productivity, and cost to export, quality of infrastructure and state of innovation and technology on value of exports for Zimbabwe for the period 2005 - 2015. The study applies the gravity model in general and the Poisson Pseudo Maximum Likelihood (PPML) estimation in particular to determine the impact of the above mentioned variables on the performance of Zimbabwean exports. The above variables are incorporated into the standard gravity that has explanatory variables namely gross domestic product, per capita gross domestic product, distance and two dummy variables. Results from the regression confirm that REER, GDP, per capita GDP, regional trading arrangement, infrastructure and innovation and technology have a positive significance in boosting Zimbabwe's export competitiveness while cost to export, labour productivity, common official language, ToT and distance have a negative effect. The results imply that Zimbabwe has to improve on the variables that negatively affect the value of exports and ultimately their competitiveness.

Keywords: Gravity Model, PPML, Zimbabwean Exports.

Jel classification code: F10, F14.

Disclaimer: The views and interpretations in this study are those of the author and they do not necessarily represent the official position of the Ministry of Industry and Commerce.

INTRODUCTION

Competitiveness is used as measure of performance especially in the context of international trade. The concept of competitiveness is important since it determines a country's economic performance as well as the prosperity of its citizens. In the same notion the International Trade Centre (ITC), in its technical notes on the development of the Trade Performance Index (TPI), highlighted that trade performance of a country can be used as a measure of its competitiveness vis-à-vis its trading partners. The reason for using the above approach is that there is a general proclivity in which a country's trade performance is positively correlated with its rate of gross domestic product (GDP). However, the measurement and definition of competitiveness is controversial since there is no general consensus in literature. Regardless of its extensive significance, Porter (2004) argues that competitiveness is still a misunderstood concept in the academic fraternity. This study is focusing on export competitiveness and will attempt to measure it using real effective exchange rate (REER), terms of trade (ToT), labour productivity and other variables which include GDP, per capita GDP, cost to export, quality of infrastructure and state of innovation and technology. For the purpose of this study, Porter (2004: 52)'s definition of competitiveness "*a country's share of world markets for its products*" was adopted.

There are a lot of benefits that a country can realise as a result of improving its exports' competitiveness. These benefits among other include reduced inflation rate and trade deficit in the economy, creation of jobs and increased market share. Given the crucial role played by the exports sector as the world's largest purveyor of employment, economic growth and current account deficit researching and gaining a sounder understanding of the nexus between exports and its determinants is hence of utmost importance to a country's trade policy. Assessing export competitiveness for Zimbabwe is critical in the sense that it helps to put measures that can be used to resuscitate the country's economy as well as improving its deteriorating trade balance. This will guide policy formulation which is aimed at improving the competitiveness of domestic producers of Zimbabwe's exports.

Objective of the Study

The main objective of this study is therefore to analyse the export performance of Zimbabwe as well as to assess the impact and relevance of real effective exchange rate (REER), terms of trade (TOT), labour productivity, cost to export, quality of infrastructure and state of innovation and technology in explaining Zimbabwe's export competitiveness in comparison with both her trading partners and also major exporters of goods that Zimbabwe exports. The use of the above variables as determinants of export competitiveness for Zimbabwe is accentuated by the need to proffer solutions to the continual deterioration of its trade balance. The intuition for using the six proxies of competitiveness is prima facie on Porter (2004) who highlighted that low wages, devaluation of a national currency and opening up of the economy can make a country more competitive. This will help in explaining trade developments as well as giving policy directions that are relevant in restoring Zimbabwe's export capacity through a sustained export led growth strategy as well as formulating trade policy measures that are export oriented. Although the study uses Zimbabwe as an example to examine export competitiveness the results can also be generally used in any country with a similar situation as that of Zimbabwe.

Background

The extent to which a country can compete regionally and internationally depends on a variety of factors. Some of the factors include the level of technology, research and development and infrastructure which in turn help in stimulating market and export diversification. Accordingly, Palley (2003) noted that the successive and rapid growth of the four East Asian Tigers namely Hong Kong, Singapore, South Korea and Taiwan was very much dependent on more exports. Despite this clear evidence on the importance of export on growth and development Samen (2010) states that most developing countries are failing to concentrate and diversify their export baskets beyond unprocessed products. In addition to the above, the Zimbabwean economy undertook various extensive economic reforms and trade initiatives since 1980 and yet these measures have not generated the required form and quality of GDP to turn around the economy. Despite adopting having integrated to regional and multilateral trading arrangements as well as focusing on trade liberalization as central components in its development the country is failing take off from the continued marginalization in the global economy.

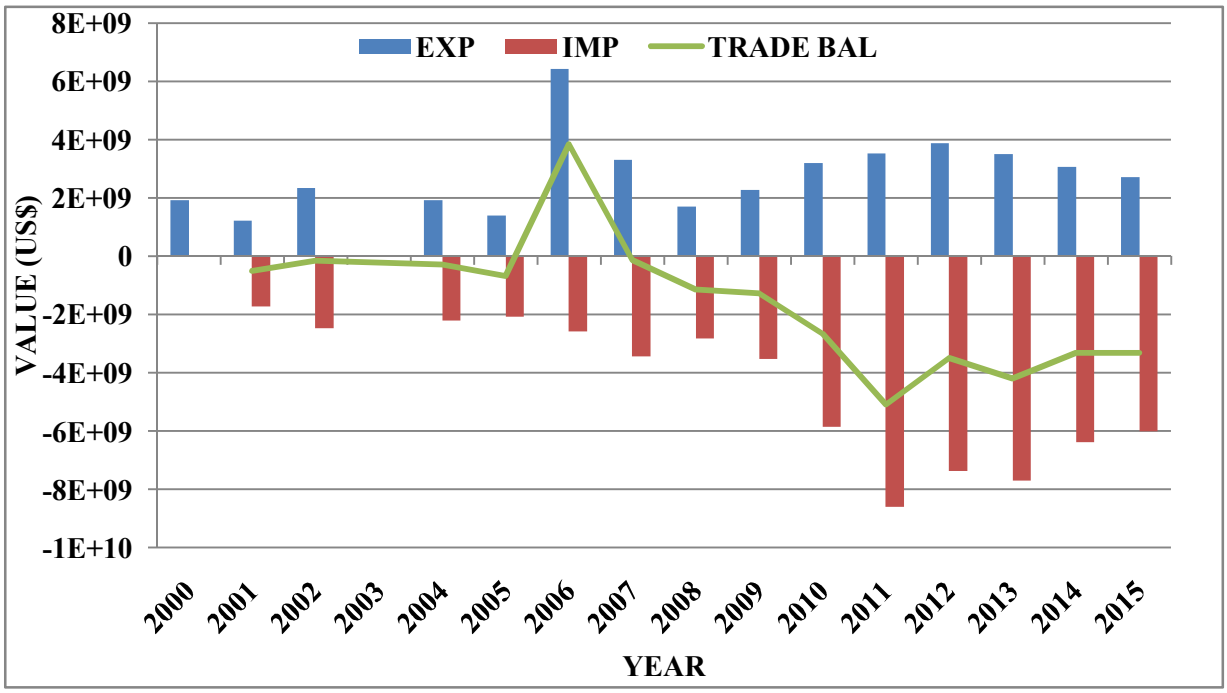
Overview of Zimbabwe's Export Performance Since 2000

The analysis of Zimbabwe's export performance is in phases. The first phase is the period from 2000 to 2005 since it marks the turning point in the structural, social, economic and political

relations of the country with the West due to their imposition of sanctions as a result of the fast track land reform. Second is the period from 2006 to the beginning of 2009. This period is characterized by a bout of inflation and the hyper-inflation crisis since from 2006 monthly inflation rate started to register a continuous double digit which brought an end to the use of the Zimbabwean dollar in 2009. Finally the analysis will include the period beginning 2009 and onwards which envisaged the dawn of the multi-currency regime. The inclusion of the above three periods is critical in the sense that they explain the export performance of Zimbabwe under very difficult and stable situations regarding inflation.

According to a study by Kaminski and Ng (2011), as from 1998 the country which used to be a net exporter of agricultural products slowly turned into a net importer of the above. The adoption of the multi-currency in early 2009 resulted in substantial gains in the country's overall economic performance as well as stabilizing inflation. Although at one hand the macroeconomic environment has been stable the country has limited capacity to influence exchange rate as well as using monetary policy to correct trade imbalances. On a positive note Zimbabwe was also a country with the highest growth rate in gross domestic product (GDP) of about 55.5% during the advent of the multi-currency in 2009 and according to Siyakiya (2014: p.16), in 2011 Zimbabwe was one of the fastest growing economies in the Africa.

Figure 1: Zimbabwe's Total Merchandise Trade in US$ over time



Source: Author's calculation based on UN COMTRADE data

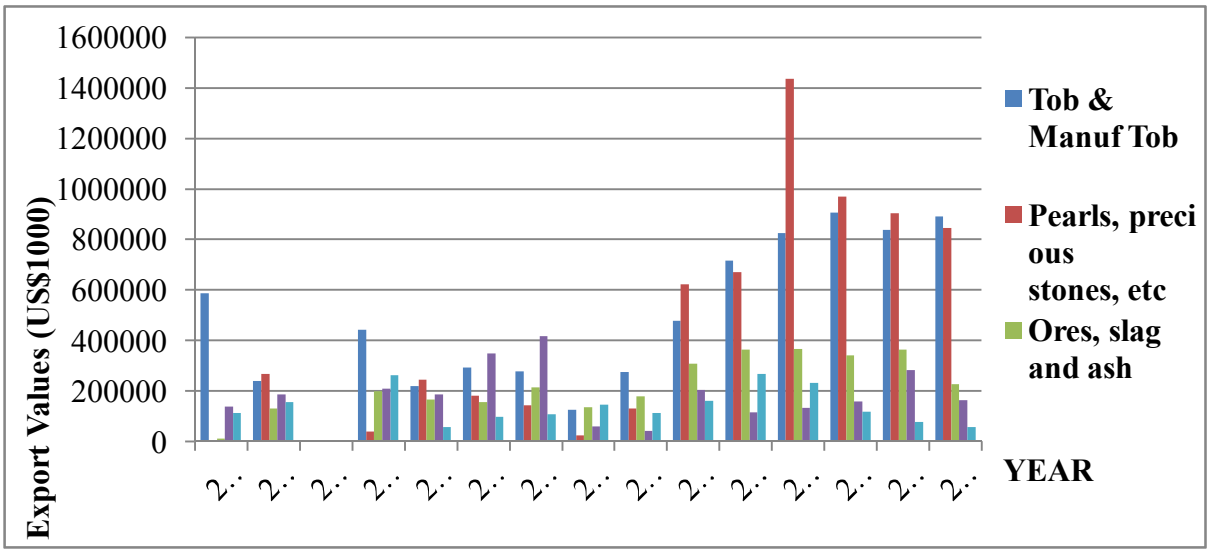
As shown in Figure 1, Zimbabwe's export values have not been all rosy. Beginning the year 2007 the trend of exports was taking a nose dive and then rebounded in 2009. Between the period 2009 and 2012 the value of exports was following an upward trend and from 2013 it started to fall again. Looking at the trade balance, from 2001 to 2005 it was negative and insignificant, and then in 2006 the country managed to record a positive trade balance of around US$ 3.8 billion. For the years 2013 and 2014 merchandise exports decreased by 9.7% and 12.6% respectively and to this end since 2007 the country has been experiencing a trade deficit. From 2007 up until 2011 the country's trade balance persistently weakened signifying that the economy was experiencing an

unsustainable fever. The continuous stagnation of exports and constant increase of imports triggered the deterioration of the country's merchandise trade balance over the past decade and half. The last time the country registered a trade surplus was in 2006 and since then the country has been recording trade deficits with the worst scenario experienced in 2008. The 2008 trade deficit occurred when the economy experienced an unusual circumstance "hyper-inflation" when compared to the rest of countries in Southern Africa. Hyper-inflation reached calamitous levels which left indelible wounds in the economy and people's memories. This was due to the fact that the country's productive potential was insignificant.

What does Zimbabwe Export?

Zimbabwe's exports are diversified ranging from agricultural products to mineral products namely tobacco, pearls, precious stones, ores, slag, ashes and cotton. Despite the de-industrialization that has gripped the economy for over a decade, the country is also exporting some few processed products like tobacco and iron and steel. As can be noted from Figure 2 below between the period 2001 and 2009 majority of the top exports were individually earning below US$ 200 million per annum on average. As from 2010 the value of tobacco and precious stones exported were topping the list followed by exports of ores, slag and ash. The highest values of precious stones and tobacco were recorded in 2012 and 2013 respectively. On a bad note export values of cotton were following a declining trend. This may be attributed to unattractive international price of cotton.

Figure 2: Proportion of Zimbabwe's Exports between 2001 and 2015.



Source: Author's calculations based on data from ITC
Note: Tob&ManufTob represent tobacco and manufactured tobacco substitutes

Why Studying Export Competitiveness is Important?

International competitiveness of any country is usually measured by the relative cost of its exports in relation to those of other countries. If the products exported by a country are more expensive than those of its competitors then there is a likelihood of a decline in that country's competitiveness. The increasing importance of exports to the world economy means that export competitiveness is very important. Chigumira (2015) also highlighted the need to put more emphasis on exports since they contributed close to 60% of Zimbabwe's foreign currency earnings between the period 2009 and 2014. Bonga, Sithole and Shenje (2015) also concurred with the idea

of exports being the main driver of Zimbabwe's economy. The Zimbabwe National Trade Policy (2012 – 2016) also underscored the importance of exporting high value added products to boost the country's international competitiveness.

In other developed countries exports contribute significant to overall economic growth. The United States of America's Department of Commerce (2014) reported that exports contributed close to 30% of GDP during the past five years. Pointing to the same direction Chemeda (2001), Abou-Stait (2005), Jordaan and Eita (2009), Azam (2011) and Kumari and Malhotra (2014) found that there is Granger causality running from exports to GDP for Ethiopia, Egypt, Botswana, Pakistan and India respectively. These results confirm the evidence of an export led growth for the above countries.

What Determines the Level of Exports?

In explaining a country's relative exports competitiveness it is important to look at prices of the exporting country relative to those of other countries. The relative price of the exports is in turn determined for instance by unit labour costs, level of productivity, inflation rate and raw material price. High labour costs, inflate rate and price of raw materials lower the competitiveness of exports while high levels of productivity improves competitiveness. Export competitiveness is also determined by the quality of the exports themselves, extent of value addition of these exports and the exchange rate between the exporting country and the importer. Depreciation of a country's exchange rate can make its exports more competitive when compared to those other countries. Export competitiveness also depends on the level of technological innovation, research and development, infrastructure and the level of both tariff and non-tariff barriers. In general lower tariffs can promote the competitiveness of exports but it should be noted that if domestic industries are not innovative they may lose out since they cannot compete with foreign ones.

LITERATURE REVIEW

Literature Review should be given in this section. All the subheadings in this section should be in font size 12 Bold, Times New Roman. The first letter of each word in subheading should be capital. A number of scholars are very flexible in using independent variables that determine competitiveness. Generally researchers especially those outside the economics field use rough indicators to measure export performance of a country. These indicators include export share, export profitability, relative trade balance and export growth in the international trade situation. To close this blatant view the International Trade Centre has of late developed a trade performance index with a vision to assess and track changes in countries' export competitiveness and performance. Recent research suggest that using the above variables as only indicators of measurement of export competitiveness is not adequate in promoting export led growth strategy. In addition to the above it is also important to determine differences in countries' levels of development particularly technology differences when assessing their export performance.

Asemphasized by Des Vignes and Smith (2005) it is easy to measure and define competitiveness at firm level than at national level because at national level complex variables are included. Porter (2004) in Cetindamar and Kilitcioglu (2013) emphasized that the successful realisation of policies is through an appropriate mixture of microeconomic, macroeconomic, legal and political factors which influence each other. Palley (2003) and Blecker and Razmi (2009) also added that developing countries fail to achieve economic growth through export oriented policies due to the fallacy composition, that is, they export almost similar products to same markets.

Evidence from a study by Zhang (2013), point to the idea that real effective exchange rate (REER) plays a significant role in explaining the export performance of Finland. Using the gravity model the author found that REER was statistically significant and negative in determining Finland's high

tech export volume. Fastbø (2013) also found that the influence of real exchange rate for Norwegian exports was significant and negative. In the same veinThapa (2002) likewise found that REER has a positive influence on Nepalese economic activity hence the need to keep the REER a bit constant.Thorbecke (2011) and Trang, Tam and Nam (2011) also discovered that exports manufactured within regional production networks are influenced by exchange rates throughout the region while Vietnam's exports depended on the depreciation of its local currency respectively.

On a contrariwise note a study by Srinivasan and Archana (2009) on Indian exports revealed that real exchange rate has insignificant impact while labour productivity is positive and significant. Yishak (2009) and Kebede (2011) also found that Ethiopian exports were insensitive to real exchange rate. In addition to the above, Rault, Sova and Sova (2007) also shown that real exchange rate has low explanatory power for trade between Eastern European and Organization for Economic Cooperation and Development (OECD) countries. Harris and Mátyás (1998) and Mátyás,Konya and Harris (2004) for the twelve and eleven Asian-Pacific Economic Cooperation (APEC) countries respectively revealed a negative and insignificant relationship as well.
When looking at terms of trade (ToT) as a determinant of export competitiveness De Sá Porto (2010) nevertheless found that it (ToT) was very important in explaining exports between Brazilian states and Brazilian's major trading partners.

Previous Studies on Zimbabwe's Export Competitiveness

Zimbabwe's export performance in 1990s used to be among the best in Southern Africa due to its strength in the agricultural sector which was largely controlled by large commercial farmers (Muñoz, 2006). Using the imperfect substitutes model as suggested by Goldstein and Khan (1985), Muñoz (2006)'s findings concluded that overvaluation of the real exchange have a negative bearing on Zimbabwe's export performance hence policies that stabilise the exchange rate need to be put in place. However, Brixiová and Ncube (2014) doubted the feasibility of the above given the limited monetary policy that Zimbabwe is facing since the adoption of the multi-currency.

Chigumira (2015) also suggested that the competitiveness of Zimbabwe's exports is premised on a comprehensive long-term structural change in policies. Kaminski and Ng (2011) also annotated that the lacklustre performance of Zimbabwe's exports is largely affected by poor policies, political instability and low commitment. Their findings revealed that good policies are key drivers that enhance the country's export performance. In contrast to the above, Kamoyo and Mabvure (2012) and Kamoyo and Chidoko (2013) used technology as a source of competitiveness. Their analysis established that technology plays a pivotal role in improving Zimbabwe's exports competitiveness. Using the revealed comparative advantage (RCA) index for the period 2005 - 2009, Mzumara (2011)'s findings established that Zimbabwe has comparative and competitive advantage in the bulk of exports.

This study however focuses on the aggregate exports of Zimbabwe within the period 2005 – 2015. The study fills in the gap by Kamoyo and Mabvure (2012) who only looked at competitiveness of Zimbabwean exports within the framework of Southern Africa Development Community (SADC) using technology as a determinant of competitiveness yet Zimbabwe's exports are found beyond SADC to as far as China, India, Europe and other countries. The bulk of Zimbabwe's exports are agricultural and mineral ore which are also exported by most SADC countries hence less intra-SADC trade of these products. This implies that focusing only on SADC may give misleading results since Zimbabwe's top export destinations within SADC are South Africa, Zambia, Mozambique, Democratic Republic of Congo and Botswana. Another weakness of their study was that their time frame is not balanced since it only includes two years after the

adoption of the multi-currency while the rest is Zimbabwean dollar era. The Zimbabwean dollar era does not portray the current scenario that Zimbabwe is going through hence the policy recommendations for that period are not applicable.

In order to improve the above weaknesses this study includes six determinants of export competitiveness namely REER, ToT, labour productivity, cost to export, quality of infrastructure and state of innovation and technology in the traditional gravity model. The motivation for doing this paper is based on a study by Stucka (2004) who proposed the use of either labour productivity/ wages or devaluation/ depreciation of the exchange rate so that the Croatia's exports could be competitive and thereby reducing the trade deficit. Given the above reasoning this study will also contribute to the scanty literature that have analysed the competitiveness of Zimbabwe's exports.

METHODOLOGY

The study employed the gravity model which is widely used in analyzing bilateral trade and immigration between countries. The gravity model is inspired from the work of Tinbergen (1962), Bergstrand (1985), Deardorff (1998), Anderson and Van Wincoop (2001),Fratianni (2007) and Chaney (2013) who stated that trade flow between two countries is positively dependent on their gross domestic products (GDP) and inversely related to the distance apart them. However, bilateral trade does not only depend on the above two factors but a lot of factors which may be economic, geographic and social has to be incorporated into the model to improve its fit. The rationale for the use of the gravity model is to find out which variable among GDP alongside other explanatory variables has a significant impact for Zimbabwe's exports.

In analyzing Zimbabwe's export competitiveness the research borrowed from a study by Nag and Nandi (2006) that analyzed India's competitiveness against her 15 trading partners and that ofBordigoni, Hita and Le Blanc (2014)that analysed competitiveness of the paper industry for 32 countries. Unlike the usual approach where fixed effects (FE) or random effects (RE) and ordinary least square (OLS) estimators are used to interpret trade relations this study applied the Poisson pseudo-maximum likelihood (PPML) estimator. The PPML results are compared with the negative binomial model (NBM) only not to the extent of robustness check. As argued by Silva and Tenreyro (2006) and Brodzicki et al. (2015) using the PPML estimator yields consistent results as compared to FE, RE and OLS when the assumption of homoskedascity is not satisfied. If there are zero trade observations between trading partners it is also advisable to use PPML estimator since it overcomes this (Westerlund and Wilhelmsson, 2011). In this case there are 19 zeros out of 462 rows of bilateral exports which are assumed not to be missing at random and they cannot be ignorable (Allison, 2001).

Model Specification

The study uses aggregate bilateral exports for the period 2005 – 2015 as dependent variable. The time period is interesting in the sense that it covers the period of recession and boom. The exports are between Zimbabwe and her 42 trading partners namely Argentina, Australia, Austria, Bangladesh, Belgium, Botswana, Brazil, Canada, China, Denmark, Egypt, France, Germany, Hong Kong, India, Indonesia, Israel, Italy, Japan, Jordan, Kenya, Madagascar, Malawi, Mexico, Mozambique, Netherlands, Pakistan, Poland, Romania, Russia, Singapore, South Africa, Spain, Sweden, Switzerland, Tanzania, Thailand, Turkey, United Arab Emirates, United Kingdom, United States of America and Zambia. The rationale for selecting these countries is that some of them compete with Zimbabwe in exporting the products that Zimbabwe export most and others are top destinations of Zimbabwean exports. A multiplicative interaction of the GDPs of Zimbabwe and her

trading partners and their per capita GDPs as well as distance between them were used as independent variables.

As a way of improving the fit of the model other independent variables which include REER, ToT, labour productivity, cost to export, quality of infrastructure, state of innovation and technology, common language and regional trading arrangement are added. In order to do the estimation of the gravity model a double logarithmic of both the right hand side and the left hand side has to be performed.

The model below is inspired from the work of Nag and Nandi (2006) and Brodzicki et al. (2015)

$$\ln EX_{ijt} = \alpha_i + \gamma_j + \lambda_t + \beta_1 \ln(GDP_{it} * GDP_{jt}) + \beta_2 \ln(GDP_{pcit} * GDP_{pcjt}) + \beta_3 \ln DIS_{ij} + \beta_4 \ln(REER_{it} / REER_{jt}) + \beta_5 \ln(ToT_{it} / ToT_{jt}) + \beta_6 \ln(LP_{it} / LP_{jt}) + \beta_7 \ln(CEX_{it} / CEX_{jt}) + \beta_8 \ln(INF_{it} / INF_{jt}) + \beta_9 \ln(IT_{it} / IT_{jt}) + \beta_{10} COMLAN_{ij} + \beta_{11} RTA_{ij} + \mu_{ijt} \quad (1)$$

Where ;

EX_{ijt} is the total value of exports from Zimbabwe to its trading partner in million US$ at a particular year; GDP_{it} and GDP_{jt} are gross domestic product of Zimbabwe and her trading partner in US$ at period ***t*** respectively; GDP_{pcit} and GDP_{pcit} are per capita gross domestic product of Zimbabwe and her trading partners at time ***t*** respectively. DIS_{ij} is the weighted distance between Zimbabwe and her trading partners. $REER_{it}$ and $REER_{jt}$ are real effective exchange rates of Zimbabwe and her trading partners at time ***t***, ToT_{it}, ToT_{jt}, CEX_{it}, CEX_{jt}, LP_{it}, LP_{jt}, INF_{it}, INF_{jt}, IT_{it} and IT_{jt} are terms of trade, cost to export, labour productivity, quality of infrastructure and state of innovation and technology of both exporter and importer at time ***t*** respectively. $COMLAN_{it}$ and RTA_{ij} are dummies which represent common official language and regional trading arrangements between Zimbabwe and the trading partners respectively.

The gravity model that uses the PPML estimator is of the following formula;

$$EX_{ijt} = \exp\left(\ln\alpha + \ln\gamma + \ln\gamma + \beta_1 \ln(GDP_{it} * GDP_{jt}) + \beta_2 \ln(GDP_{pcit} * GDP_{pcjt}) + \beta_3 \ln DIS_{ij} + \beta_4 \ln(REER_{it} / REER_{jt}) + \beta_5 \ln(ToT_{it} / ToT_{jt}) + \beta_6 \ln(LP_{it} / LP_{jt}) + \beta_7 \ln(CEX_{it} / CEX_{jt}) + \beta_8 \ln(INF_{it} / INF_{jt}) + \beta_9 \ln(IT_{it} / IT_{jt}) + \beta_{10} COMLAN_{ij} + \beta_{11} RTA_{ij}\right) \mu_{ijt} \quad (2)$$

Data for GDP andper capita GDP were retrieved from UNCTAD[1]website; ToT, CEX, INF, IT and REER were obtained from World Development Indicators[2] (WDI). Data for bilateral exports was extracted from International Trade Centre[3] (ITC)'s trade map database while data for LP and DIS were retrieved from the Total Economy Database (TED)[4] and CEPII[5] websites respectively.

[1] http://unctadstat.unctad.org/wds/ReportFolders/reportFolders.aspx

[2] http://databank.worldbank.org/data/reports.aspx?source=2&type=metadata&series=GB.XPD.RSDV.GD.ZS#

[3] http://www.trademap.org/Index.aspx

[4] https://www.conference-board.org/data/economydatabase/index.cfm?id=27762

[5] http://cepii.fr/CEPII/en/bdd_modele/presentation.asp?id=6

Cost to export is a measure of the cost associated with the logistical process of exporting goods across borders. The higher the costs associated with exporting the lower the volume of exports. The quality of infrastructure is a key indicator of competitiveness since it measures the cost of transporting goods from one place to another. Labour productivity measures the efficiency of a country with which inputs are used in an economy to produce goods and services and it offers a measure of economic growth, competitiveness, and living standards within a country. The variable innovation and technology measures the strength of companies in producing new products. Termsof trade measures the ratio between export price and import price index. The higher the terms of trade the more competitive a country's exports.

ESTIMATION AND DISCUSSION OF RESULTS

Using the Poisson Pseudo Maximum Likelihood (PPML) estimation technique, results from Table 1 shows that the independent variables namely GDP, per capita GDP, distance, real exchange rate, terms of trade, quality of infrastructure, state of innovation and technology and regional trading arrangement have expected signs while cost to export, labour productivity and common official language do not have expected signs. Interestingly, one thing to note is that of the explanatory variables that have expected signs only per capita GDP, distance and RTA are highly statistically significant at 99% level in explaining the value of aggregate bilateral exports for Zimbabwe and her trading partners. The results from the PPML estimator were compared to those from the negative binomial (NB) model. Results from the PPML model confirm that the coefficients of multiplicative interaction of both GDP and per capita GDP have a positive influence on the Zimbabwe's value of aggregate exports. A 10% increase in GDP and per capita GDP has a positive boost on Zimbabwe's exports value by 1.17% and6.79% on average respectively. Since GDP represents the productive capacity of the country and per capita GDP represent the income level of consumers, the higher the GDP of a country the higher the level of output and exports and the higher the disposable income to domestic consumers the more they demand foreign products leaving room for more exports of domestic products.

The sign of the coefficient of the distance between Zimbabwe and her trading peers is negative and significant as anticipated by the model. This means that an increase in distance between two trading partners by 10% lowers the value of exports between them by 17.95% on average. The dummy variable RTA has the expected sign and it is also significant which means that as countries enter into regional trading arrangements they boost their levels of trade. The positive and significant of the RTA dummy suggests that a huge chunk of Zimbabwe's exports are driven by her membership to either COMESA or SADC. The coefficient of RTA signifies that Zimbabwe's membership to one of the RTA increases her exports by a factor of 2.526 which is equivalent to a1150.34%[6] increase in exports**.**Although it is positive the percentage looks too big and for the case of Zimbabwe most of her exports are destined to countries which do not belong to either SADC or COMESA for example China. This is not the same scenario with countries that have a common official language between them. The reason is that most Zimbabwe's trading partners in the study do not share a common official language hence the reason of the negative coefficient in explaining

[6] $(e^{2.526} - 1) * 100 = 1150.34\%$. This explains how dummy variables' coefficients are calculated. Since our equation is in exponential form the actual increase in the dependent variable is the exponent of the coefficient of the independent variable. If the coefficient is positive it means an increase and decrease for a negative coefficient. See Schofer (2010, slide 11 - 12) for a detailed explanation.

exports value. The preferred sign for the coefficient of common language should be positive since language makes it easier to penetrate the market. A good example is that most Zimbabwean exports are destined to China where there is no common official language between the two countries.

Looking at the priority variables in the equation, the relative real effective exchange rate of Zimbabwe to her trading partners is positive and significant, which implies that depreciation of the exchange rate of Zimbabwe's currency against those of other countries generates a positive impact on Zimbabwe's exports. Since Zimbabwe is a small economy, the relative terms of trade and value of exports have the preferred relationship which is negative as revealed by the results. Labour productivity is not also depicting the intended sign since higher labour productivity for Zimbabwe in comparison to her trading partners means Zimbabwean exports are more competitive than those of her peers. This suggests that Zimbabwean workers are not paid according to their productivity levels. The signs of other variables namely quality of infrastructure and state of innovation and technology are in line with theoretical predictions.

The coefficient of the cost to export does not have the expected sign which should be negative though significant. The reason for this is that as exports increase demand for transaction costs related to exporting increases resulting in a positive relationship between the two variables. Given the scenario that Zimbabwe is a landlocked country the cost to export can be as revealed and it therefore implies that transportation costs and taxes have to be reduced in order to improve the competitiveness of Zimbabwean exports. The sign of the quality of infrastructure and the state of innovation and technology are also as anticipated both in terms of sign and significance since Zimbabwe's infrastructure and level of innovation and technology is less when compared to most of its trading partners.

Results from the study confirm that from the explanatory variables RTA has the greatest positive influence on Zimbabwe's exports followed by relative state of innovation and technology, quality of infrastructure, per capita GDP, cost to export, real effective exchange rate, terms of trade and GDP in that order. Contrary to the above it is further revealed that Zimbabwe's exports are most depressed by distance, labour productivity and lack of common official language. A detailed presentation of results is in Table 1 below.

Table: 1.PPML and NB Results

	(1)	(2)	(3)
VARIABLES	**NB Model**	**lnalpha**	**PPML**
lGDPijt	0.169		0.117
	(0.117)		(0.207)
lGDPpcijt	-0.458***		0.679***
	(0.167)		(0.199)
lDISij	-2.612***		-1.795***
	(0.520)		(0.272)
lREERijt	-1.452***		0.425
	(0.301)		(0.432)
lToTijt	0.459		0.342
	(0.501)		(0.441)
lLPijt	-1.449***		-1.068***
	(0.174)		(0.116)
lCEXijt	0.848***		0.666**
	(0.279)		(0.324)
lINFijt	0.872		1.134*

	(0.884)		(0.638)
lITijt	-3.091***		1.149
	(1.175)		(1.073)
COMLANij	0.202		-0.353
	(0.288)		(0.411)
RTAij	0.138		2.526***
	(1.078)		(0.485)
Constant	38.75***	1.215***	17.34***
	(5.391)	(0.0589)	(2.738)
Observations	359	359	359
R-squared			0.824

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

CONCLUSIONS

Given the important role played by exports in contributing to the Zimbabwean economy it is imperative to find out which factors have the greatest influence on Zimbabwean exports to help government and policy makers so that they can undertake appropriate mixture of measures that can boost export competitiveness. The study makes use of six indicators of export competitiveness and highlight which one contributes more to the competitiveness of Zimbabwean exports. The results from this paper are based on quantitative perspective through the gravity model. The study applied the Poisson pseudo maximum likelihood estimator using the STATA version 13 statistical package. The econometric model is generated using panel dataset of exports from Zimbabwe to the 42 countries for the period 2005 and 2015. The findings reveal that real effective exchange rate, infrastructure, innovation and technology, regional trading arrangement, GDP and per capita GDP are crucial in enhancing the export performance of Zimbabwean goods to the 42 trading counterparts.

The results for all the variables are in line with hypothesis except cost to export, labour productivity and common official language. It should be noted that competitiveness of exports is not only determined by REER, ToT, labour productivity, cost to export, quality of infrastructure and state of innovation and technology but there are many paths to the success of any economy such as set of institutions and policies just to mention a few. With increasing global and regional competition the improvement of Zimbabwe's export competitiveness hinges on a correct mix of policies and participation by various stakeholders. Improving export competitiveness is imperative for the turnaround of Zimbabwe's economic turmoil especially regarding the deteriorating balance of payment and unemployment.

The study offers recommendations for both government and important stakeholders in providing a comprehensive solution regarding what to be done in order to make Zimbabwean exports more competitive. In order to improve the competitiveness of Zimbabwean exports there is need for a long term structural transformation in the political, legal, economic, technological and physical environments.

The implications of the results are that Zimbabwe should improve in areas where she is performing badly so that her exports can be more competitive in comparison to her trading counterparts. To get a full analysis of the impact of the variables on exports value, there is need to split the exports by sector or by product or to use other variables that have a bigger time span. This is left as a future area to research.

REFERENCES

Abou-Stait, F. (2005). Are Exports the Engine of Economic Growth? An Application of Cointegration and Causality Analysis for Egypt, 1977-2003, *Working Paper 76,*

Allison, P. D. (2001). *Missing data* Sage publications.

Anderson, J. E., & Van Wincoop, E. (2001). Gravity with Gravitas: A Solution to the Border Puzzle.

Azam, M. (2011). Exports and economic growth in Pakistan: An empirical analysis. *Journal of Managerial Science, 5*(2), 159 -166.

Bergstrand, J. H. (1985). The gravity equation in international trade: Some microeconomic foundations and empirical evidence. *The Review of Economics and Statistics,* , 474-481.

Blecker, R. A., &Razmi, A. (2010). Export-led growth, real exchange rates and the fallacy of composition. *Handbook of Alternative Theories of Economic Growth, Cheltenham: Edward Elgar.*

Bonga, W. G., Sithole, R., &Shenje, T. E. (2015). Export sector contribution to economic growth in Zimbabwe: A causality analysis. *The International Journal of Business & Management, 3*(10).

Bordigoni, M., Hita, A., & Le Blanc, G. (2014). Econometric analysis of the paper industry competitiveness: the role of energy costs. [Accessed 15 May 2016] Available from World Wide Web:http://proceedings.eceee.org/papers/proceedings2014/3-013-14_Bordigoni_PR.pdf?returnurl=http%3A%2F%2Fproceedings.eceee.org%2Fvisabstrakt.php%3Fevent%3D4%26doc%3D3-013-14.

Brixiová, Z., &Ncube, M. (2014). The real exchange rate and growth in Zimbabwe: Does the currency regime matter? IZA DP No. 8398.

Brodzicki, T., Sledziewska, K., Ciolek, D., &Uminski, S. (2015). Extended Gravity Model of Polish Trade.Empirical Analysis with Panel Data Methods.

Cetindamar, D., &Kilitcioglu, H. (2013). Measuring the competitiveness of a firm for an award system. *Competitiveness Review: An International Business Journal, 23*(1), 7-22.

Chaney, T. (2013). The Gravity Equation in International Trade: An Explanation.

Chemeda, F. E. (2001). The role of exports in economic growth with reference to Ethiopian country. *Agricultural Economic Association in Chicago, (August 5-8, 2001).*

Chigumira, G (2015) Situational Analysis of the Zimbabwe Trading Environment: Enhancing Export Competitiveness. [Accessed 25 May 2016] Available from World Wide Web: http://www.zimtrade.co.zw/IMG/pdf/presentation-situational-analysis-of-the-zimbabwe-trading-environment.pdf.

Deardorff, A. (1998). Determinants of bilateral trade: Does gravity work in a neoclassical world? *The regionalization of the world economy* (pp. 7-32) University of Chicago Press.

De Sá Porto, Paulo Costacurta. (2010). What role of the port in Brazilian states exports: A gravity model approach.*RevistaEletrônica De Gestão De Negócios, 6*(2), 1-11.

Des Vignes, L., & Smith, K. (2005). Measuring the competitiveness of the Trinidad & Tobago economy.

Fastbø, K. A. (2013). An econometric analysis of Norwegian mainland exports.[Accessed 20 May 2016] Available from World Wide Web:http://studenttheses.cbs.dk/bitstream/handle/10417/4659/karen_anne_fastboe.pdf?sequence=1

Fratianni, M. U. (2007). The gravity equation in international trade.

Harris, M. N., &Mátyás, L. (1998). The econometrics of gravity models *Melbourne Institute of Applied Economic and Social Research.*

International Trade Centre (ITC). (n.d.). *Trade competitiveness map - benchmarking national and sectoral trade performance: Trade Performance Index*. [Accessed 27 April 2016] Available from World Wide Web:http://legacy.intracen.org/appli1/tradecom/Documents/TradeCompMap-Trade%20Performance%20Index-Technical%20Notes-EN.pdf

Jordaan, A. C., & Eita, J. H. (2009). Testing the export-led growth hypothesis for Botswana: A causality analysis. *Botswana Journal of Economics, 6*(10), 2-14.

Kaminski, B., & Ng, F. (2011). Zimbabwe's foreign trade performance during the decade of economic turmoil: Will exports recover. *World Bank,*

Kamoyo, M., &Mabvure, T. J. (2012). Role of technological factors on Zimbabwe's export competitiveness in Southern Africa Development Community Free Trade Area from 1995-2010.*Interdisciplinary Journal of Contemporary Research in Business.4* (7), 123-133.

Kamoyo. M., &Chidoko, C. (2013). International Trade, Technology Transfer and Firm Competitiveness: The Case of Zimbabwe Exporting and Non-Exporting Firms. *Greener Journal of Business and Management Business Studies3* (1), 46-53.

Kebede, B. (2011). Does Real Exchange Rate Matter for Ethiopia's Exports? A Gravity Model Analysis.

Kumari, D., & Malhotra, N. (2014). Export-led growth in India: Cointegration and causality analysis. *Journal of Economics and Development Studies, 2*(2), 297-310.

Mátyás, L., Konya, L., & Harris, M. N. (2004). Modelling export activity of eleven APEC countries, 1978-1997. *Applied Econometrics and International Development, 4*(4).

Muñoz, S. (2006). Zimbabwe's export performance: The impact of the parallel market and governance factors *International Monetary Fund. Washington DC, January*.

Mzumara, M. (2011). Was Zimbabwe competitive in international trade 2000-2009? *International Journal of Economics and Research* 2(5), 195-216.

Nag, B., & Nandi, A. (2006). Analysing India's trade dynamics vis-é-vis SAARC members using the gravity model. *South Asia Economic Journal, 7*(1), 83-98.

Palley, I. T. (2003). Export-Led Growth: Evidence of Developing Country Crowding-out, Economic Integration, Regionalism, and Globalization, Arestis, Baddeley, and McCombie (eds.), Cheltenham: Edward Elgar.

Porter, M. E. (2004). Building the microeconomic foundations of prosperity: Findings from the business competitiveness index. *World Competitiveness Report, 2005*

Rault, C., Sova, R., &Sova, A. (2007). Modelling international trade flows between Eastern European countries and OECD countries.

Samen, S. (2010). Export development, diversification and competitiveness: How some developing countries got it right? *World Bank Institute,*

Schofer, E. (2010). Class 3: Count Models - UCI Social Sciences. http://www.socsci.uci.edu/~schofer/2010Soc229AR/pub/Class%203%20Count%20Models%201.0.ppt

Silva, J. S., &Tenreyro, S. (2006). The log of gravity. *The Review of Economics and Statistics, 88*(4), 641-658.

Siyakiya, P. (2014). An Analysis of the Effects of Hyperinflation on Manufacturing Sector Output. A Case of Zimbabwe's Manufacturing Firms 2000-2013. MA dissertation submitted to Erasmus University, The Hague, Netherlands in 2014.

Srinivasan, T., &Archana, V. (2009). India in the global and regional trade: Determinants of aggregate and bilateral trade flows and firms‟ decision to export", *Indian Council for Research on International Economic Relations, working paper no.232.* Ongepubliceerd manuscript.

Stucka, T. (2004). *The effects of exchange rate change on the trade balance in Croatia* International Monetary Fund Working Paper 65.

Thapa, N. B. (2002). An econometric analysis of the impact of real effective exchange rate on economic activities in Nepal. *Economic Review: Occasional Paper, 14*, 17-36.

Thorbecke, W. (2006). The effect of exchange rate changes on trade in East Asia. *Discussion Papers, 6009*

Tinbergen, J. (1962). Shaping the World Economy: Suggestions for an International Economic Policy.

Trang, N. T. H., Tam, N. T. T., & Nam, V. H. (2011). *An Inquiry into the Determinants of Vietnamese Product Export,DEPOCEN working paper series no.2011*

United States of America's Department of Commerce (2014), The Role of Exports in the U.S. Economy.

Westerlund, J., &Wilhelmsson, F. (2011). Estimating the gravity model without gravity using panel data. *Applied Economics, 43*(6), 641-649.

Yishak, T. (2009). Determinants of Ethiopia's export performance: A gravity model analysis. *Trade & Development, 447*

Zhang, Y. (2013). Determinants of Finnish high technology exports: An application of gravity model.