

Article

An Econometric Investigation of the Impact of Foreign Trade on Economic Growth: The Case of Namibia

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ABSTRACT

This study investigated the impact of foreign trade on economic growth in Namibia for the period 1990-2012 using the Auto-regression Distributed Lag (ARDL) method. Further, annual time series macroeconomic data was utilised. The results show co-integrating relationships amongst the variables used in the study suggesting the possibility of a long-run relationship amongst these variables. Secondly, the study found positive relationships amongst the four variables used in the study implying that foreign trade could potentially be used to promote economic growth. The result is also in line with economic postulation. Thirdly, the model used for the study was found to be stable from an econometric point of view. Based on these results the study puts forward various policies that would make Namibian exports to have a comparative and competitive edge in international markets. In this context, the study stressed the importance of investing in the country's export-oriented sectors for the sake of promoting foreign trade and economic growth in Namibia.

Keywords: Foreign trade; economic growth; impact; ARDL technique; co-integration; Namibia

1. INTRODUCTION

A prominent issue still occupying the attention of economic scholars in most modern economies relates to how countries can achieve greater economic prosperity and also sustain this phenomenon. The answer to this question lies partially in an export-led industrialisation strategy, which emphasizes that export expansion is a critical factor in the process of searching for economic growth (Brown & Stern, 2008). In fact, during the last four decades, there has been a paradigm shift on the part of a large number of developing countries from import-substitution to export-led growth policy. The important enthusiasm for this shift is anchored on the expectation that such policy has the potential to grow markets which could lead to increased specialization and division of labour. Further, this policy can assist developing countries, when it comes to climbing the development ladder, by way of specializing in low-technology products and in turn export such products to industrialised countries. There is also a possibility for developing countries to gain from international trade given its abundance of cheap and unskilled labour.

These gains would in turn allow them to repackage themselves and subsequently graduate to the rank of middle income countries by exporting labour-intensive cum technologically refined products (Mastel, 2006). Jin (1995); Love and Chandra (2004); Yang (2008) and Kehinde et al., (2012), also contributing in support of the export-led growth model using co-integration and error correction modelling techniques. They found a positive relationship

between exports and economic growth for a number of developing countries. These researchers acknowledged the following as potential benefits of foreign trade to developing countries. Firstly, foreign trade enables developing countries to have access to advanced technology and ideas in the imported products. Further, foreign trade leads to improvements in efficiency on the part of domestic firms, which in turn makes them more competitive in the domestic and international markets. Besides, it could lead to a continuous increase in a developing country's capital stock, as well as the level of technology as a result of massive investments on the part of multinationals in its economy. These studies, however, cautioned that in order for a country to maximize the gains from participating in international trade, there is the need to liberalize trade by way of reducing trade barriers and also opening its' economy to foreign competition. Other economists' disagrees with this notion and maintain that trade expansion may not always be a good predictor of economic growth for developing countries at all times (Kavoussi, 1984) and Ahmad and Kwan (1991). No comprehensive study has been done for the Namibian economy using modern econometric time-series techniques. This study aims to econometrically determine the impact of trade on economic growth for the period 1990-2012 by using Namibia as a case study. Specifically, this study is driven by three interrelated objectives. The first is to estimate a foreign trade model for Namibia. The second objective is to find out if trade is a major predictor of economic growth in Namibia. The third objective is to test the stability of the estimated foreign trade model given the importance of stability issues in the general management of macro-economic policies. In fulfilment of these multiple objectives, the study employed the Auto-regression Distributed Lag (ARDL) approach.

2. A REVIEW OF SELECTED MACROECONOMIC VARIABLES IN NAMIBIA

Macroeconomic policy modelling helps policymakers to predict the behaviour and responsiveness of macroeconomic variables to policy changes. The number of macroeconomic variables available is vast. This section only presents a brief review of three macroeconomic variables pertaining to Namibia specifically. The objective of this section is to show the trends in respect of the identified macro-economic variables during the period under review. An attempt is also made to present the major factors accounting for the observed trends in respect of the variables. The variables reviewed are exports, net foreign direct investment and foreign exchange rate trends in the economy of Namibia for the period 1990-2012.

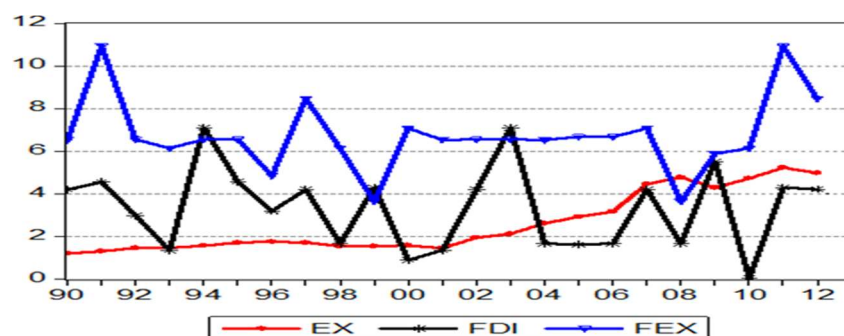


Figure 1: Graphical representation of selected macroeconomic variables regarding Namibia 1990-2012.

Source: Author's construct

The macroeconomic data-set that have been used to plot figure 1 are displayed as appendix

1. It is evident from figure 1 that Namibia's exports (EX) revenue has been relatively stable between 1990 and 2001 due mainly to a consistent demand for its exports, especially solid minerals. However, there was a continuous rise in Namibia's exports revenue between the periods 2002 and 2008, as well as, in 2010 and 2011, due principally to the depreciation of its national currency. This ensured that its exports were cheaper for foreign markets. Generally development in its mining sector, especially the increase in foreign investment in uranium mining also contributed significantly to this increase in the country's exports' revenues. The various free trade agreements that the Namibian Government signed with some of its major trading partners during the period under review, also contributed in some ways to the rise in its exports' revenues.

Correspondingly, the value (FEX) of the Namibian dollar did experience fluctuations during the period under review. The interplay of demand and supply factors within the foreign exchange market accounted for most of the depreciation and appreciation that took place in respect of the country's currency. In particular, the value of the Namibian dollar during the years 1990, 1991 and 1992 was characterised by a high degree of swinging. Further, the Namibian dollar also experienced a number of ups and downs between 2008 and 2012. It is, however, important to note that the value of the country's currency in relation to the United States Dollar was relatively stable between 2000 and 2007. This stability was mainly as a result of the interventionist approach in the general management of the country's foreign exchange market on the part of the Bank of Namibia.

Just like FEX, net foreign direct investment (FDI) in Namibia during the period under consideration was also found to be unstable. In particular, the years 1993, 1998, 2000, 2001, 2004, 2005, 2006 and 2008 recorded low net FDI flows, while the years 1990, 1991, 1992, 1994, 1995, 1996, 1997, 1999, 2000, 2003, 2007, 2009, including 2011 and 2012 registered high net FDI flows. A combination of developments in the country's domestic economy, as well as external developments contributed to these perturbations. Pessimism and fears on the part of foreign investors, who exited the market as a result of uncertainties driven by market turbulence, including developments in the country's mining sector, mainly accounted for the various fluctuations in FDI.

3. REVIEW OF EMPIRICAL LITERATURE

A large number of empirical studies have been done and documented in the existing literature regarding the connection between foreign trade and economic growth for many countries. One of the early works in this regard is that of Emery (1967). Emery investigated the relationship between exports and economic growth for 48 developed, as well as 48 developing countries. He employed a simple regression model and time-series macro-economic annual data covering the period 1953-63. The results indicate that there is a strong positive relationship between exports growth and economic growth. By implication, a country can use foreign trade as an instrument of promoting economic growth in its economy. The inclusion of a multiple regression framework would have also assisted Emery in determining the effects of other explanatory variables on economic growth.

Voivodas (1973) made an inquest into the relationship between exports, foreign capital inflow, and domestic growth rates. He used both time series and cross sectional data for 22 less developed countries (LDCs) stretching from 1956-66 in order to investigate the issue further. He observed that both exports and foreign capital inflow do have a positive impact on GDP. Exports in particular were found to have a greater influence on growth.

Balassa (1978) through the application of the production function framework determined the

relationship between exports and economic growth for 11 LDCs. The following three ratios were used in his study: growth of exports versus growth of output; growth of exports versus growth of output in net export; as well as, the average ratio of exports to output versus growth of output. Annual macro-economic data for the period running from 1960-73 was also used for this study. The result indicated that export expansion affects economic growth rates positively. This study also provides evidence to further support export-led strategies compared to import-substitution strategies.

Ram (1987) examined the connection between exports and economic growth for 88 LDCs. He combined time series and cross-sectional data sets that covered two different time periods; that is, 1962-72 and 1973-82 in order to carry out the study. He found a positive relationship between export performance and economic growth for most countries under consideration. In addition, his results also indicate that government expenditure has a positive impact on economic growth.

Ogbokor (2005) also tested whether the foreign sector in Zimbabwe has any connection with the economic performance of that country. He made use of time series data covering 1991 to 2003. The study found that the foreign export sector in Zimbabwe was weakly linked to the rest of its economy. Both exports and imports variables were found to be poor predictors of growth in respect of Zimbabwe. This result is not surprising, since Zimbabwe has been under various forms

of economic cum political sanctions for the past decade or more, due mainly to the issue of land grabbing and political abracadabra on the part of its ruling government.

Mahadevan (2007) also investigated whether export growth and trade-adjusted GDP are connected using Malaysia as a case study. The causality test arising from the study gave credence to the fact that economic growth leads to GDP growth. Indeed, causation was found to be a one-way traffic. It was also observed from the study that the connection between exports and labour productivity growth was bi-directional. Further, labour productivity growth was import-growth driven, and that the reverse was untrue.

Mag (2010) tested whether export promotion measures led to export expansion in South Korea. He used data based on the export patterns of South Korea since the 1960s. The study found that during the period of rapid economic growth, the South Korean authorities gave tax concessions and financial incentives. In addition, the government of South Korea also established a number of export promotion agencies. All of these measures and incentives contributed significantly to a rise in respect of exports to the rest of the world.

Also, contributing to the literature on trade and economic growth Medina and Chaido (2013) empirically examined the relationship between financial development, trade openness and economic growth in Bulgaria using co-integration analysis and Granger causality techniques. The bounds testing approach to co-integration was used to establish the existence of long-run relationships between financial development, trade openness and economic growth. An augmented form of the Granger causality was implemented to identify the direction of causality among the variables both in the short-run and the long-run. The results from Granger causality tests based on a multi-variate error-correction model, suggest uni-directional causation from financial development and economic growth to trade openness in the long run. In the short run, bi-directional causality between financial development and trade openness and a uni-directional causality running from economic growth to financial development was observed at 1% significance level.

It is apparent from the literature reviewed so far that foreign trade has contributed to economic growth in a number of countries. The authors of this research article are not aware

of studies based on Namibia that have specifically investigated the impact of foreign trade on economic growth through the use of ARDL approach, and hence the justification for this study.

4. METHODOLOGY

4.1 Sources of Data

The main sources of data used include the Bank of Namibia and National Planning Commission of Namibia. This was supplemented by data from the Namibia Statistical Agency and the International Financial Statistics (IFS). The study employed secondary macroeconomic data-sets stretching from the period 1990 to 2012. The explanatory variables used in this study are exports, foreign direct investment and exchange rate, while real gross domestic product serves as the dependent variable. The authors are aware of the potential dangers often associated with the use of aggregative datasets. However, the non-availability of disaggregated macroeconomic data for Namibia makes the use of highly aggregated data inevitable in this study.

4.2 Empirical Model

The study employed the Auto-regression Distributed Lag (ARDL) approach, which is a modern econometric method used in investigating co-integration relationships amongst variables (Finger, 2008). This approach is alternatively referred to in the literature as the Bound Testing method (BT). The increasing use of the Bounds technique is based on three validations. Firstly, Pesaran et al. (2001) advocated the use of the ARDL model for the estimation of level relationships because the model suggests that once the order of the ARDL has been recognised, the relationship can be estimated by the Ordinary Least Squares (OLS) method. Secondly, the Bound test allows for testing for the existence of a relationship between variables in levels using a combination of I(1) and I(0) variables as regressors. That is, the order of integration of appropriate variables may not necessarily be the same. Therefore, the ARDL technique has an advantage of not requiring a specific identification of the order of the underlying data. Thirdly, this technique is unbiased and efficient because it performs well in small or finite sample size. Furthermore, it allows for the estimation of long-run and short-run components of the model simultaneously, thereby, removing problems associate with omitted variables and serial correlations. Besides, this method can distinguish between regressand and regressors.

The vector auto-regression (VAR) of order p , denoted VAR (p), for the following growth function:

$$Z_t = \mu + \sum_{i=1}^p \beta_i z_{t-i} + \varepsilon_t \tag{4.1}$$

where z^t is the vector of both x^t and y^t , where y^t is the dependent variable defined as real

gross domestic product (RGDP), x^t is the vector matrix which represents a set of explanatory variables i.e., exports (XPORT), foreign direct investment (FDI), exchange rate (EX) and t is a

time or trend variable. y^t must be I(1) variable, but the regressor x^t can be either I(0) or I(1).

Furthermore, a vector error correction model (VECM) can also be formulated as follows:

$$\Delta z_t = \mu + \alpha t + \lambda_{z_{t-1}} + \sum_{i=1}^{p-i} \gamma_t \Delta y_{t-i} + \sum_{i=1}^{p-1} \gamma_t \Delta x_{t-i} + \varepsilon_t \tag{4.2}$$

where Δ is the first-difference operator. The long-run multiplier matrix λ as:

$$\lambda = \begin{bmatrix} \lambda_{YY} & \lambda_{YX} \\ \lambda_{XY} & \lambda_{XX} \end{bmatrix}$$

The diagonal elements of the matrix are unrestricted, so the selected series can be either I(0) or

I(1). If $\lambda_{YY} = 0$, then Y is I(1). In contrast, if $\lambda_{YY} < 0$, then Y is I(0).

The VECM procedures described above requires co-integration test among the variables, testing

for at most one co-integrating vector between dependent variable y_t and a set of regressors x_t .

This model is derived from the postulations of unrestricted intercepts and no trends as presented

by Pesaran et al. (2001). After imposing the restrictions $\lambda_{YY} = 0$, $\lambda_{YX} = 0$ and $\lambda_{XX} = 0$ the GJIE hypothesis function can be stated as the following unrestricted error correction model (UECM):

$$\Delta(RGDP)_{t-i} = \beta_0 + \beta_1 (RGDP)_{t-1} + \beta_2 (XPORT)_{t-1} + \beta_3 (FDI)_{t-1} + \beta_4 (EX) + \sum_{i=1}^p \beta_5 \Delta(RGDP)_{t-i} + \sum_{i=0}^q \beta_6 \Delta(XPORT)_{t-i} + \sum_{i=0}^q \beta_7 \Delta(FDI)_{t-i} + \sum_{i=0}^q \beta_8 \Delta(EX)_{t-i} + \mu_t \tag{4.3}$$

Where Δ is the first-difference operator and u_t is a white-noise disturbance term. Hence, Equation (4.3) also can be viewed as an ARDL of order $(p, q_1, q_3...q_n)$ and it indicates that real gross domestic product tends to be influenced and explained by its past values. The orders $(p, q_1, q_3...q_n)$ are structural lags established by using minimum Akaike’s Information Criteria (AIC). Those maximum lags are determined by using one or more of the "information criteria" - Hannan-Quinn (HQ), Schwarz Information Criterion (SC), Akaike Information Criterion (AIC), Final Prediction error (FPE) and Likelihood Ratio (LR). These criteria are based on a high log-likelihood value, with a "penalty" for including more lags to achieve this. The form of the penalty varies from one criterion to another. Each criterion starts with $-2\log(L)$, and then penalises, so the smaller the value of an information criterion the better the results. The Schwarz (Bayes) Criterion (SBC) is generally used in this regard because it is a consistent model-selector. However, caution should be exercised in order to prevent the possibility of over-selecting the maximum lags.

Since this model is of auto-regression in nature, there is a need to test if it is dynamically stable or meets stability condition. This means to check that all of the inverse roots of characteristic equation associated with the model are strictly within the unit circle. Thereafter, one can perform a Bounds test by performing an “F-test” of the null and alternative hypotheses as follows:

$$H_0 = \beta_1 = \beta_2 = \beta_3 = \beta_4 = 0 \text{ (no long-run relationship)}$$

Against the alternative hypothesis

$$H_0 \neq \beta_1 \neq \beta_2 \neq \beta_3 \neq \beta_4 \neq 0 \text{ (a long-run relationship exists)}$$

The computed *F*-statistic values are evaluated with the critical values for the asymptotic

distribution of the *F*-statistic. Based on various situations (e.g., different numbers of variables, (*k*

+ 1)), there are lower and upper bounds on the critical values. The lower bound is based on the assumption that all of the variables are *I*(0), while the upper bound is based on the assumption that all of the variables are *I*(1). If the computed *F*-statistic falls below the lower bound it suggests that the variables are *I*(0), meaning no co-integration. If the *F*-statistic exceeds the upper bound, it suggests the existence of co-integration. Finally, if the *F*-statistic falls between the bounds, the test is inconclusive Atif et al. (2010).

From the estimation of unrestricted error correction models (UECM), the long-run elasticities are

the coefficient of one lagged explanatory variable (multiplied by a negative sign) divided by the coefficient of one lagged dependent variable Bardsen (1989:345-50). For example, in equation

(4.3), the long-run inequality, elasticities are (β_2 / β_1) , (β_3 / β_1) and (β_4 / β_1) respectively. The short-run effects are captured by the coefficients of the first-differenced variables in equation (4.3) according to Misati et al., (2011); Liu, Margaritis and Tourani-Rad (2008) and Beng and Shrestha (2006). Furthermore, one could derive the Granger causality test results, the impulse response functions and variance decomposition through the applications of these techniques.

5. DISCUSSION OF ECONOMETRIC RESULTS

5.1 Unit Root Tests

The standard practise prior to any estimation that involves co-integration analysis requires the researcher to first determine the order of integration in respect of the variables used in the model (Ogbokor and Samahiya, 2014). The ARDL technique does not require a pretesting of variables to determine the order of integration. However, it is an essential exercise due to the fact that this technique can only be applied to variables whose order of integration is either *I*(0) and/or *I*(1). It cannot be applied to variables whose order of integration is *I*(2). The ADF, PP and KPSS unit root tests procedures are employed in this regard. The results obtained are reported in Table 1.

Table 1: Unit root tests: ADF and PP in levels and Difference

Variable	Model Specification	ADF	PP	ADF	PP	Order of Integration
		Levels	Levels	First Difference	First difference	
lnRGDP _t	Intercept and trend	-2.257	-2.024	-3.670**	-5.043**	1
	Intercept	-0.469	-0.456	-3.670**	-5.067**	1
lnXPORT _t	Intercept and trend	-2.126	-1.562	-1.834	-4.818**	1
	Intercept	-0.759	-0.386	-1.914	-4.857**	1
lnFDI _t	Intercept and trend	-3.029	-5.338**	-5.955**	-7.940**	0
	Intercept	-2.666**	-5.386**	-6.237**	-8.154**	0
lnEX _t	Intercept and trend	-3.735**	-4.353**	-4.006**	-6.262**	0
	Intercept	-3.836**	-4.368**	-3.972**	-6.318**	0

Notes:(a)** means the rejection of the null hypothesis at 5%

Source: Author’s construct

Table 1 presents the results of the unit root tests for the series. The results show that all the variables are stationary in levels with the exception of real GDP and exports. This implies that foreign direct investment and exchange rate are of order of integration I(0) processes as confirmed by both the ADF and PP tests. Upon establishing that some series are non-stationary in levels, the next step was to difference them once. Taking the first differencing resulted in real GDP and exports variables becoming stationary suggesting that they are of I(1) processes. Against this background, the hypothesis of the presence of a unit root was rejected. The mixture of both I(0) and I(1) variables would be questionable under the Johansen procedure. This further provides a good justification for using the ARDL approach.

5.2 Long-run Relationships Estimation and Error Correction Modelling

The next step was to estimate and determine the long-run relationship using the ARDL approach. Firstly, a lag order was selected and the Schwarz-Bayes Criterion (SBC) is generally used in this regard, since it is a consistent model-selector. However, caution should be exercised, in order to prevent the possibility of over-selecting the maximum lags. The determination of the lag order is dictated by the fact that the computation of F-statistics for co-integration is very sensitive to lag length. The lag length that minimizes SBC is 2. The results are presented in table 2.

Table 2: VAR Lag Order Selection Criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	110.6322	NA	0.004503	-2.565805	-2.327603	-2.470303
1	128.5903	31.87562	0.002948	-2.989758	-2.721780	-2.882318
2	131.3048	4.750300*	0.002825*	-3.032619*	-2.734866*	-2.913241*
3	131.6422	0.582064	0.002874	-3.016055	-2.688526	-2.884739
4	134.3618	4.623386	0.002754	-3.059046	-2.701742	-2.915792
5	139.7216	8.977630	0.002471	-3.168040	-2.780961	-3.012849
6	140.2412	0.857350	0.002503	-3.156030	-2.739176	-2.988901
7	140.2416	0.000570	0.002569	-3.131039	-2.684409	-2.951972
8	141.9870	2.792620	0.002524	-3.149674	-2.673269	-2.958669
* indicates lag order selected by the criterion						

Source: Author’s construct

The results in the table show that the optimal lag length criteria for the model should be 2. That is, the maximum lag length for this model should not be more than 2 as it may distort the results of the estimated model. Further, the literature recommends that models that are auto-regressive in nature should be tested to determine if they are dynamically stable or meets stability condition as a matter of technical necessity. Besides, this test is to ensure that, all of the inverse roots of characteristic equation associated with a particular model are strictly within the unit circle. Subsequently, one can perform a Bounds test through the application of an “F-test”. The results regarding the stability condition are presented in table 3.

Table 3: Roots of Characteristic Polynomial

Root	Modulus
0.771241	0.771241
-0.301842	0.301842
No root lies outside the unit circle.	

VAR satisfies the stability condition.

Source: Author's construct

In addition to the stability test of the dynamic model, it is also advisable to examine the “fit” of the unrestricted error correction model. This is done by visualising the “actual/fitted/residuals. The results are displayed in figure 2.

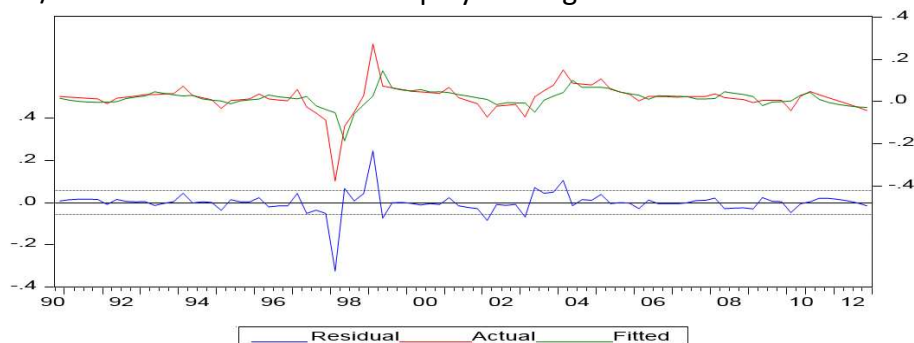


Figure 2: Fitness of the Unrestricted Error Correction Model

Source: Author's construct

Upon establishing that the model estimated is stable, a Bound test is applied by performing an “F-test in respect of the null and alternative hypotheses as follow:

$H_0 = \beta_1 = \beta_2 = \beta_3 = \beta_4 = 0$ (no long-run relationship)

Against the alternative hypothesis

$H_0 \neq \beta_1 \neq \beta_2 \neq \beta_3 \neq \beta_4 \neq 0$ (a long-run relationship exists)

The calculated F -statistic of 4.98 is greater than the upper bound critical value of 4.85 at the 5% level of significance, using an unrestricted intercept and no trend specification. This suggests that the null hypothesis of no co-integration is rejected and that, indeed, there is a co-integrating relationship among the variables.

The estimation of unrestricted error correction models (UECM) was done using the ARDL model. The model was evaluated in terms of the goodness-of-fit. Furthermore, various diagnostic tests were applied, in order, to affirm the robustness of the model. The tests include the Breusch-

Godfrey serial correlation LM test, the ARCH test, the Jacque-Bera normality test and the Ramsey RESET specification test. All the tests revealed that the model has met the desired econometric properties, in the sense that, it has a correct functional form and the model's residuals are serially uncorrelated, normally distributed and homoscedastic. Hence, the results reported are valid and reliable from the technical point of view. From the estimation of unrestricted error correction models (UECM), the long-run elasticities are the coefficient of one lagged explanatory variable (multiplied by a negative sign) divided by the coefficient of one lagged dependent variable. The estimated coefficients of the long-run relationship amongstRGDP, XPORT, FDI and EX can be represented as follow:

$$D(\ln RGDP_t) = 0.023 + 1.063 \ln XPORT_t + 0.125 \ln FDI_t + 0.278 \ln EX_t \quad (5.1)$$

Equation (5.1) indicates that exports, foreign direct investment and exchange rate do positively affect economic growth. This suggest that trade does positively affect economic growth in the context of Namibia. The results also demonstrate that, there is a long-run relationship between foreign trade and economic growth in Namibia. The results of the error correction model are presented in table 4.

Table 4: Error Correction Model for ARDL

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.027208	0.033193	0.819688	0.4151
D(LNRGDP(-1))	0.624666	0.432593	1.444003	0.1530
D(LNRGDP(-2))	0.129300	0.312000	0.414423	0.6798
D(LNXPORT(-1))	0.197932	0.093187	2.124030	0.0301
D(LNXPORT(-2))	0.062114	0.173153	0.358721	0.7082
D(LNFDI(-1))	0.266520	0.057522	4.657812	0.0109
D(LNFDI(-2))	0.121750	0.014414	8.446649	0.0436
D(LNEX(-1))	0.144115	0.024128	5.972936	0.0221
D(LNEX(-2))	0.080623	0.047508	0.644590	0.0412
RESID01(-1)	-0.162452	0.072297	-2.247008	0.0170
R-squared	0.462711	Akaike info criterion		16.96446
Adjusted R-squared	0.389110	Schwarz criterion		11.64614
Sum squared resid	0.015718	Durbin-Watson stat		2.011017
F-statistic	6.286735	Prob(F-statistic)		0.000001

Diagnostic Checking: $JB = 0.372 [0.734]$; $LM = 1.184 [0.517]$; *White Heteroskedasticity* = $0.504 [0.871]$; *Ramsey RESET* = $1.609 [0.557]$

Source: Author's construct

Table 4 show the results of the short-run dynamic model, in particular the coefficient estimated of the lagged differenced variables. In fact, the error correction model shows the changes in the

variables in the short-run while adjusting to their long-run equilibrium. In this model, all the regressors namely, exports, foreign direct investment and exchange rate have a positive relationship with economic growth. They are also statistically significant, meaning that, they play a big role in explaining changes in economic growth. Furthermore, the model exhibits a negative and significant coefficient in respect of the error correction term, suggesting co-integration relationships among the variables. The absolute value of the coefficient of the error-correction term indicates that about 16 percent of the disequilibrium in economic growth is offset by short-run adjustment in each quarter. Furthermore, the various diagnostics test were performed, in order, to test for serial autocorrelation, normality, heteroscedasticity and omitted variables, including functional forms. The model passed all the tests. The Lagrange Multiplier (LM) test of autocorrelation indicates that the residuals are not serially correlated. The Jarque-Bera (JB) test indicates that the null hypothesis of normally distributed residuals could not be rejected. The White heteroscedasticity test suggests that the disturbance term in the equation is homoscedastic. The Ramsey RESET test result shows that the calculated value is less than the critical value at the 5% level of significance, suggesting that there is no specification error.

5.3 Model Stability Test Results

The study went further to test for the existence of stability of the model. It is important to test for structural changes as there might be structural changes in the relationship between the regressand and regressors. The Cumulative Sum of Recursive Residuals (CUSUM) and Cumulative Sum of Squared Recursive Residuals (CUSUMSQ) tests or procedures are useful ways of detecting systematic changes in the regression coefficients. Furthermore, these tests also assist in establishing whether the coefficients of the Error Correction Model (ECM) are stable over the sample period. There is a possibility of problems of instability that could arise from inadequate modelling of the short-run dynamics and thus, portraying departures from the long-run relationship. The CUSUM test is based on the cumulative sum of recursive

residuals, as well as, the first set of n observations. It is updated recursively, and is plotted against the break points. If the plot of CUSUM statistic stays within 5% significance level, then estimated coefficients are said to be stable. Similarly, the CUSUMSQ also follow the same procedure. It is, however, based on the squared recursive residuals as the name of this procedure suggests. The results obtained using both procedures are displayed in figures 3 and 4.

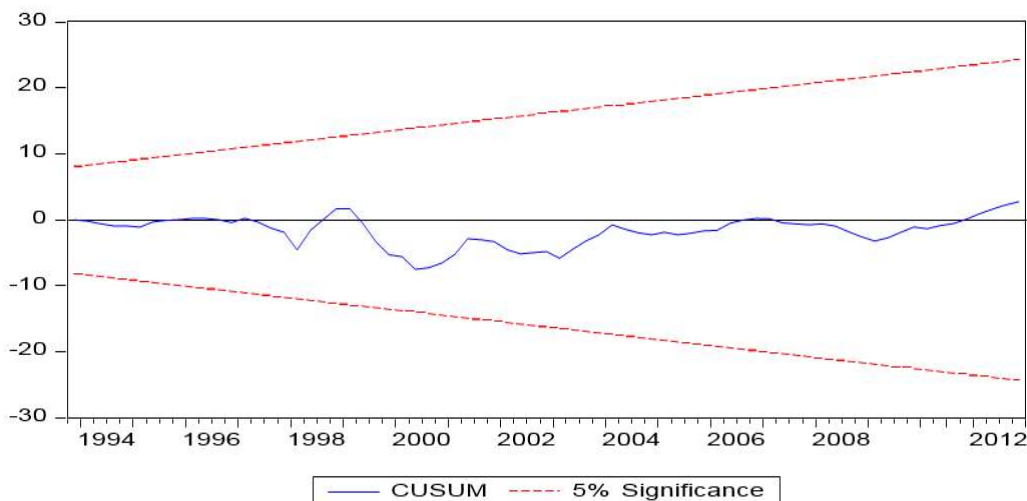


Figure 3: Cumulative Sum of Recursive Residuals

Source: Author’s construct

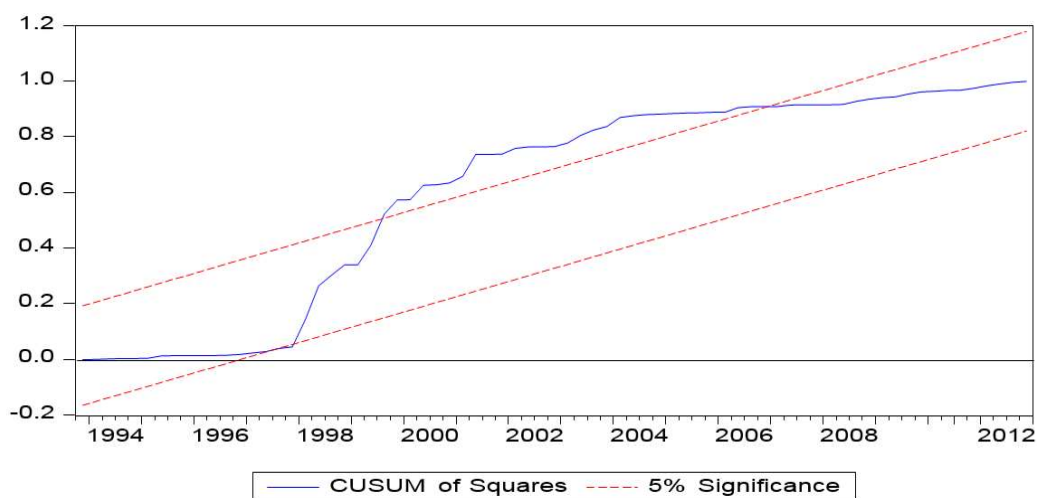


Figure 4: Cumulative Sum of Squared Recursive Residuals

Source: Author’s construct

The plots of the CUSUM statistic show that the model is stable and that there might not have been major structural changes that could warrant instability. However, the plots of CUSUMSQ statistic marginally cross the critical value lines, which do not threaten the stability of the model as it went back within the range of critical values. Hence, one can confidently infer that the economic growth model under examination is stable. Lastly, the results obtained from this study re-enforces the outcome of the research works of Mahadevan (2007), Atif et al., (2010) and Misati and Kamau (2011) which found foreign trade to be a major source of economic growth in a number of modern economies that these researchers investigated.

6. CONCLUSION AND POLICY RECOMMENDATIONS

This study estimated the impact of foreign trade on economic growth in Namibia for the period 1990-2012 using ARDL method. The results show co-integrating relationships amongst the variables used in the study. Indeed, this suggests a long-run relationship amongst these variables. Secondly, the study found positive relationships amongst the four variables used in the study implying that foreign trade could be used to promote economic growth in the economy of Namibia. The result is also in line with theoretical economic reasoning. Thirdly, the model used for the study was found to be stable from an econometric point of view. This particular result is an indication that the model can be rely upon for purposes of macroeconomic policy formulation and implementation.

On the policy front, this study shows that foreign trade is essential for the growth of the economy. By implication, policies that support export expansion and promotion should be adopted by the government of Namibia. In this context, the need for the government of Namibia to commit more resources towards its current export processing zones scheme cannot be overstressed. Further, there is the need to build local capacity, since it has been observed over the years that most of the highly skilled employees in export-oriented industries in Namibia are expatriates. Therefore, skills and knowledge transfer opportunities should be maximized. Besides, the need to embark upon value-addition activities on its primary products before exporting them cannot be overlooked. This study also recommends an export promotion strategy that would speed-up the process of export diversification, as well as enabling exports from Namibia to penetrate important regional markets across the globe. Besides, efforts should be made towards removing regulations that undermines the capacity of the country to optimise its full benefits from participating in foreign trade. In addition, regional economic integration process that would lead to bigger market opportunities for the country's exports should aggressively be pursued.

In future studies, it would be necessary to use disaggregated data to further investigate the influence of foreign trade on economic growth in Namibia. In particular, forthcoming studies should pay attention to causality issues concerning foreign trade and economic growth in Namibia.

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