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THE EFFECTS OF EXCHANGE RATE ON EXPORTS IN NAMIBIA

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ABSTRACT

This paper investigated the impacts of exchange rate on exports in Namibia for the period 1991:Q1 to 2014:Q4. Time series techniques such as unit root test, cointegration and Autoregressive Distributed Lag (ARDL) techniques were applied. The results on the unit root tests show that the variables are integrated of order zero and one, meaning they are stationary in level and first difference. The bound testing approach for cointegration reveal that there is no cointegration among exports, exchange rate, exports relative price, real gross domestic product and foreign direct investment. Therefore, the differenced ARDL long run function is estimated. The study concludes that there is a positive relationship between exchange rate and exports in Namibia.

Keywords: Exports, exchange rate, foreign direct investment, unit root, cointegration, Bounds test, real gross domestic product, Autoregressive Distributed Lag.

INTRODUCTION

Export is defined as the function of international trade whereby goods produced in one country are shipped to another country for future sale and realisation of foreign income. In order to buy exported products, a country should acquire foreign currency. This involves the exchange of domestic currency. The buying and selling of currency is priced at the exchange (Hodge, 2015).

Numerous studies have been conducted regarding the effect of exchange rate on exports in Namibia. These studies established that exchange rate affects exports in two ways, positively and negatively. When the currency appreciates it hurts the exporters, as their products become more expensive in the international market. This consequently lowers demand. On the other hand, the depreciation of a currency, leads to cheaper export in the international market. This leads to increase in the demand of local exports in the foreign market (Shane, Roe & Somwaru, 2008).

ISSN: 2455-8834

Volume:02, Issue:05 "May 2017"

Namibia's main exports are dominated by mineral resources and agricultural products. The country is naturally challenged by climate change with a prolonged period of drought experienced since. The country's climate is also influenced by the Namib Desert along the coastline and the Kalahari Desert in the eastern region which are less productive in terms of agriculture. Furthermore, hot climate, dry and scarce rainfalls pose huge threats to the production of agriculture (Bank of Namibia, 2014).

Namibia is endowed with a rich array of natural resources such as diamond, copper, uranium, gold, lead, tin, lithium, zinc, salt, natural gas, fish, coal, iron ore and livestock but still cannot utilize the resources to its best, hence the manufacturing industry is very small. In addition, the country's economy is heavily dependent on the extraction and processing of mineral for exports, where it accounts for 20% of the Gross Domestic Product (Bank of Namibia, 2014). According to the World Bank's country ranking, Namibia is the fourth largest exporter of non-fuel mineral in Africa and the world's fifth largest producer of Uranium. Even though the country's economy growth is derived from several sectors such as primary sector, secondary sector, tourism and tertiary sector, its exports only depends hugely on primary industry and manufacturing sector from secondary markets. Namibia's major exports destination countries are Botswana which receives about 24% of total export, South Africa 18.4%. A total, 14% of Namibia exports go to European Union, 13.5% to Switzerland, 11.1% to Angola and 19% of the total exports is exported to other parts of the world (Bank of Namibia, 2015).

Namibia enjoys duty and quota free access for a majority of its exports, most of which goes to South Africa and the European Union markets. Namibia exports mainly mineral products, agricultural and agro-processed exports to EU while South Africa is the major destination exports for Namibian agricultural and agro-processed exports such as beer, live animals, fish and frozen bovine meat. Namibia's exports to South Africa accounts for 24% of total exports. The Namibian economy is highly linked to that of South Africa with about 87% of imports coming from South Africa (Meyn, Peruzzo & Kennan, 2013).

Even though, Namibia has a certain preference of cross border trade derived from being a member of SACU and SADC with trade benefits from European Union and Common Market Area (CMA) where 1:1 exchange rate regime is adapted, there are a number of Namibia's trading partners who are outside this regime namely, Brazil, USA, China and Switzerland. Hence, Namibia's exchange rate is undependable and fluctuates due to market volatility against the major currencies namely, the American dollar, the Euro and the British pound and Botswana Pula, thus bringing along risks and uncertainty towards the exporters especially those who trade outside the CMA (National Planning Commission, 2008).

ISSN: 2455-8834

Volume:02, Issue:05 "May 2017"

Given that the bulk of Namibia's exports are derived from mineral resources and agriculture products, these products are of cheaper values in the international market which is prone to dramatic demand fluctuation in the international markets. Mineral commodities mainly respond to exchange rate shocks resulting from global shocks, this response may influence Namibia's exports. Therefore, this study investigates the effect of the exchange rate on the Namibian exports with the specific objective to determine the direction of the impact of exchange rate on export in Namibia. The paper is organized as follows: the next section presents a literature review. Section 3 discusses the methodology. The empirical analysis and results are presented in section 4. Section 5 concludes the study.

LITERATURE REVIEW

World trade began way back when countries used to trade goods over goods, it become prominent after the introduction of the comparative advantage theory which was introduced by the economist David Ricardo. This theory states that each country should produce the goods where it has the comparative advantage and import the least from other country through means of exchange. However, due to difficulties and costs of time involved in finding customers of a country that needs what you produce, this led to the introduction of money as a medium of exchange. Each country adopted its own money known as currency (Reuvid & Sherlock, 2011). The world moved to a new page where people exchanged goods for money. This led to a situation where a country has to acquire a domestic currency of a country where to import or buy the goods from. This brought in the existence of exchange rate which is a price of one currency for another currency.

The popular theory on how exchange rate affects export is the Risk-Averse effect, which suggested that exchange rate and exports have an adverse relationship, this was empirically proven true by many studies. This theoretical assumption was first developed by Hooper and Kohlhagen (1978). The authors argued that hedging will be expensive if exporting firms are risk-averse (Wong & Tang, 2008). Wei (1999) as cited in Appahamilange (2010) supported the hypothesis which claims that increase in exchange rate volatility might have a negative effect on international trade. This was drawn from the assumption that exporters are faced by risk and uncertainty regarding the profit earned, and may lead to the reduction in supply of traded goods.

Brahmasrene and Jiranyakul, (2002) state that currency depreciation can improve the trade balance if there is a relative price among the country and its trading partners, if other things remain constant. The authors further stated that a rise in the real exchange rate will improve a country's trade balance while a decline will worsen it, if other things remain constants. De Grauwe (1988) as cited in Shipanga (2009) argued that increase in exchange rate volatility will increase the expected marginal utility of exports revenue which measures the level of export. De

ISSN: 2455-8834

Volume:02, Issue:05 "May 2017"

Grauwe, Hooper and Kohlhagen, (1978) state that, the impact of exchange rate on exports will depend on the variation in exchange rate and it has a significant influence on international trade (Shipanga, 2009)

There is voluminous empirical literature on how exchange rate affects exports. Du and Zhu (2001) employed a Two-Stage Least Squares method which was suggested by Hsiao to estimate a system of dynamic export for the period of 1974:1 to 1995:4 for industrial countries: USA, UK, Japan, Sweden, Italy and France. The study found that exchange rate appreciation depresses exports volume significantly. On the contrary, Grube and Samanta (2003) used quarterly data for the period 1980 to 2000 to examine the effects of exchange rate uncertainty on Mexican foreign trade. The study employed regression analysis and it was found that the Mexican economy does not provide enough evidence to conclude that exchange rate affects the volume of foreign trade significantly.

Another study conducted by Wong and Tang (2008) analysed the effects of exchange rate variability on Malaysia's disaggregated electrical exports. The study employed the autoregressive distribution lag (ARDL) modeling approach and cover the period of 1990 to 2001. The results revealed an adverse relationship between exchange rate variability and electrical exports. On the contrary, Shipanga (2009) found a positive and significant impact of exchange rate volatility on the Namibian real exports. The study employed Engle-Granger two step procedures and the quarterly data for the period 1998-2008.

Van Thi & Lin (2011) investigated the effects of exchange rate on exports between Germany and Sweden for the period 2000 to 2011. The study employed Auto Regressive Distributed Lag (ARDL) model to estimate the long-run and short-run effects, simultaneously on monthly data. The results reveal that exchange rate affects exports value in the short-run for most estimated industries while in the long-run it has no influence on trade between the two countries.

Aftab, Abbas and Kayani (2012) investigated the impact of exchange rate volatility on export of Pakistan. The study employed operational testing proposed by Pesaran et al. (2001), on the period 2003:Q3 to 2010:Q4. The findings show that a variation on exchange rate affects Pakistan's exports negatively. Similarly, Liu, Lu and Zhou (2013) investigated how exports respond to exchange rate variations and found a negative effect of exchange rate variation on exports. The fitted regression line was employed to capture the behaviour between the two variables in 56 countries for the period 2000 to 2006.

Similar to Grube and Samanta, the study by Nyeandi, Atiga and Atogenzoya (2014) established that exchange rate has no effects on export of goods and services in Ghana. The study employed the ordinary lest squares method on the data covering the period 1990 to 2012.

The studies presented above show the important role exchange rate plays on international trade. Many studies found that exchange rate effects vary from country to country and brings uncertainty amongst exporters in the economy. It also brings many deviations on the current accounts. In addition, literature also shows that the 2SLS, Cointegration and Autoregression Distributed Lag model ARDL approach, Two-Stage Least Squares (2SLS) and General Autoregression Conditional Heteroscedasticity (GARCH) seem to dominate other approaches. The studies revealed different results with different conclusions. In Namibia's literature, the only study that investigated the effect of exchange rate on exports is that of Shipanga (2009). The present study differs from that of Shipanga (ibis) as it uses a different econometric technique and increased the number of observation. Furthermore, the study looked at the effect of exchange rate on exports and not exchange rate volatility as it is the case for Shipanga.

RESEARCH METHODOLOGY

Econometric Framework and Model Specification

This study used the model adopted by Van Thi and Lin (2011) to investigate the direction of impact of exchange rate on Namibian exports. The model has been modified slightly that is; a variable was added to try to suit it to the Namibian context.

$$XPRT = F(EXR, RP, RGDP, FDI) \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots .1$$

The model was transformed into log linear form as shown in equation 2 below.

$$LNXPRT_t = \propto_o + \propto_1 LNEXR_t + \propto_2 LNRP_t + \propto_3 LNRGDP_t + \propto_4 LNFDI_t + \mu_t \ldots\ldots\ldots\ldots\ldots\ldots .2$$

Where: XPRT is Namibian total export (a dependent variable)

Independent variables are: ER is exchange rate measured in real exchange rate (N$/US$), RP is the relative price of Namibia exports to the rest of the world measured in Exports Value Index. RGDP is Real gross domestic product measured the productivity of the economy. FDI is Foreign Direct Investments to Namibia, measured in the foreign direct investment inflows as a percentage of GDP. μ is a white noise error term, while α_i are parameters to be estimated in other words, are coefficients of variables.

The empirical and existence theories suggested a negative relationship between relative prices of exports and exports therefore, the sign of $\propto_2$ is expected to be negative. Real gross domestic product (RGDP) is said to have a positive relationship with exports, hence the sign of $\propto_3$ is expected to be positive. Lastly, the exchange rate has either positive or negative relationship on

ISSN: 2455-8834

Volume:02, Issue:05 "May 2017"

exports depending on the direction change of the exchange rate. The sign $\propto_1$ is expected to be either positive or negative.

To examine the effects of exchange rate on export in Namibia, the following ARDL model is adopted. Thus equation 1 is therefore transformed into ARDL model as follows, in order to examine the short-run dynamic and long-run relationship:

$$\Delta LNXPRT_t = \alpha_0 + \sum_{i=1}^{n} \alpha_{1i} \Delta LNXPRT_{t-1} + \sum_{i=1}^{n} \alpha_{2i} \Delta LNEXR_{t-1} + \sum_{i=1}^{n} \alpha_{3i} \Delta LNRP_{t-1} + \sum_{i=1}^{n} \alpha_{4i} \Delta LNRGDP_{t-1} + \beta_1 LNXPRT_{t-1} + \beta_2 LNEXR_{t-1} + \beta_3 LNRP_{t-1} + \beta_4 LNRGDP_{t-1} + \beta_5 LNFDI_{t-1} + \varepsilon_t \ldots\ldots\ldots 3$$

Where, Δ is the first-difference operator, ($\alpha_1 - \alpha_4$) are the long-run relationship parameters, (β_1-β_4) represents short-run dynamic of the model, α_o is a drift component and ε_t is the white noise error term.

The reason for transforming the equation 1 to equation 2 is because a long-run multiple linear equation is said to be more likely to find evidence of determining effect of independent variable on dependent variable than linear form. Hence, equation 1 can be estimated by using Johansen likelihood procedure or Engle-Granger 2 step procedure. However, prior to estimation, data treatment is a requirement due to the fact that most macro and financial data are usually trended and thus, non-stationary (Sheefeni, 2013). This means they have no constant mean, variance and co-variance. This necessitates for the data to be tested for stationarity and to be differenced if they are non-stationary in levels, in order to be used to estimate the above stated model. Gujarati (2004) states that data should be stationary when estimating the model in order to avoid spurious regression which in most cases leads to wrong economic conclusions.

Unit root is a test of stationarity (non-stationary) has become widely popular (Chen, 2011). In this study the unit root test is conducted by using Augumented Dicky-Fuller test (ADF) and Phillps-Perron test. The advantage of using ADF is that, it uses the higher order autoregressive process for checking the stationarity of data, while the Phillip-Perron (PP) helps to correct any serial correlation (Gujarati & Porter, 2010).

If time series data are tested for unit root and happen to be integrated for order one I(1) or more (in other word found not stationary in level), a cointegration test will be conducted if not, the Ordinary Least Square (OLS) method will be employed. The null hypothesis (H_0): states that there is unit root, while the alternative hypothesis (H_1): indicates that there is no unit root. The decision rule rejects the null hypothesis (H_0) if ADF statistics is greater than at least one of the critical values at 1%, 5% and 10%, respectively. Hence, if the variables are integrated of order

ISSN: 2455-8834

Volume:02, Issue:05 "May 2017"

zero denoted I(0), it is means that the residual series are stationary at levels, hence, equation 1 will be estimated using Ordinary Least Squares (OLS) technique. But if the residual series are found to be non-stationary at level, but integrated of order 1, the cointegration test is conducted to examine whether the variables have a long-run relationship or not. The cointegration techniques are used to resolve the problem associated with spurious regression model and are used when variables are integrated of order one I(1) (Du & Zhu, 2001). Hence, Bound cointegration test was used in this study to investigate the presence of a long-run relationship between variables.

The Bound cointegration test is selected because of its advantage of testing for both long-run and short-run coefficient in comparison to other methods of cointegration test such as, Engle-Granger, Two Step Procedure and Johansen cointegration test. It is assumed that all variables are endogenous and do not require all variables to be integrated of order 1. Hence, it can be applied irrespective of whether some variables are integrated of order 1 and some of order 0 in one set, or if all variables are integrated of order 1 completely (Sekantsi, 2009; Dritsakis, 2011).

The results of the Bounds test present two critical values for cointegration test with their lower critical bound and upper critical bound. The lower critical bound suggests that all the variables are integrated of order zero I(0), meaning that there is no cointegration among variables. On the other hand, upper bound assumes that all the variables are integrated of order 1, meaning that the variables are cointergrated (Pesaran; Shin & Smith, 2001) as cited in (Dritsakis, 2011). H_o is rejected when the F-statistic is greater than the upper bound critical value and concludes that variables are cointergrated. If F-statistic is below the lower bound, H_o cannot be rejected, meaning there is no cointegration among variables. If F-statistic falls between upper and lower bound then the results are inconclusive/unproductive (Senantsi, 2009; Dritsakis, 2011; Sheefeni, 2013).

According to Gujarati and Porter (2010), the error correctional model (ECM), known as dynamic model, should be constructed in order to indicate the speed of adjustment for variables from the short term equilibrium to long term equilibrium rate that is, if variables are found to have a long run relationship. In this regard, the study used Engle-Granger and Error Correction model (ECM). The following ECM will be estimated from equation 1:

ISSN: 2455-8834

Volume:02, Issue:05 "May 2017"

$$\Delta LNXPRT_t = \beta_0 + \sum_{i=1}^{n} \beta_{1i}\, \Delta LNXPRT_{t-1} + \sum_{i=1}^{n} \beta_{2i}\, \Delta LNEXR_{t-1} + \sum_{i=1}^{n} \beta_{3i}\, \Delta LNRP_{t-1} + \sum_{i=1}^{n} \beta_{4i}\, \Delta LNRGDP_{t-1} + \sum_{i=1}^{n} \beta_{5i}\, \Delta LNFDI_{t-1} + \gamma ECM_{t-1} + \varepsilon_t \ldots\ldots 4$$

Where:

ECM is a residual obtained from the estimated cointegration equation 3. γ is the parameter which represents the speed of adjustments in the long run. ε_t is the white noise error term (iid$(0,\delta^2)$). Hence, β_i ……β_4 are short-run coefficients and $\gamma$is a long-run coefficient. The parameter γ its sign is expected to be negative and significant, otherwise there is a problem in the model, if that happens not to be a case. The advantage of computing a coefficient and long run is that it captures both short-run and long-run model (Tahir, Khan, Israr & Qahar, 2015).

However, there are diagnostic tests used to test whether the regression is fitted well. From the assumption of Classical Linear Regression Model (CLRM) the model should meet all seven assumptions. From assumption five up to seven the efficiency tests need to be computed in order to check if the model is of good fit otherwise other assumptions can be verified from the above stated estimations.

The model has to be tested for efficiency and the various tests are discussed below as per Gujarati and Porter (2010). This test includes:

Autocorrelation test - this test is used to determine whether there is a presence of correlation between residual variable and lagged term. This study used Breusch-Godfrey serial correlation LM test (BG test), however, when residuals are correlated, it is said to be a problem and may lead to a wrong economic conclusion. Therefore the null hypothesis H_0 will be a No serial correlation between residual variables, whereas the alternative H_1 is a serial correlation between residual variables. The decision rule is, reject the null hypothesis when p-value of observation-R-square is less than 0.05 level of significant and conclude that the model suffers from serial correlation.

ISSN: 2455-8834

Volume:02, Issue:05 "May 2017"

Heteroscedasticity – the classical linear regression model (CLRM) assumes that the model should have a constant variance to be deemed as a good model. Hence, Heteroscedastcity is used to test whether the variance of residual is constant. Thus, this study employed Bruesch-Pegan-Godfrey test in order to investigate the presence of heteroscedasticity. The null hypothesis is that H_0: homoscedasticity (there is no heteroscedasticity) and the alternative is that, H_1: heteroscedasticity (There is heteroscedasticity). The decision rule, reject the null hypothesis when F-statistic value is greater than alpha $\alpha = 0.05$ and conclude that the model is not fitted well, otherwise, do not reject.

Normality test – the CLRM assumes that the model should follow the normal distribution hence, normality test is the econometric technique used to test for normality in the model. This study will use Jarque-Bera statistics test to test whether the residual in the model is normally distributed or not. The null hypothesis (H_0) is that the residual term does not follow a normal distribution (not normally distributed) and the alternative (H_1) is that residual term does not follow a normal distribution form (not normally distributed). The decision rule is that, reject the null hypothesis if the P-value of Jarque-Bera statistic test is less than 5% $\alpha = 0.05$, and conclude that the residual is not normally distributed, otherwise do not reject.

Data sources

This study used quarterly time series secondary data covering the period 1991:Q1- 2014:Q4. The data was obtained from Bank of Namibia and World Bank annual data base.

EMPIRICAL FINDINGS AND ANALYSIS

Unit Root test

Unit root test also known as stationary test; is used to find the variables' order of integration. Firstly, the order of integration has been determined by conducting the unit root test using the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests. The ARDL technique does not require a pretest of unit root. It is however used in this study because the ARDL cannot be used if the variables are integrated of order two.

The ADF and PP unit root test results in Table 1 below indicate that exports and exchange rate are both stationary after first difference. The results mixed results that relative price is stationary both in level and first difference. Real Gross Domestic Product results show that the variable is stationary in level while FDI is stationary in first difference. Both ADF and PP results confirmed that there is no variable integrated of order two I(2). Therefore, justify the use of ARDL Bounds testing procedure.

ISSN: 2455-8834

Volume:02, Issue:05 "May 2017"

Table 1: Unit Root test: ADF and PP in levels and first difference

Variable	Model Specification	ADF		PP		Order of Integration
		Levels	First Difference	Levels	First Difference	
LNXPRT	Intercept	-1.833	-9.594**	-1.898	-9.594**	I(1)
	Trend and Intercept	-1.766	-9.564**	-1.834	-9.564**	I(1)
LNEXR	Intercept	-1.396	-10.046**	-1.395	-10.067**	I(1)
	Trend and Intercept	-1.785	-10.032**	-1.751	-10.057**	I(1)
LNRP	Intercept	-2.995**	-9.603	-3.261**	-9.603	I(0)
	Trend and Intercept	-2.990	-9.553**	-3.264	-9.553**	I(1)
LNRGDP	Intercept	-3.203**	-9.592	-4.222**	-9.592	I(0)
	Trend and Intercept	-3.677**	-9.549	-4.286**	-9.549	I(0)
LNFDI	Intercept	-2.165	-8.594***	-3.820	-9.592**	I(1)
	Trend and Intercept	-2.187	-8.549***	-3.801	-9.546**	I(1)

*Source: Author's compilation using E-views. a) Note: ***, ** and * means the variable is stationary at 1%, 5% and 10% level of significance respectively.*

Cointegration test

A cointegration test was conducted to determine the long-run relationship among the variables used in the export model. The study employed the ARDL Bounds test to determine whether there is a long-run relationship among variables. The Bounds test results are reported in Table .2.

ISSN: 2455-8834

Volume:02, Issue:05 "May 2017"

Table 2: Bounds test results

Level of Significance	Lower bound value	Upper bound values	F-statistic Value	Null Hypotheses
10%	2.450	3.520		No cointegration
5%	2.860	4.010	0.804	No cointegration
2.5%	3.250	4.490		No cointegration
1%	3.740	5.060		No cointegration

Source: Author's compilation using E-views, Note: K=3 d.f, the lag length is chosen automatic by the Eviews using Akaike information criteria

The Bounds test results indicate that there is no long-run relationship among the variables under study, since the F-statistics value is less than all lower bounds critical values. The Bound test was conducted at fixed lag length of 2 as suggested by Akaike information criteria. Since the variables in the exports model are not cointegrated, the study did not go further to estimate the short-run (ARDL Error Correction) equation. The long-run ARDL results in difference are presented in Table 3.

Table 3: ARDL estimations

Dependent variable ΔXPRT					
The long-run estimated results					
Constant	**R-square**	**D-W**	**F-statistic (P-value)**		
-0.011 (-0.827)	0.636	2.018	0.001		
Lag Order	ΔXPRT	ΔEXR	RP	RGDP	ΔFDI
0		0.321 (3.875)	0.017 (3.056)	-0.028 (-2.786)	-0.006 (-0.959)

ISSN: 2455-8834

Volume:02, Issue:05 "May 2017"

1	-0.032 (-0.271)	0.032 (0.345)	-0.016 (-2.037)	0.028 (2.044)	-0.000 (-0.165)
2	-0.037 (-0.317)	0.054 (0.634)	0.000 (0.088)	-8.060 (-0.006)	-0.001 (-0.262)
3	-0.037 (-0.317)	0.054 (0.634)	-1.260 (-2.200)	2.310 (1.880)	-0.001 (-0.262)
4	-0.707 (4.876)	-0.167 (-1.819)	-0.013 (-2.067)	0.048 (3.294)	0.009 (1.269)
5		0.031 (0.365)	0.014 (2.760)	-0.046 (-4.001)	-0.000 (-0.070)

Source: Author's compilation using E-views. Note: value on top of the value in brackets is coefficients values while the one in brackets are t-statistic values. K=3 d.f, the lag length used is five as suggested by Akaike lag length criteria.

From Table 3, exchange rate, real gross domestic product and relative prices are significant in explaining exports. While foreign direct investment is insignificant in explaining exports. The exports lag 4, relative price lag 1, 4 and 5 as well as real gross domestic product lag 1, 4 and 5 are all found to be significant in explaining exports in Namibia. This means that, the exports of the current period is not only explained by the current period value but also by the previous values of exports, relative price and real gross domestic products. The sign for exchange rate is correct as expected hence, this support many scholars who found a positive relationship between exchange rate and exports (Auboin & Ruta, 2011, Sekantsi, 2009). The sign for the relative price supposed to be negative, as it was found that there is a negative relationship between export and relative price. The sign for real gross domestic product and foreign direct investment are negative, but were expected to be both positive in explaining export. This means that, there is a negative relationship between exports and production capacity of Namibia as well as foreign direct investment.

The model is found to be significant since the F-value probability 0.002 is less than 0.05 levels of significance. The R-square of 0.636 suggests that about 63.6% of variation in exports is explained by the exchange rate, relative price, real gross domestic product and foreign direct investments in Namibia. The results also indicate the absence of autocorrelation, since the Durbin-Watson value 2.018 is closer to 2.

ARDL long run estimated equation:

$$\Delta lnXPRT = -0.011 + 0.321EXR + 0.017RP - 0.028RGDP - 0.006FDI$$

(-0.827) (3.875) (3.056) (-2.786) (-0.959)

The estimated long-run function presented in previous section indicates that: a 1% increase in exchange rate, leads to 32.1% increase on exports. This implies that, a 1% depreciation on exchange rate, increase exports with 20.9%. A 1% increase in relative price, leads to 1.7% increases on export. A 1% growth in real gross domestic products, leads to a 2.8% decrease on export and a 1% increase in foreign direct investment leads to 0.6% decrease in exports.

Model efficiency test

Following the classical assumption, which states that, model should be normally distributed with a mean of zero and constant variance, the study went further to test for model efficiency. The results are presented below in Table 4 and Figure 1.

Table 4: Heteroskedasticity test: GARCH

F-statistic	1.371692	Prob. F(1,68)	0.2456
Obs*R-squared	1.384116	Prob. Chi-Square(1)	0.2394

Source: Owner's compilation using Eviews

Table 4 shows that the probability of Chi-Square 0.2294 is greater than 0.05. The test failed to reject the null hypothesis, suggesting that residuals are homoscedasticity (constant variance).

Table 5: Autocorrelation

F-statistic	0.001432	Prob. F(2,41)	0.9986
Obs*R-squared	0.005029	Prob. Chi-Square(2)	0.9975

Source: Owner's compilation using Eviews

Table 5 shows that there is no presence of serial correlation in the estimated model since the p-value of observed R-square 0.997, is greater than 0.05 level of significant.

ISSN: 2455-8834

Volume:02, Issue:05 "May 2017"

Stability test

The stability test is used to test whether the model is stable. The Ramsey Reset test was used in the study to test the stability capacity of the model. Table 6 below presents the Ramsey Reset stability test. Since the probability of F-statistic 0.7614 is greater than 0.05 level of significant, the H_o which claims that the model is stable is accepted and concludes that the export model is stable.

Table 6: Ramsey RESET Test

Omitted Variables: Squares of fitted values

	Value	df	Probability
t-statistic	0.340219	42	0.7354
F-statistic	0.115749	(1, 42)	0.7354

Source: Owner's compilation using E-view

CONCLUSION

The study aimed to investigate the impact of exchange rate on exports in Namibia. The main purpose of the study was to determine the direction of the impact of exchange rate on export in Namibia. In this regard, the study employed the autoregression distributive lag model (ARDL). The results from the unit root test, the study used the Augmented Dickey-Fuller (ADF) and Phillips-Perron unit root test results showed a combination of order integration of order zero I(0) and one I(1). There is no variable integrated of order two I(2). This justifies why the study adopted the ARDL bounds testing procedure. The study conducted ARDL bound test to cointegration to determine the long-run relationship among the variables used in the export model. The results showed no cointegration among the variables and thus, the study proceeded with the differenced long-run ARDL model. From the long-run results, exchange rate, real gross domestic products (RGDP) and relative price are significant in explaining export in Namibia but the sign for exchange rate is correct as expected. The RGDP and relative price are not as expected. Foreign direct investment is insignificant in explaining exports in Namibia. The estimated model also suggested that there is no long-run relationship among the variables. Based on the findings, the study recommends the following: First, Namibia needs to specialise on comparative advantage so that the country can export more and import less. Although this study found that export and real gross domestic product have a negative relationship in the long-run, at least the previous economic growth affects the exports positively. Second, government policymakers need to attract more foreign direct investment in order to boost the local

ISSN: 2455-8834

Volume:02, Issue:05 "May 2017"

productivity so that the country will produce in access and export more. Third, policy makers should also encourage the local producers such as small medium enterprises (SME) to engage in manufacturing industries in order to increase the manufacturing products' capacity for exports. This can be done by subsidizing the SMEs. Finally, there have been debates on the issue pertaining to the costs and benefits of various exchange rate regimes, the determinants of the exchange rate regime choice and how exchange rate affects trade flows. Therefore is important for continuous studies on the effect of exchange rate on exports in the country and for the purpose of formulating appropriate economic policies for future measures.

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