Manufactured exports and economic growth in Southern African Development Community (SADC) region: A panel cointegration approach

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Abstract: The purpose of this study is to examine the empirical relationship between manufactured exports and economic growth in SADC. This study applied the recent panel econometric methods to determine the long run equilibrium between manufactured exports and economic growth. The results of this study indicate that there is an existence of long run equilibrium between manufactured export and economic growth during 1980 to 2012. The results show that there is a positive impact of manufactured exports on economic growth in SADC. Furthermore, the study applied causality analysis and it was found that causality is running from economic growth to manufactured exports.

Keywords: manufactured exports, economic growth, and panel cointegration

JEL Classification: B41; C33, C82

1. Introduction

A number of countries have been strongly implementing regional trade agreements as a central objective of their trade policy. Since 1980, Southern African Development Communities (SADC) was established as a loose alliance of seven states in Southern Africa. Currently SADC consist of 15 countries which are Angola, Botswana, Democratic Republic of Congo, Lesotho, Madagascar, Malawi, Mauritius, Mozambique, Namibia, Seychelles, South Africa, Swaziland, Tanzania, Zambia and Zimbabwe. One of the SADC aim is to achieve development and economic growth, alleviate poverty and support the socially disadvantaged through regional integration, (Export-Import Bank of India, 2012). SADC economies have been enjoying the benefits associated with trade. Over the past thirty years gross domestic product (GDP) growth performance in SADC was moderate. In terms of GDP growth SADC is the largest contributor to in African region. SADC contribute about 54.3% of the nominal GDP of Sub-Sahara Africa. GDP growth for

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SADC in 2009 stood at 2.3% rebounded to 5.4% in 2010, (Reserve Bank of Zimbabwe, 2011). The growth in the region was mainly supported by increased mining activities as a result of favourable commodities prices, stimulus packages cushion economies against the global financial crisis and improved manufacturing activities. According to Banco Nacional de Angola (2012) SADC GDP growth was estimated at an average of 5.07% in 2011. All the economies in the region recorded a positive growth rates except for Angola, South Africa and Mozambique during the 2011. Chauvin and Gaulier (2002) indicates that for the period 1981-1991, on average GDP growth for D.R Congo, South Africa, Zambia, and Mozambique was below 1%. Countries such as Angola, Malawi, Tanzania and Zimbabwe at average were between 1 to 3%. Lesotho, Seychelles, Botswana, Mauritius and Swaziland were about 4 to 10% at average. During the period 1991-1999 on average GDP growth for Angola, Malawi, Seychelles, South Africa, Swaziland, Tanzania, Zambia, Zimbabwe and D.R Congo was around 3%. Meanwhile, average GDP growth for Botswana, Lesotho, Mauritius and Mozambique was around 4 to 7%. During the period 2000 to 2012 average GDP for Zimbabwe, Swaziland, South Africa, Seychelles, Madagascar and Lesotho was around 1 to 3%. On the other hand, average GDP for Botswana, D.R Congo, Malawi, Mauritius, Mozambique, Namibia, Tanzania and Zambia was around 4 to 7%. The economic literature has emphasised that countries with more diversified exports base are suitable trade contenders (Samen, 2010). According to the literature SADC economies have recorded moderate or downward trend of their export diversification (Chauvin and Gaulier, 2002). Amakom (2012) explains that low growth of manufactured exports has been identified as a major factor for poor economic performance in many Sub-Saharan African economies. The main exports of the SADC region are mineral fuels, oils and their distillation products. These products account 37.5% of total exports of the region. This relative confirms that SADC countries are strongly reliant on primary commodity exports.

Industrialisation is recognised as catalyst for poverty eradication, such an intention requires careful planning precisely in manufacturing industries. This implies that for a country to move from traditional economy is through economic development. One of the indicators for economic development is the percentage of manufacturing in total exports. On average economies such South Africa and Swaziland constitutes more than 50% of manufacturing in their total exports of goods (Umlilo Wemfundo, 2007). For Namibia 41% of exports are manufactured goods. Manufactured goods constitute 20-28% of exports for Zimbabwe, Madagascar and Tanzania, and less than 16% of total exports for Malawi, Zambia, and Mozambique. It should be noted that the growth changes in GDP, total exports and manufactured exports in SADC area changes depending on each country's characteristics and its trade policies adopted. Despite progress and increased trade policies in SADC, manufactured exports expansion remains a challenge. Manufactured exports as a percentage of GDP in SADC accounts 11.15%, which it indicates that the region still falls far short meeting a target of 25% (SADC, 2009). SADC still lags behind all other regions of developing world such as Asia (30% of GDP) in terms of manufacturing exports expansion. SADC‘s exports are highly concentrated on a few products, mainly primary commodities. SADC needs to put much more effort into ensuring that manufacturing exports have a strong impact on poverty reduction and employment creation. The expansion of manufactured exports could have a positive impact on growth, which in turn could contribute to create protective employment. The purpose of this study is to examine the empirical relationship between manufactured exports and economic growth in SADC region. For this purpose the following objectives of the study are undertaken: firstly, to determine panel long run equilibrium between manufactured exports and economic growth. Secondly, to test the direction of causality between manufactured exports and economic growth in SADC region. The study is structured as follows: Section 2 is the review of the literature, section 3 is the empirical model specification, whereas section 4 is data and panel framework. Section 5 is the panel empirical results and Section 6 presents the conclusion of the study.

2. Review of Literature

Earlier cross sectional studies such as Amakom (2012), Kilavuz and Topeu (2012), Bbaale and Mutenyo (2011), Lee (2011), Parida and Sahoo (2007), Abu-Qarn and Abu-Bader (2004), Alam (2003), Soderbom and Teal (2002) and Abu-Qarn & Abu-Bader (2001) have found different results on the relationship between manufactured exports and economic growth in cross sectional analyses. In his study of 71 countries, Lee (2011) investigated export specialization in respect of technological manufacturing and economic growth around the world. His finding shows that countries that have specialized in export of high technological content experienced more rapid growth. Conversely, countries that have fallen behind have tended to increasingly specialize in exporting “traditional” or low-technology goods, such as textile and food products. Parida and Sahoo (2007) investigated the relationship between manufactured export and economic growth in four South Asian countries namely India, Pakistan, Bangladesh and Sri Lanka during 1980-2002. Their investigation used the Pedroni’s panel cointegration technique to determine the hypothesis of export-led growth in South Asia. Their study confirmed the existence of manufactured export led growth hypothesis. Abu-Qarn and Abu-Bader (2004) applied vector autogressive and error correction models to investigate the validity of the ELG hypothesis in the Middle East and North Africa (MENA) region. The study found that positive causality runs from manufactured export to economic growth for economies with a relatively high share of manufactured exports in total merchandise exports.

The question that manufactured exports is the key to economic success in Africa was investigated by Soderbom and Teal (2002). Their study found that there is no evidence of correlation between manufactured exports and higher economic growth in nine African countries. Recently study by Amakom (2012) conducted in 10 Sub-Saharan African (SSA) countries recommends manufactured exports in SSA domestic markets. This sentiment root from the fact of small fraction of manufactured exports in total exports in SSA. The influence of diverse classifications of import and export on economic growth in 22 developing countries during 1998-2006 was studied by Kilavuz and Topcu (2012). Their study revealed that developing economies with high-technology manufactured exports experience high economic growth. This means that there is a positive relationship between high-technology manufactured exports and economic growth. This study they suggest that foreign trade policy must be adopted. The study suggested that foreign trade policies that encourage high-tech manufacturing exports are important for sustained economic growth. Furthermore, Bbaale and Mutenyo (2011) carried a study to investigate exports composition and economic growth in Sub-Saharan African and economic growth. The study sampled 35 Sub-Saharan African economies. The technique of generalised methods of moments (GMM) estimator was used for analysis. The study reveals that manufactured exports is positively but not significantly linked to per capita income. More generally a number of factors have been identified in this literature section above. These factors relates to specifically studies conducted in Africa and econometric methods applied. Empirical studies on manufactured exports and economic growth have shown mixed findings on the topic. Most of previous studies such as Amakom (2012), Bbaale and Mutenyo (2011) did not consider the investigation within SADC region. To the best knowledge of this paper it is the recent kind of study in SADC area.

3. Empirical Model Specification

Following a review on empirical literature on the relationship between manufactured exports and economic growth, the modified Abu-Qarn and Abu-Bader (2004) empirical model is specified as follows:

$$GDP_t = \beta_0 + \beta_1 lnGNS_t + \beta_2 lnMIM_t + \beta_3 lnTME_t + \varepsilon_t \qquad 1.1$$

Where: GDP_t = is the economic growth, GNS_t is gross national saving, MIM_t is the imports of goods and service, TME_t is total manufactured exports. Lastly, β_1, β_2 and β_3 are parameters for each variable explain above. All the exogenous variables from the above model they are expected to have a positive impact on economic growth.

4. Estimation Technique

4.1 Data

In order to investigate the relationship between manufactured exports and economic growth in SADC[1] region the following is done. The study uses a panel data for the period 1980 to 2012. Variables to be used are gross domestic product, gross national saving, imports of goods and total manufactured exports. Data for this study is obtained from the International Monetary Fund (IMF), World Development Indicators (WDI) and World Trade Organisation (WTO) websites.

4.2 Econometric Methodology

According to Baltagi (2008) panel data refers to pooling of observations on a cross section over several time periods. Since that it is well documented that the investigation with univariate cointegration fails at some point due to limitations of time series. Gogas, Plakandaras and Papadimitriou (2014) argues that panel data analysis is set in order to allow for the use of more observations and more degrees of freedom on test statistics and appropriate power for the corresponding tests to reject the null hypothesis if possible. The study employ the panel cointegration techniques that can be used to determine if economic growth, gross national saving, imports of goods and service and total manufactured exports in panel system. This study uses the Petroni's panel cointegration test and Kao panel cointegration test. This two panel cointegration types which is Petroni's test and Kao test uses residual based analysis for cointegration and assume one cointegrating vector. Engle and Granger (1987) constructed a test with assumption that when the residual of the regression of variables is I(0) is said to be stationary. In the same sentiments of Engle and Granger (1987) the Petroni's cointegration proposes the residual based test on the following equation:

$$y_{it} = \gamma_i + k_{it} + \lambda_i \chi_{it} + \varepsilon_{it} \qquad 1.2$$

$$\varepsilon_{it} = \psi_i \varepsilon_{it-1} + \omega_{it} \qquad 1.3$$

Where for $i = 1, .., N$ for each unit in the panel, $t = 1, ..., T$. γ_i is the fixed effects and λ_i is the slope coefficient allowed to change across individual units. From equation 1.3 ψ_i is the autoregressive coefficient of the residual ε_{it} from equation 1.2. Petroni's cointegration proposed seven panel cointegration tests which are divided in two dimensions (Petroni, 1995). The first dimension examines the case where equation 1.3 $\psi_i = \psi = 1$ for all units, against the null statement of "no cointegration". The test statistics under the first category (within-dimension) are; panel v-statistics, panel rho-statistics, panel PP-statistics and panel ADF-statistics. Under the second category (between-dimension) is the group PP-statistics, group

[1] All the SADC countries are included to the sample except for Mozambique and D.R Congo due to data unavailability.

rho-statistics and group ADF statistics. The study is making use of all seven test statistics to make a decision whether there is Petroni's contegration between variables by looking at the majority test statistics that confirmed the existence of cointegration. To confirm the robustness of panel cointegration from Petroni, the study also uses Kao test. The test uses the identical elementary approach as the Petroni test, but the Kao specifies cross-section specific constant and homogeneous coefficients on the first stage regressors. Kao (1999) specified a residual based test of cointegration within the panel data by applying the DF and ADF type tests. As Kao cointegration derives two types of panel cointegration, the first DF test type can be computed from residuals estimated as:

$$\mu_{it} = \rho\mu_{it-1} + \varphi_{it} \qquad 1.4$$

Where for ADF test type can be estimated in the following model:

$$\mu_{it} = \rho\mu_{it-1} + \sum_{j=1}^{p} \theta_j \, \Delta\rho\mu_{it-j} + \varphi_{it} \qquad 1.5$$

Where the residuals μ_{it} are obtained from the long run equation. Now the null and alternative hypothesis may be written as follows: $H_0\colon \rho = 1$ for all i (null hypothesis) $H_1\colon \rho < 1$ for all i (alternative hypothesis). From these hypothesis it can be learned that the null hypothesis specifies that no cointegration (assuming existence of unit root in the residuals) against the alternative assuming stationarity in the residuals.

Once the study has confirmed that cointegration relationship exist among the variables, the following step is to determine the long run parameters. For that reason the current study uses the panel fully modified OLS (FMOLS) and panel OLS (DOLS). Kao and Chiang (2000) argued that these two estimators correct the standard pooled OLS for serial correlation and endogeneity of regressors that are normally present in the long run equilibrium. FMOLS is a non-parametric system and it takes in to consideration the possible correlation between error term and first difference of the regressors. The test also consider the presence of the constant term to deal with corrections of serial correlation. The panel FMOLS estimator for long run parameters is defined as follows:

$$\beta_{i.FMOLS} = N^{-1} \sum_{i=1}^{N} \left[\sum_{i=1}^{T} (x_{it} - \check{x}_{it})^2 \right]^{-1} \left(\sum_{t=1}^{T} (x_{it} - \overset{\frown}{x_{\imath}})\, y_{it}^{*} - T\tau_i^{-} \right) \; 1.6$$

Where:

$y_{it}^{*} = (x_{it} - \check{y}_i) - \frac{\widetilde{L_{21\imath}}}{\widetilde{L_{22\imath}}} \Delta x_{it}$, described as the transformed variable of y_{it} in order to achieve the endogeneity correction,

$\tau_i^{-} = \acute{\Gamma}_{21} + \Omega_{21\imath}^{\acute{0}} - \frac{\widetilde{L_{21\imath}}}{\widetilde{L_{22\imath}}} (\acute{\Gamma}_{21} - \Omega_{21\imath}^{\acute{0}})$ also describe as the serial correlation term and L_i is a lower triangular decomposition of Ω_i (i.e. long run covariance matrix) is explained as follows:

$$\Omega_i = \begin{bmatrix} \Omega_{11} & \Omega_{12} \\ \Omega_{21} & \Omega_{22} \end{bmatrix} \quad 1.7$$

DOLS estimation approach is entirely parametric and it gives a computationally convenient alternative. One of the shortfalls of using the DOLS estimators is that degrees of freedom are lowered by leads and lags. The DOLS estimator is achieved from the following equation:

$$y_{it} = \alpha_i + \beta i X_{it} + \sum_{k=q}^{q} c_{ik}\,\Delta X_{it+k} + \mu_{it}; \qquad t = 1, \ldots T \quad i = 1 \ldots \ldots N \quad 1.8$$

Where α_i denotes country specific effect and c_{ik} is the coefficient of a lead or lags of first differenced exogenous variables. Lastly; μ_{it} is the error term which assumed to I(0). The parameter estimates of DOLS is as follows:

$$\beta_{i.DOLS} = \left[N^{-1} \sum_{i=1}^{N} \left(\sum_{t=1}^{T} Z_{it} \hat{Z}_{it}\right)^{-1} \left(\sum_{t=1}^{T} Z_{it}\, y_{it}^{*}\right)\right] \quad 1.9$$

Where $Z_{it} = (x_{it} - \bar{x}_i, \Delta x_{it-k}, \ldots \ldots \Delta x_{it+k})$ is the $2(k+1) * 1$ vector of regressors.

To study the panel causality relationship a vector error correction (VEC) model is estimated. The current study uses panel causality proposed by Holtz-Eakin, Newey and Rosen (1988). Also Pradhan (2009) argues that if variables are I(1) and not cointegrated, the study uses the following models to investigate the relationship:

$$lnGDP_{it} = \theta_0 + \sum_{j=i}^{p} \beta_{1i}\, lnGDP_{it-j} + \sum_{j=1}^{p} \beta_{2i}\, lnTME_{it-j} + f_{yi} + \in_{it} \quad 2.0$$

$$lnTME_{it} = \delta_0 + \sum_{j=i}^{p} \gamma_{1i}\, lnGDP_{it-1} + \sum_{j=1}^{p} \gamma_{2i}\, lnTME_{it-1} + f_{xi} + \ni_{it} \quad 2.1$$

Where $lnGDP_{it}$ and $lnTME_{it}$ it is a measure for economic growth and total manufactured exports respectively. $i = 1, 2, \ldots N$ are cross sectional panel data; $\in_{it}$ and $\ni_{it}$ are error terms; f_{yi} and f_{xi} are individual fixed effects and p is the lag length. When the first difference is considered in order to remove the fixed effect, the models becomes as follows:

$$\Delta lnGDP_{it} = \theta_0 + \sum_{j=i}^{p} \beta_{1i}\, \Delta lnGDP_{it-j} + \sum_{j=i}^{p} \beta_{2i}\, \Delta lnTME_{it-j} + ect_{yi-1} + \in_{it} \quad 2.2$$

$$\Delta lnTME_{it} = \delta_0 + \sum_{j=i}^{p} \gamma_{1i}\, \Delta lnGDP_{it-1} + \sum_{j=i}^{p} \gamma_{2i}\, \Delta lnTME_{it-1} + ect_{xi-1} + \in_{it} \quad 2.3$$

Where Δ indicate the first difference of the variables under study, ect_{yi} and ect_{xi} are respectively the residuals from the cointegrating equation. Where the above equations 2.2 and 2.3 are estimated in a case where variables under study I(1) and cointegrated. In most time series and panel data analysis it is important to determine the panel order of integration in variables before estimated their cointegration. The literature provides a wide range of tests for panel unit root frameworks. For the current study the tests are employed to investigate the order of integration in panel data set. The study employs Levin, Lin and Chu (LLC) (2002) and Im, Pesaran and Shin (IPS) (2003) panel unit root tests.

5. Empirical Results

This section gives the results for panel analysis for this study. The study first starts by descriptive analysis to unit root analysis. After understanding the order of integration for each variable the study continues to undertake panel cointegration and causality testing. In most every econometric analysis is very important for a researcher before any in-depth analysis to first explore data. Appendix A and B[1] present the line graphs for each variable at levels and first difference. To test the existence of unit root in panel data, Table 1 present the results from two tests of LLC and IPS unit root test. The upper part is the results for LLC test and below is IPS test results. The equation type is based on individual effect and also individual effect plus trend. Table indicates that both common and individual tests for the variables, except gross national saving variable are non-stationary at levels. They become stationary at first difference, and this means that they are I(1). This implies that GDP I(1), MIM I(1), TME I(1) whereas GNS I(0). The results of the Petroni panel cointegration test are reported in Table 2. The table is divided into three columns, where the first column is the within and between dimension statistics, second column is the panel t-statistics and lastly is panel probability.

Table 2 shows that under the first dimension category all the test statistics are significant at 5% significant level, except for panel rho-statistics which is not significant at 5%. The second category shows the results for between dimension statistics, and indicates that Group PP-statistics and Group ADF-statistics are statistically significant at 5% except for Group rho-statistics which is not. Eventually this results implies that with majority of test statistics there is long run panel cointegration between economic growth, gross national saving, imports of goods and services and total manufactured exports (5 out of 7 test statistics confirmed existence of cointegration).

Table 1. Panel unit root results for variables GDP, GNS, MIM and TME

Levin, Lin & Chu Test	levels		First difference	
	Individual effect	Individual effect + trend	Individual effect	Individual effect + trend
LogGDP	2.165 (0.984)	-0.405	-13.579	-15.237
	-1.704	(0.342)	(0.000) ***	(0.000) ***
LogGNS	(0.044) **	-2.874	-19.531	-16.893
	3.921	(0.002) **	(0.000) ***	(0.000) ***

[1] These appendix A and B are available from the author on request

LogMIM LogTME	(1.000) 1.308 (0.904)	-1.404 (0.080) 0.409 (0.659)	-13.454 (0.000) *** -14.774 (0.000) ***	-11.104 (0.000) *** -12.836 (0.000) ***
Im, Pesaran and Shin Test	Individual effect	Individual effect + trend	Individual effect	Individual effect + trend
LogGDP LogGNS LogMIM LogTME	5.508 (1.000) -3.943 (0.000) *** 6.975 (1.000) 1.818 (0.965)	0.600 (0.725) -3.426 (0.000) *** -1.235 (0.108) -1.598 (0.054)	-11.444 (0.000) *** -19.609 (0.000) *** -14.177 (0.000) *** -16.146 (0.000) ***	-12.500 (0.000) *** -18.159 (0.000) *** -12.985 (0.000) *** -14.582 (0.000) ***

//*// 10% statistically significant //**// 5% statistically significant//***// 1% statistically significant

Table 2. Petroni panel cointegration results

Within-dimension statistics	Panel t-statistics	Panel probability
Panel v-Statistic Panel rho-Statistic Panel PP-Statistic Panel ADF-Statistic	2.204 -0.818 -2.144 -2.199	0.013 ** 0.206 0.016 ** 0.013 **
Between dimension statistics	Panel t-statistics	Panel probability
Group rho-Statistic Group PP-Statistic Group ADF-Statistic	-0.121 -3.072 -3.023	0.451 0.001 *** 0.001 ***

//*// 10% statistically significant //**// 5% statistically significant//***// 1% statistically significant

Table 3. Kao panel cointegration results

Statistics methods	t-Statistic	Probability
ADF	-5.184	0.000 ***
Residual variance	0.018	
HAC variance	0.015	

//*// 10% statistically significant//**// 5% statistically significant//***// 1% statistically significant

Table 3 presents the results for Kao panel cointegration results. The table shows that the first column reports the statistics methods, second column is t-statistics and the last column is the probability values. According to the results, the Kao ADF t-statistics is -5.1846 for panel analysis and it is significant at 1% significant level. This implies that the study reject the null hypothesis that no panel cointegration existing among the variables in the study. This means that there is long term equilibrium between economic growth, gross national saving, imports of goods and service and total manufactured exports according to Kao panel test.

After the analysis confirming the long run equilibrium relation existing among variables under study. The long run impact of gross national saving, import of goods and total manufactured exports on economic growth is estimated. The study uses the two types of estimation methods which is fully modified ordinary least squares (FMOLS) and dynamic ordinary least squares (DOLS). According to Tintin (2009) there is no consensus in the literature which method between FMOLS and DOLS can be used instead of the other.

Table 4. FMOLS and DOLS results

Dependent variable: LOGGDP

Independent variables	Parameter coefficients (FMOLS)	Parameter coefficients (DOLS)
LogGNS	0.033 (1.660) *	0.025 (1.2657)
LogMIM	0.780 (15.612) ***	0.709 (14.921) ***
LogTME	0.001 (0.103)	0.002 (0.1819)
Adjusted R-squared	0.999	0.999

/*/ 10% statistically significant /**/ 5% statistically significant, /***/ 1% statistically significant

Table 4 above presents long run coefficients where the dependent variable is economic growth. The first column records the independent variables and the second column is the parameter coefficients of the explanatory variables. From the table above the values in the brackets are probabilities and others are coefficients. The results of FMOLS shows total manufactured exports have a positive impact on economic growth. It can be postulated that a 1% increase in total manufactured exports will lead to 0.0015% increase in economic growth. The results also show that there is a positive relationship between gross national saving and economic growth. A 1% increase in gross national saving will lead to 0.03% increase in economic growth. The results lastly shows that there is a positive relationship between imports of goods and economic growth, the coefficient shows that it is statistically significant at 1%. Table 4 also presents the long run coefficients for DOLS, where the dependent variable is economic growth. The DOLS results show that there is a positive relationship between total manufactured exports and economic growth. Also there is a positive relationship between gross national saving and economic growth and is not statistically significant. The coefficient for imports of goods is 0.70, suggesting that a 1% increase in imports will lead to 0.70% increase in economic growth. Following the results of the study from the two panel cointegration methods, the concept of causality is tested. It is very important to estimate causality within VEC since there is a confirmation of cointegration between the variables under study.

Table 5. Panel granger causality results

Null hypothesis	Chi-square	P-value
ΔLGNS does not granger cause ΔLGDP	1.006660	0.6049
ΔLGDP does not granger cause ΔLGNS	4.446286	0.1097
ΔLMIM does not granger cause ΔLGDP	10.46232	0.0057 ***
ΔLGDP does not granger cause ΔLMIM	35.10436	0.0000 ***
ΔLTME does not granger cause ΔLGDP	1.876968	0.3921
ΔLGDP does not granger cause ΔLTME	9.289324	0.0102 **
Jointly independent variables cause ΔLGDP	14.37702	0.0276 **

//*// 10% statistically significant//**// 5% statistically significant//***// 1% statistically significant

From table 5 above the study presents panel granger causality results for SADC communities. It can be seen from the results that there is causality running from economic growth to total manufactured exports. This means that between the two variables there is uni-directional causality running at 5% significant level. Causality is also running from imports of goods to economic growth and vice versa. This implies that there is bi-directional causality between imports of goods and economic growth in SADC. Lastly the result indicates that jointly the exogenous variables granger cause economic growth at 5% significant level.

6. Conclusion of the Study

The purpose of this study was to investigate the relationship between manufactured exports and economic growth in SADC area. This investigation was motivated by lack of empirical work in this area especially for SADC countries. The investigation of the study covers the period of 1980 to 2012 on an annual basis. The study applied three panel cointegration techniques to rely on a more robust results. The results indicate that in all panel cointegration methods applied they confirmed the existence of cointegration among the variables assumed. In an effort to study the parameters of variables of interest it was found that both the method of DOLS and FMOLS are consistent. The results from panel analysis also confirm that there is a positive relationship between economic growth and total manufactured exports. The study furthermore investigated panel causality, and it was found that causality is running from economic growth to total manufactured exports at 5% significance level. Based on the results of the study it is recommended for policy implication that policy makers in SADC countries should increase total manufactured exports in order to improve economic growth. It appears that manufactured export promotion is a feasible economic growth strategy.

5. References

Abu-Qarn, A.S & Abu-Bader, S. (2004). The validity of the ELG hypothesis in the MENA region: cointegration and error correction model analysis. *Applied Economics*, 36:15, pp 1685-1695.

Abu-Qarn, A & Abu-Bader, S. (2001). The Validity of the ELG Hypothesis in the MENA Region: Cointegration and Error Correction Model Analysis. Department of Economics, Ben-Gurion University of the Negev. *MPRA Paper No. 1116*, posted 11, December 2006.

Alam, M.I (2003). Manufactured Exports, Capital Good Imports, and Economic Growth: Experience of Mexico and Brazil. *International Economic Journal*, 17:4, pp 85-105.

Amakom U. (2012). Manufactured Exports in Sub-Saharan African Economies: Econometric Tests for the Learning by Exporting Hypothesis. *American International Journal of Contemporary Research,* 2:4, pp 195-206.

Baltagi, B. H. (2008). *Econometric Analysis of Panel Data*. 4th Ed. New York: Wiley.

Banco Nacional de Angola (2012). Integrated Paper on Recent Economic Developments in SADC. *Prepared for the Committee of Central Bank Governors in SADC by Banco Nacional de Angola*, September 2012.

Bbaale, E. & Mutenyo, J. (2011). Export Composition and Economic Growth in Sub-Saharan Africa: A Panel Analysis. Consilience: *The Journal of Sustainable Development*, Vol. 6, no 1 (2011), pp. 1–19.

Chauvin, S. & Gaulier, G. (2002). Prospects for Increasing Trade among SADC Countries. *2002 Annual Forum at Glenburn Lodge, Muldersdrift, Trade and Industrial Policy Strategies* (TIPS). Available at: http://www.tips.org.za/files/555.pdf.

Engle, R.F & Granger, C.W.J (1987). Co-Integration and Error Correction: Representation, Estimation and Testing. *Econometrica*, 55, pp 251-276.

Export-Import bank of India (2012). Southern African Development Community (SADC): A study of India's trade & investment potential. *Occasional paper no*. 152.

Gogas, P., Plakandaras, V. & Papadimitriou, T. (2014). Public Debt and Private Consumption in OECD Countries. *Journal of Economic Asymmetries*, vol. 11, pp. 1-7.

Holtz-Eakin, D.; Newey, W. & Rosen, H. (1988). Estimating Vector Autoregressions with Panel Data. *Econometrica*, 56(6), pp. 1371-1395.

Im, K.S., Peseran, M.H. & Shin, Y. (2003). Testing for Unit Roots in Heterogeneous Panels. *Journal of Econometrics* 115, pp. 53–74.

Kao, C. (1999). Spurious regression and residual-based tests for cointegration in panel data when the cross-section and time series dimensions are comparable. *Journal of Econometrics* (90), pp 1– 44.

Kao, C. & Chiang, M.H (2000). On the Estimation and Inference of a Cointegrated Regression in Panel Data. *Advances in Econometrics*, 15, pp. 179-222.

Kilavuz, E. & Topcu, B.A (2012). Export and Economic Growth in the Case of the Manufacturing Industry: Panel Data Analysis of Developing Countries. *International Journal of Economics and Financial Issues*, Vol. 2, No. 2, 2012, pp. 201-215.

Lee, J. (2011). Export specialization and economic growth around the world. *Economic Systems* 35, pp. 45–63.

Levin, A.; C. Lin, & Chu, C.J. (2002). Unit Root Tests in Panel Data: Asymptotic and Finite-sample Properties. *Journal of Econometrics* 108, pp. 1–24.

MacKinnon, J.G.; Haug, A.A & Michelis, L. (1999). Numerical Distribution Functions of Likelihood Ratio Tests for Cointegration. *Journal of Applied Econometrics*, 14, pp. 563-577.

Maddala, G.S & Wu, S. (1999). A comparative study of unit root tests with panel data and new simple test. *Oxford Bullertin of Economics and Statistics*, Special issue, pp. 631-652.

Parida, P.C & Sahoo, P. (2007). Export-led Growth in South Asia: A Panel Cointegration Analysis. *International Economic Journal*, 21:2, pp. 155-175.

Pedroni, P. (1995). Panel Cointegration; Asymptotic and Finite Sample Properties of Pooled Time Series Tests, with an Application to the PPP Hypothesis. *Indiana University working papers in economics,* pp. 95-013.

Pradhan, R.P. (2009). The FDI-led-growth hypothesis in ASEAN-5 countries: Evidence from cointegrated panel analysis. *International Journal Business and Management*, 4(12), pp. 153-164.

Reserve Bank of Zimbabwe (2011). Integrated Paper on Recent Economic Developments in SADC. *Prepared for the Committee of Central Bank Governors in SADC by the Reserve Bank of Zimbabwe, September.*

SADC (2009). Study report on SADC industrial policy and strategies. *SADC Secretariat,* November 2009. Available at:http://www.google.co.za/url?sa=t&rct=j&q=&esrc=s&frm=1&source=web&cd=1&ved=0CCcQFjAA&url=http%3A%2F%2Findustrialization.eac.int%2Findex.php%3Foption%3Dcom_docman%26task%3Ddoc_download%26gid%3D119%26Itemid%3D70&ei=lyHhUozWBdGihgf8qIHgDw&usg=AFQjCNG6ooE0w5_tAmpvmY5Nxin-ZNOZMA.

Samen, S. (2010). *A Primer on Export Diversification: Key Concepts, Theoretical Underpinnings and Empirical Evidence.* International Trade Department, World Bank. Available at: http://blogs.worldbank.org/files/growth/EXPORT_DIVERSIFICATION_A_PRIMER_May2010(1).pdf.

Shakouri, B. & Yazdi, S. (2012). Granger Causality Relationship between Mining Exports and GDP Growth in Iran. *Australian Journal of Basic and Applied Sciences,* 6(12), pp. 429-435.

Söderbom, M. & Teal, F. (2002). Are Manufacturing Exports the key to economic success in Africa. Paper prepared for the *Third United Nations Conference on the least Developed Countries, Brussels* 14-20 May.

Tintin, C. (2009). Testing the Balassa-Samuelson Hypothesis: Evidence from 10 OECD Countries. Master Thesis, School of Economics and Management, Spring Available at: http://lup.lub.lu.se/luur/download?func=downloadFile&recordOId=1436890&fileOId=1646902.

Umlilo, WeMfundo (2007). Review of the Status and Capacities for the Implementation of the Protocol on Education and Training. *Southern African Development Community.*