

Export Performance and Foreign Direct Investment in Zimbabwe: An ARDL Approach

S Zhanje and R Garidzirai

University of Limpopo, South Africa

Abstract: Zimbabwe's international exposure after the attainment of independence in 1980 and through the introduction of structural adjustment programs was meant to, among other macroeconomic objectives, enhance export performance. The Zimbabwe Agenda for Sustainable Socio-Economic Transformation (Zim-ASSET), a developed economic blue print for the country, with the intention of re-engaging the international community has motivated this research study to investigate export performance in Zimbabwe. Therefore, the purpose of this research study is to examine the effect of FDI on Zimbabwe's export performance considering the influence of other variables such as economic growth and terms of trade. To investigate such a relationship, the research study employed the Autoregressive Distributed Lag Analysis (ARDL) on time series data for the period 1980 to 2016. The results show a positive relationship between export performance and FDI. Furthermore, other control variables such as economic growth and terms of trade were also positively related to exports. Thus the study recommends the government of Zimbabwe to maintain political stability in the economy to attract FDI. Moreover, the government should loosen the local industrial laws to promote exports.

Keywords: ARDL, Export Performance, Foreign Direct Investment, Zimbabwe

1. Introduction

Economic performance in most African countries has been impeded by a lack of capital caused by low levels of domestic savings and foreign exchange constraints (Adams & Atsu, 2014). The investment-saving-import-export identity theoretically portrays that the import-export gap must be equally matched by an identical investment-savings gap (Clunies-Ross, Forsyth & Huq, 2009). Since domestic savings have remained subdued the situation has been exacerbated by the fact that SADC countries such as Mauritius, Mozambique, Malawi, Madagascar, Swaziland and Zimbabwe, just to mention a few, have experienced unfavourable trade balances for more than 10 years (World Bank, 2018). Overall, when the Balance of Payments through the Current Account is not generating surpluses to close the savings-investment gap, other foreign resources such as inward Foreign Direct Investment (FDI) can be considered to close such gap. This will ease foreign exchange constraints and in the process fuel economic activity. Given the existence of an unfavourable trade balance experienced by Zimbabwe from 2002 to 2016 (World Bank, 2018), the Zimbabwean policies should be designed in such a way as to take advantage of the export-FDI nexus. This in turn enhances export performance, which also accelerates Zimbabwe's

economic recovery as envisaged by the country's blue print, the Zimbabwe Agenda for Sustainable Socio-Economic Transformation (Zim-ASSET).

The theoretical literature reviewed reveals that the linkages between FDI and trade are complementary, substitutive in nature or just neutral (Koroci & Deshati, 2016). The complementary view on export-FDI relationship is supported by a major strand of empirical literature (Kutan & Vuksic, 2007; Sun, 2012; Davaakhuu, Sharma & Oczkowski, 2015; Akoto, 2016; Li & Park, 2016; Koroci & Deshati, 2016), whereas the substitution view of the export-FDI relationship is also supported empirically (Kuntluru, Muppani & Khan, 2012). There are also advocates of the claim that the relationship between export performance and FDI is neutral (Banga, 2006; Singh & Tandon, 2015). Given such mixed views from both the theoretical literature and empirical evidence it is therefore the intention of this study to objectively investigate the nature of the export-FDI relationship in Zimbabwe using the Autoregressive Distributed Lag (ARDL) bounds testing technique for the period 1980 to 2016. The rest of the paper is organised as follows: Section 2 reviews the theoretical and empirical literature of export performance and FDI. Section 3 outlines the empirical model, estimation methods and the data used in this research study. In Section 4 estimated results are reported and discussed. Lastly in Section 5 conclusions are drawn.

2. Literature Review

The relationship between export performance and FDI is of utmost importance to the host country such as Zimbabwe, the country where FDI is bolted or located. Such a relationship should be investigated in order to determine whether FDI enhances or impedes export performance or its effect is just neutral. The complementarity, substitutability and neutrality of FDI with respect to export performance depends on the relative magnitude of FDI inflows, motives of FDI, characteristics of FDI, policy options for host countries, policy actions on FDI by a host developing country and the type of FDI resident in the host country (Clunies-Ross *et al.*, 2009). Further the application of either horizontal models of FDI or vertical models of FDI can yield different export performance outcomes from the perspective of the host country. When FDI is horizontal in nature it implies that Multinational Enterprises (MNEs) locate their subsidiaries (to produce the same goods and services) in the different respective countries of interest where transport costs could be exorbitant or just favouring to be closer to the market (Helpman, Melitz & Yeaple, 2004). Koroci & Deshati (2016) in Helpman *et al.* (2003) argues that horizontal FDI is mostly known to have a negative impact on export performance which reinforces the substitution relationship between exports and FDI.

The substitution relationship between trade and FDI is also supported by the Heckscher-Ohlin-Samuelson (HOS) theory. The theory propounds that two countries in question should be identical except the resource endowments (Leamer, 1995). For instance, a country that is labour abundant should produce goods that require more labour export. Conversely, a country that has its capital abundant should also export goods that are capital intensive. Thus HOS theory holds that when the factor mobility assumption is relaxed, exports and FDI become substitutes and the factor endowment differential between countries is reduced due to factor mobility and eventually trade flows are reduced (Urkude & Jadhav, 2013).

The complementarity relationship between exports and FDI becomes a reality when MNEs divide the production process among various countries in an attempt to curtail or contain costs (Urkude & Jadhav, 2013) and in the process take advantage of relative factor endowment differential prevailing between host developing countries. A host country such as Zimbabwe becomes the recipient of international

capital flows for economic development, technology and management knowledge transfer and the resultant spillover effects empowers the host country's related industries which eventually enhances the host country's international trade (Koroci & Deshati, 2016). The neutrality of FDI on exports will be addressed by empirical evidence which follows among other view points to be discussed.

The positive relationship between exports and FDI is well documented as empirical evidence. On that note, Kutan & Vuksic (2007) estimated the impact of FDI inflows on exports using the Generalised Least Squares (GLS) technique on data for 12 Central and Eastern European Countries (CEEC). The empirical results showed that FDI inflows increase the domestic supply capacity and in turn boosts exports for all economies included in the research study. Complementing the supply capacity-increasing effects are the FDI specific effects on exports which were associated with the new member states of the European Union. The research study results indicated that when FDI stock of European Union countries is increased by 1% the export performance is improved by 0.42% in the long run due to the specific impact only. Such specific effects can arise from possible improvement in competitive advantage enjoyed by domestic producers in the host country.

Sun (2012) explored the impact of FDI on Chinese exports by applying a feasible and efficient two step Generalised Method of Moments (GMM) IV Estimation on domestic firms' panel data for the period 1991-2007. The study results revealed that a positive relationship between FDI and exports exist since a 1% increase in foreign presence encourages domestic firms to boost their exports by 0.57%. In other words, due to positive productivity spillovers emanating from foreign firms, domestic firms respond by increasing their exports despite the fact that FDI may push up production costs and in the process make the domestic market more profitable. Since FDI is not the sole determinant of export performance, Davaakhuu, Sharma & Oczkowski (2015) analysed the determinants of export performance by applying Fixed Effects Methodology on Mongolian panel data (from mining, manufacturing and primary sectors) for the period 1995-2012. The empirical outcome suggested that not only FDI inflows can influence exports but also increased world income and higher export prices that Mongolian exports can fetch in the international markets.

In support of the exports-FDI complementary view, Li & Park (2016) investigated the trade features of FDI inflows and the dynamic link between FDI inflows and the Chinese international trade using probability regression models on Eastern, Middle and Western regional firms for the period 1992-2006. The study results indicated that FDI inflows are significantly and positively related to international trade with respect to China's provinces and also to regional trade. Research study results also revealed that the contribution of FDI to imports outweigh the FDI contribution to exports. Underpinning positive perspective Koroci & Deshati (2016) determined the effect of FDI on Albania's export performance by applying regression analysis on time series data covering the period 1996-2014. The study results showed that there is a positive relationship between FDI and Albanian exports.

Exploring the same line, Akoto (2016) used Vector Error Correction Model (VECM), VAR Granger causality test and impulse response analysis to determine the responsiveness of exports to FDI shocks. This analysis was conducted on the South African quarterly time series data for the period 1960Q1 to 2009Q4. The unit root test results showed that the model variables (real exports, real non-export GDP and FDI) were stationary at first difference. The co-integration test suggested that variables were co-integrated based on the trace test outcome. The long run VECM results suggested that FDI positively influences export performance significantly. That is, a 1% increase in FDI leads to a 0.187% increase in exports. The VAR Granger causality test confirmed a bi-directional causality relationship between GDP and exports, while a uni-directional causality running from FDI to exports seems to hold for the South African case. But the results from the variance decomposition analyses indicated that exports are not very sensitive to changes in FDI inflow.

Jana, Sahu & Pandey (2017) also investigated the FDI-export nexus by using the Vector Error Correction Model (VECM) and VEC Granger causality test on Indian time series data for the period 1996-97 to 2016-17. The Johansen's co-integration test suggested that there is a significant positive long run co-movement between the FDI and Indian exports.

The substitution view on the export-FDI nexus was supported by Kuntluru *et al.* (2012) who analysed the impact of FDI on the export performance of 103 pharmaceutical firms' data in India using the

Tobit Fixed Effects Model using data from 1997-98 to 2004-05. Although the research study had hypothesised the existence of a positive relationship, the study results revealed that FDI has a significant inverse or negative impact on the firm export performance.

The neutrality perspective on the export-FDI relationship was justified by Banga (2006) who examined the impact of FDI on export diversification using Fixed Effects and Random Effects Models on Indian panel data for the period 1994-2000. The empirical results showed that the Indian export diversification is both directly and indirectly caused by US FDI. On the contrary research study results confirmed an insignificant impact of Japanese FDI on Indian export performance. In support of the neutrality perspective, Singh & Tandon (2015) analysed the causal relationship between FDI and exports by applying unit root test, Johansen Co-integration test and Granger causality test on Indian time series data covering the period 1990-2013. The empirical results showed that neither FDI Granger cause exports nor exports Granger cause FDI. In this case a neutrality verdict was justified between FDI and export performance.

Other studies also endeavoured to set a foot print with respect to the exports-FDI nexus debate. Chiappini (2011) investigated the Granger causality between FDI and exports of goods and services using the panel data set of 11 European countries covering the period 1996 to 2008. The rejection of the null hypothesis of the existence of a unit root when the panel unit root tests were applied to panel data led to the evaluation of the causal relationship between FDI and exports. The research study results from a heterogeneous panel justified the existence of a causal relationship running from FDI to exports. Further a strong heterogeneity evidence of the causal relationship running from exports to FDI was found.

Adhikary (2012) investigated the effect of FDI (including other variables such as trade openness, domestic demand and exchange rate) on export performance by applying Vector Error Correction Model (VECM) on the time series data of Bangladesh for the period 1980-2009. The co-integration test results supported the existence of a co-integrating relationship between the variables. The study results revealed that FDI is an important variable which significantly explains the variation in exports

in both the short term and long term. Calegario *et al.* (2014) used the Moderated Multiple Regressions and Generalised Linear Models to test the impact of FDI on exports and imports on 11 Brazilian industries covering the years 1996 to 2009. The study results revealed that FDI and increased exports are correlated in the short term but not in the long term. A positive relationship between FDI and exports was proved to be associated with the preponderance of resource seeking strategies by export oriented industries. A positive relationship between imports and FDI was said to exist in the short run for import oriented industries, while a negative relationship between FDI and imports was suggested to prevail in the long term.

For the Chinese economy, Chang, Su & Dai (2017) investigated the causal relationship between FDI and exports through the Knowledge Capital Model using the Bootstrap Granger Full Sample and Sample Rolling Window Causality test covering years 1994 to 2014. Study results from the full sample indicated that the causal link running from FDI to exports does not exist, but such an outcome was derived from an unreliable sample as emphasised by the authors. When the Rolling Window Causality test was applied on a dynamic causal link, the results showed that a significant impact of FDI on exports was realised mostly around time periods associated with increasing levels of FDI in Hong Kong, Macao and Taiwan which outweighed negative impacts in China.

3. Research Method

The research study investigates the relationship between export performance and FDI in Zimbabwe using the Autoregressive Distributed Lag (ARDL) bounds testing methodology. Some complementing econometric testing techniques are also employed to improve the efficiency of model results. The Augmented Dickey Fuller and Phillips Perron unit root tests are used to determine stationarity of model variables and the order of integration. The ARDL bounds testing technique is applied to initially justify the presence of co-integrating relationship between the variables. When the existence of co-integration among the variables is established, the ARDL analysis is then used to determine both the short run and the long run relationships present in the model. To check for the robustness and reliability of results, diagnostic tests are then conducted. Testing for the normality

of residuals, the absence of serial correlation and heteroscedasticity and the stability of the model is justified in this case.

4. Data and Model Specification

The Zimbabwean data that was analysed in this research study was obtained from the World Bank Data base (World Bank, 2018) for the period 1980-2016. The empirical research study used the export model of the form:

$$X_t = f(FDI_t, GDP_t, TOT_t) \quad (1)$$

Removing brackets, Equation 1 is transformed into

$$\begin{aligned} LNX_t = & \alpha_0 + \alpha_1 LNFDI_1 \alpha_2 LNGDP_t \\ & + \alpha_3 LNTOT_3 + \varepsilon_t \end{aligned} \quad (2)$$

where:

LNX_t = natural logarithm of exports at time 't', $LNFDI_t$ = natural logarithm of Foreign Direct Investment at time 't', $LNGDP_t$ = natural logarithm of Gross Domestic product (proxy of economic growth) at time 't', $LNTOT_t$ = natural logarithm of terms of trade at time 't', $\beta_0, \alpha_1, \alpha_2, \alpha_3$ are model coefficients and alphas are elasticities, ε_t = represents a random variable called an error term at time 't'.

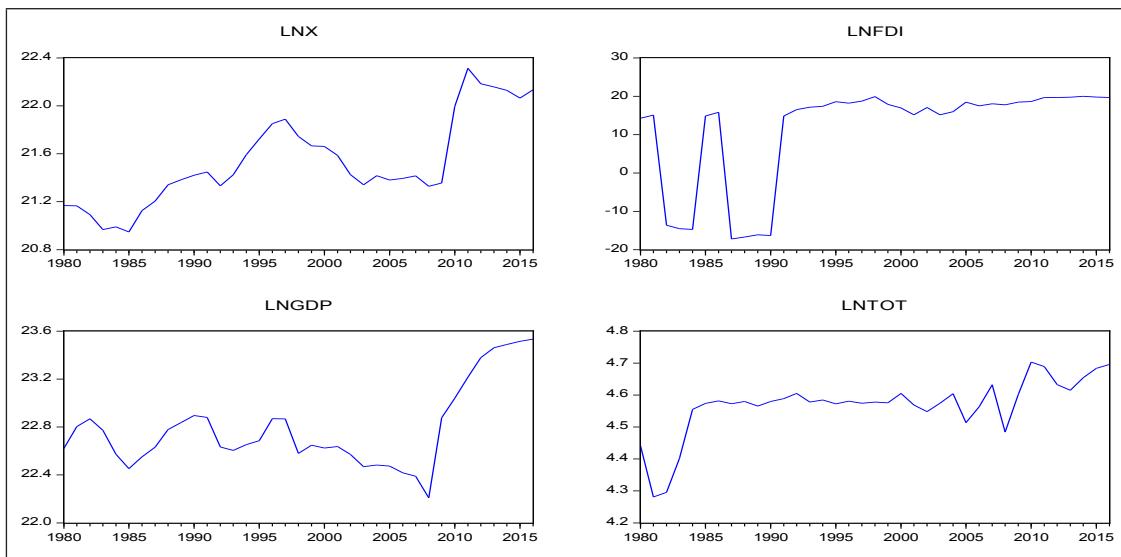
The $LNGDP$ and $LNTOT$ are control variables used in the model to minimise omitted variable bias, thereby improving the efficiency and reliability of model results (Adhikary, 2012; Davaakhuu, Sharma, & Oczkowski, 2015). The unrestricted error correction model (UECM) of ARDL to co-integration is applied to determine both the short run and the long run relationship (Mohapatra, Giri, & Sehrawat, 2016). It takes the form:

$$\begin{aligned} \Delta LNX_t = & \varphi_0 X_t + \sum_{i=1}^n f_{ix} \Delta LNX_{t-i} + \sum_{i=1}^n g_{ix} \Delta LNFDI_{t-i} \\ & + \sum_{i=1}^n h_{ix} \Delta LNGDP_{t-i} + \sum_{i=1}^n k_{ix} \Delta TOT_{t-i} + \psi_{1x} LNX_{t-1} \\ & + \psi_{2x} LNFDI_{t-1} + \psi_{3x} LNGDP_{t-1} + \psi_{4x} LNTOT_{t-1} + \gamma_{1t} \end{aligned} \quad (3)$$

where Δ is the first difference operator.

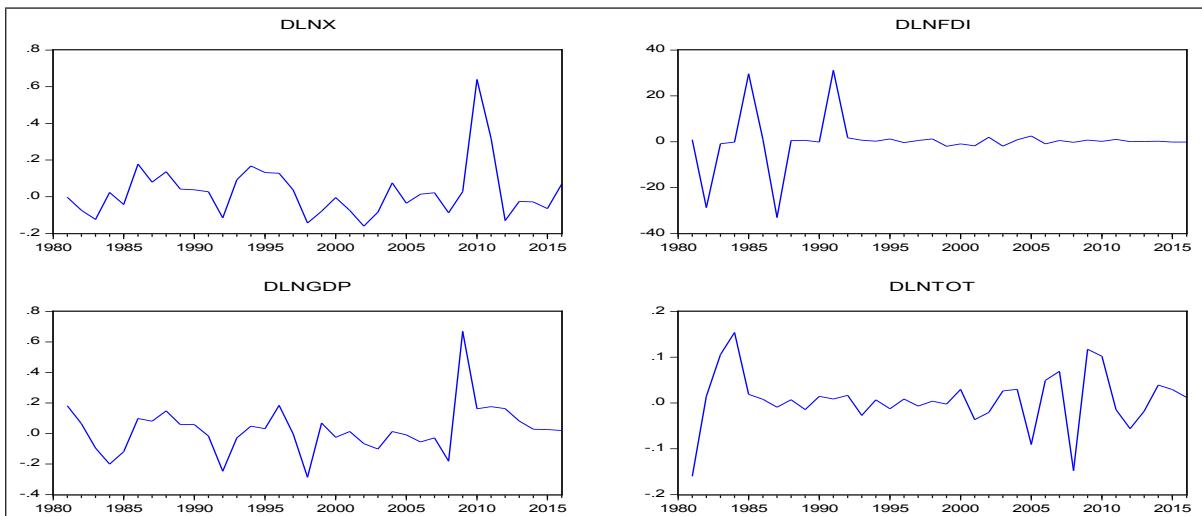
Mohapatra, Giri & Sehrawat (2016) hold that the first ARDL test is the justification of a long run relationship among the variables. Such a determination is conducted using an F-test which represents the joint significance of the coefficients of the lagged levels of variables. The two asymptotic bound critical values give the test for co-integration when independent variables are

Figure 1: Time Series in Levels



Source: Own Computation, 2018

Figure 2: Time Series in 1st Difference



Source: Own Computation, 2018

I(d) where $(0 \leq d \leq 1)$. When the F-statistic computed is greater than the upper critical value, the null hypothesis of no co-integration is rejected. If the F-statistic calculated falls between the lower and the upper critical values, the result is inconclusive. When the calculated F-statistic falls below the lower critical value, then the null hypothesis of no co-integration cannot be rejected (Pesaran & Shin, 1999). The acceptance of the existence of a cointegrating relationship justifies the estimation of a conditional ARDL long run model for LNX_t . Orders of ARDL (q_1, q_2, q_3, q_4) models are then selected using Akaike Information Criteria (AIC). Eventually, the short run dynamic parameters together with long run estimates are derived from

an error correction model which also establishes the speed of adjustment coefficient.

5. Findings and Discussion

5.1 Unit Root Tests

Unit root tests are conducted to test for stationarity. Whether the variables are stationary at level or at first difference is of critical importance since variables stationary at second difference cannot be included in the model used in this research study. Figure 1 depicts the LNX , $LNFDI$, $LNGDP$ and $LNTOT$ in levels. Since the variables' time series graphs seem not to oscillate around their respective means,

this implies that the time series may not be stationary at level.

Eventually, when time series variables are transformed to their first difference status in Figure 2 (see previous page), $DLNX$, $DLNFDI$, $DLNGDP$ and $DLNTOT$ appear to hover around their mean. But the graphical approach cannot be used to make conclusive statements about stationarity since such can be done after more efficient and robust unit root tests (Augmented Dickey Fuller-ADF and the Phillips Perron-PP unit root tests) are applied to the Zimbabwean data.

Table 1 highlights the unit root test results derived from the application of ADF and PP unit root techniques. The unit root results reveal that variables LNX (exports), $LNGDP$ (proxy for economic growth) and $LNTOT$ (terms of trade) are not stationary in levels hence they contain a unit root. $LNFDI$ (Foreign Direct Investment) is stationary at 1% and 10% when

ADF and PP unit root tests are applied respectively. When variables LNX , $LNGDP$, and $LNTOT$ are transformed to first difference as $DLNX$, $DLNGDP$ and $DLNTOT$ all become stationary at 1% level when both ADF and PP unit root testing procedures are employed (Akoto, 2016). Hence the econometric model is composed of both I(0) and I(1) variables and in such a case ARDL bounds testing procedure is more applicable (Klasra, 2011).

6. ARDL Co-Integration Tests: Short Run and Long Run Form

In Table 2 on the next page, the ARDL Co-integration test results show that the calculated F-statistic is 5.783301 which is on the right side of the 1% upper critical value of 4.66. Therefore, the null hypothesis (No long run relationship exists) is rejected at 1% level, meaning that LNX , $LNFDI$, $LNGDP$ and $LNTOT$ are co-integrated in the long run (Adhikary, 2012; Jana, Sahu, & Pandey, 2017).

Table 1: Augmented Dickey Fuller (ADF) and the Phillips Perron Unit Root Test Results

Series	Model	ADF Lags	ADF Statistic	PP Bandwidth	PP Statistic	Conclusion & Order of Integration
LNX	τ_t	0	-2.796685	3	-1.832504	Do not reject H_0 : Series contains unit root, (= series not stationary), I(1)
	τ_μ	0	-1.494880	4	-1.078188	
	τ	0	1.130154	0	0.927324	
DLNX	τ_t	0	-4.436988***	7	-3.779930**	Reject H_0 : Series contains unit root, (= series is stationary)
	τ_μ	0	-4.497786***	3	-3.836119***	
	τ	0	-4.331076***	1	-3.883369***	
LNFDI	τ_t	0	-3.959098**	1	-3.375282*	Reject H_0 : Series contains unit root, (= series is stationary), I(0)
	τ_μ	0	-5.377971***	2	-2.302939	
	τ	0	0.663626	2	-1.581024	
LNGDP	τ_t	0	-1.093540	1	-1.093540	Do not reject H_0 : Series contains unit root, (=series not stationary), I (1)
	τ_μ	0	-0.573951	1	-0.762849	
	τ	0	0.938334	0	0.938334	
DLNGDP	τ_t	0	-5.319721***	9	-5.313031***	Reject H_0 : Series contains unit root, (= series is stationary)
	τ_μ	0	-5.108452***	8	-5.108452***	
	τ	0	-5.117172***	1	-5.113586***	
LNTOT	τ_t	0	-2.876885	9	-2.745509	Do not Reject H_0 : Series contains unit root, (=series is not stationary), I (1)
	τ_μ	0	-2.135236	8	-1.687133	
	τ	0	1.489416	1	1.620881	
DLNTOT	τ_t	0	-6.325475***	9	-6.983016***	Reject H_0 : Series contains unit root, (= series is stationary)
	τ_μ	0	-6.215032***	8	-6.693597***	
	τ	0	-5.897832***	1	-6.515950***	

H_0 : There is unit root, * mean significant at 10%, ** imply significant at both 5% & 10% and *** indicate significant at 1%, 5% & 10%.

Source: Own Computation, 2018

Table 2: ARDL Co-Integration Test Results

Test Statistic	Value	K
F-statistic	5.783301	3
Critical Value Bounds		
Significance	I0 Bound	I1 Bound
10%	2.37	3.2
5%	2.79	3.67
2.5%	3.15	4.08
1%	3.65	4.66

Source: Own Computation, 2018

Table 3: ARDL Cointegrating and Long Run results

Cointegrating Form				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNX(-1))	0.057082	0.115922	0.492420	0.6267
D(LNFDI)	0.002900	0.001542	1.881289	0.0716
D(LNFDI(-1))	-0.002637	0.001759	-1.498555	0.1465
D(LNGDP)	0.302767	0.101751	2.975574	0.0064
D(LNGDP(-1))	0.465870	0.107972	4.314740	0.0002
LNTOT	0.002933	0.003482	0.842310	0.4076
CointEq(-1)	-0.414013	0.082742	-5.003649	0.0000
Cointeq = LNX - (0.0131*LNFDI + 0.3070*LNGDP + 2.4309*LNTOT + 3.2753 +3.2753)				
Long Run Coefficients				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNFDI	0.013144	0.003022	4.350090	0.0002
LNGDP	0.307030	0.148977	2.060922	0.0499
LNTOT	2.430879	0.719614	3.378032	0.0024
C	3.275315	2.858522	1.145807	0.2627

Source: Own Computation, 2018

The estimated long run relationship is deduced from Table 3 as follows:

$$LNX_t - (0.0131'LNFDI_t + 0.3070'LNGDP_t + 2.4309'LNTOT + 3.2753) = 0 \quad (4)$$

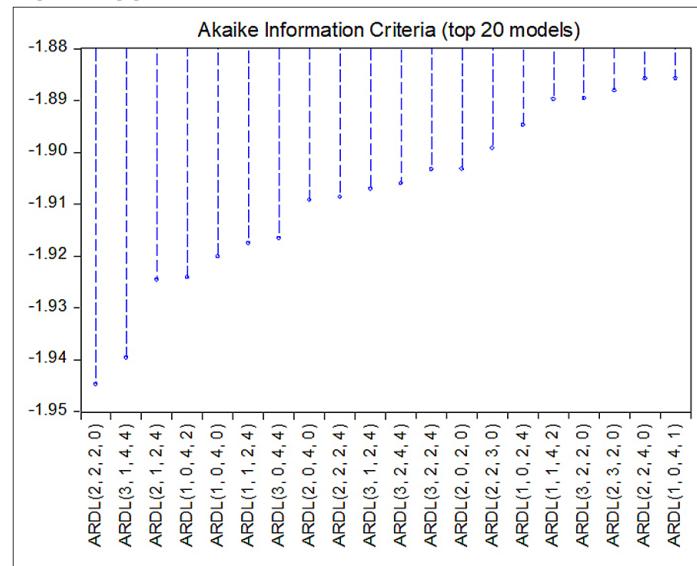
$$LNX - 0.0131LNFDI_t - 0.3070LNGDP_t - 2.4309LNTOT - 3.2753 = 0 \quad (5)$$

Rearranging to make LNX_t the subject of the formula, Equation 5 becomes:

$$LNX = 3.2753 + 0.0131LNFDI_t + 0.3070LNGDP_t + 2.4309LNTOT = 0 \quad (6)$$

Equation 9 and the results in Table 3 indicate that Foreign Direct Investment ($LNFDI$) and export performance (LNX) relationship is positive and significant at 1% level (Kutan & Vuksic, 2007; Sun,

2012; Davaakhuu, Sharma, & Oczkowski, 2015; Li & Park, 2016; Koroci & Deshati, 2016). The $LNX-LNFDI$ relationship is inelastic implying that export performance is less responsive to changes in FDI although the relationship is significant (Akoto, 2016). A 10% increase in FDI leads to a 0.1314% improvement in export performance. The study results also reveal that both the control variables, that is, economic growth ($LNGDP$) and terms of trade ($LNTOT$) are significant (at 5% and 1% level respectively) and positively related to export performance. The relationship between export performance and the control variables is inelastic and elastic with respect to economic growth and terms of trade respectively. A 10% increase in economic growth ($LNGDP$) results in a 3.070% enhancement of export performance (LNX), whereas a 10% improvement

Figure 3: Top 20 Applicable Models Based on Akaike Information Criteria

Source: Authors

Table 4: Summary of Diagnostic Test Results

Diagnostic Tests						
Test Statistics	Type	LM Version		F version		
		NxRS/Stat*	P-Value	F-dimensions	F-statistic	P-Value
Serial Correlation: Breusch-Godfrey [H_0 : No serial correlation]	Chi-Sq(2)	0.965998	0.6169	F(2,23) =	0.0076	0.7248
Heteroscedasticity: Breusch-Pagan-Godfrey [H_0 : No Heteroscedasticity]	Chi-Sq(9)	10.18351	0.3358	F(9,25) =	1.139868	0.3731
Normality of Residuals [H_0 : Residuals are normally distributed]	Jarque-Bera	0.990192	0.609512	Not applicable		

* where NxRS/Stat stands for number of observations multiply by R-squared or Statistic.

Source: Own Computation, 2018

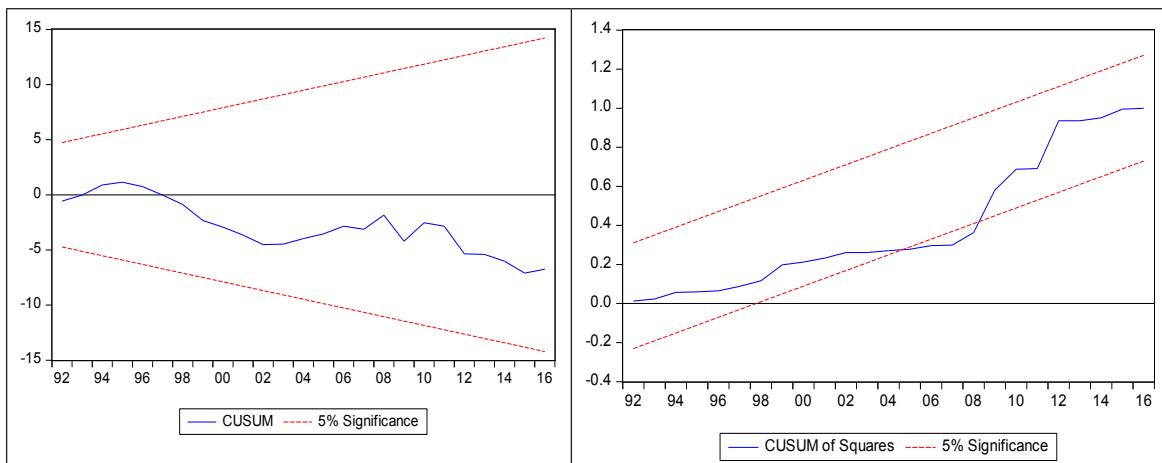
in terms of trade enhances export performance by 24.3088%.

Table 3 on the previous page also shows the short run results which includes the speed of adjustment of -0.414013 having an expected sign and significant at 1% level. Since the speed of adjustment is negative it means that the whole system will converge to a steady state equilibrium which then justifies the validity of the model. Hence 41.40% of the disequilibrium in the previous year is rectified towards the long run steady state equilibrium in the following year (Ibrahiema, 2015). The selection of the superior model [ARDL(2,2,2,0)] among the best top 20 models in Figure 3 also justifies the validity of the model selected in this research study. Therefore, the results displayed in Table 3 are more reliable

as compared to the other possible 19 outcomes suggested by the Akaike Information Criteria.

6.1 Diagnostic Tests

Table 4 shows the diagnostic test for serial correlation, heteroscedasticity and normality of residuals using the Breusch-Godfrey Serial Correlation LM Test, Breusch-Pagan-Godfrey heteroscedasticity Test and the Jarque-Bera normality test. All the probability values of the three tests are above 10% level of significance. Therefore, all the null hypotheses cannot be rejected. This means that the model is free from serial correlation, heteroscedasticity and residuals are normally distributed as shown by the absence of asterisks in Table 4. Such an outcome reinforces the reliability and robustness of the research results.

Figure 4: Plot of CUSUM and CUSUMSQ

Source: Own Computation, 2018

6.2 Stability Test Results

The tests show that when the plots of the CUSUM and CUSUMSQ residuals remain within the critical bounds of 5% level of significance, all regression coefficients of the model are stable (Mohapatra *et al.*, 2016). The inspection of the plots in Figure 4 shows that CUSUM and CUSUMSQ statistics are well within the acceptable 5% critical bounds although the CUSUMSQ plot breaks the 5% critical bounds for a short period and then returns back to the recommended space. Therefore, despite the short stint of the CUSUMSQ, generally it can be concluded that both the short run and the long run coefficients in the ARDL models are stable.

7. Conclusion and Recommendations

This research study investigated the relationship between export performance and FDI by incorporating into the model, economic growth and terms of trade as control variables covering the period 1980 (the dawn of Zimbabwean independence) and 2016. Both the Augmented Dickey Fuller and the Phillips Perron unit root test results show that exports, economic growth and terms of trade are I(1) variables, integrated of order (1). They become stationary after being differenced once while FDI proved to be an I(0) variable, stationary at level. The ARDL Bounds test results confirmed the existence of a cointegrating relationship among the variables. While the ARDL cointegrating and long run results indicated that FDI and other control variables, economic growth and terms of trade are significant and positively related to export performance. The diagnostic tests revealed that the model is bereft of the

problems of serial correlation, heteroscedasticity and residuals are normally distributed. The stability tests confirmed that the short run coefficients and the long run coefficients in the ARDL models are stable. Hence the suggestion of the direction of policy formulation is based on robust research study outcomes. Therefore, the Zimbabwean government should create a conducive economic-political environment which promotes FDI and exports to reclaim its lost glory of being the bread basket of Africa.

References

- Adams, S. & Atsu, F. 2014. Aid dependence and economic growth in Ghana: *Economic Analysis and Policy*, 44:233-242.
- Adhikary, B.K. 2012. Impact of Foreign Direct Investment, Trade Openness, Domestic Demand and Exchange Rate on Export Performance of Bangladesh: A VEC Approach: *Economics Research International*, 2012:1-10.
- Akoto, W. 2016. On the nature of the causal relationships between Foreign Direct Investment, GDP and Exports in South Africa: *Journal of International Development*, 28:112-126.
- Banga, R. 2006. The export -diversifying impact of Japanese and US foreign direct investment in the Indian manufacturing sector: *Journal of International Business Studies*, 37:558-568.
- Calegario, C.L., Bruhn, N.C. & Pereira, M.C. 2014. Foreign Direct Investment and Trade: A Study on Selected Brazilian Industries: *Latin American Business Review*, 15:65-92.
- Chang, H.L., Su, C.W. & Dai, Y. 2017. Does Foreign Direct Investment promote exports in China? *China Finance Review International*, 7(2):185-202.
- Chiappini, R. 2011. FDI and Trade: A Granger causality analysis. *Economics Bulletin*, 31(4): 2975-2985.
- Clunies-Ross, A., Forsyth, D. & Huq, M. 2009. *Development Economics* (5th ed.). London: Mc Graw-Hill.

- Davaakhuu, O., Sharma, K. & Oczkowski, E. 2015. Has foreign investment played a role in Mongolia's export success? *Post-Communist Economics*, 25(2):256-267.
- Helpman, E., Melitz, M.J. & Yeaple, S.R. 2004. Export versus FDI with Heterogeneous Firms. *The American Economic Review*, 94(1):300-316.
- Ibrahiema, D.M. 2015. Renewable electricity consumption, foreign direct investment and economic growth in Egypt: An ARDL approach: *Procedia Economics and Finance*, 30: 313-323.
- Jana, S.S., Sahu, T.N. & Pandey, K.D. 2017. Foreign Direct Investment and Exports in India: Some Empirical Insights: *Journal of Commerce and Management Thought*, 8(4):684-702.
- Klasra, M.A. 2011. Foreign direct investment, trade openness and economic growth in Pakistan and Turkey: An investigation using bounds test: *Qual Quant*, 45:223-231.
- Koroci, A. & Deshati, E. 2016. How Does FDI Affect Albania's Export performance. *Sociology Study*, 6(11):731-736.
- Kuntluru, S., Muppani, V.R. & Khan, M.A. 2012. Foreign Direct Investment and Export Performance of Pharmaceutical Firms in India: An Empirical Approach. *Journal of Economics and Finance*, 4(5):216-226.
- Kutan, A.M. & Vuksic, G. 2007. Foreign Direct Investment and Export Performance: Empirical Evidence: *Comparative Economic Studies*, 49:430-445.
- Li, X. & Park, S. 2016. Trade characteristics of foreign direct inflows in China: Empirical evidence from China. *China Finance Review International*, 6(2):177-207.
- Mohapatra, G., Giri, A.K. & Sehrawat, M. 2016. Foreign aid, macroeconomic policies and economic growth nexus in India: An ARDL bounds testing approach: *Theoretical and Applied Economics*, 23(4):183-202.
- Pesaran, M.H. & Shin, Y. 1999. An Autoregressive Distributed Lag Modelling Approach to Co-integration Analysis. In S. Storm (Ed.), *Econometrics and Economic Theory in the 20th Century: The Ragnar Frisch Centennial Symposium*. Cambridge: Cambridge University Press.
- Singh, A.B. & Tandon, P. 2015. Causality Between FDI Inflows and Exports with Reference to India: An Analysis: *The IUP Journal of Applied Economics*, 14(3):59-70.
- Sun, S. 2012. The role of FDI in domestic exporting: Evidence from China: *Journal of Asian Economics*, 23:434-441.
- Urkude, A.M. & Jadhav, P. 2013. Relationship between Trade and FDI: Evidence from Food Processing Sector in India: *International Journal of Research in Commerce and Management*, 4(7):24-26.
- World Bank. 2018. Available at: <http://data.worldbank.org/>. Accessed on 28 March 2018,