Handbook on Economics, Finance and Management Outlooks
ISBN: 978-969-9952-03-6
homepage: http://pakinsight.com/?ic=book_detail&id=11
Conference venue : lebua Hotels and Resorts, 1055 Silom Road, Bangrak, Bangkok 10500 Thailand

Vol.3 , 2015
(27-28 July)

**Paper ID :** 652/15/3rdICEFMO

# Exchange Rate Volatility and Export Performance in South Africa: (2000-2014)

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## Abstract

This study sought to investigate the relationship between exchange rate volatility and export performance in South Africa. The main objective of the study was to examine the impact of exchange rate volatility on export performance in South Africa. This relationship was examined using GARCH methods. Exports were regressed against real effective exchange rate, trade openness, and capacity utilisation. The research aimed to establish weather exchange rate volatility impacts negatively on export performance in the manner suggested by econometric model. The result obtained showed that exchange rate volatility had a significantly negative effect of South African exports in the period 2000-2011.

**Keywords:** Exchange rate volatility, Export performance, GARCH, South Africa.

## 1. Introduction

The exchange rate of a country plays a pivotal role in public debate on trade and trade policy in South Africa. Like many developing countries, South Africa's economic success depends on the rest of the world. The level of interdependence has increased from the previous decade as we move towards an era of free trade. This means it is highly influenced by changes in world demand and currency fluctuations. Widespread calls for depreciation or appreciation of the rand currency were witnessed in South Africa. The Congress of South African Trade Union approached the government about the need for exchange rate depreciation in June 2005. Business around the country also argues that the rand's post 2001 strength negatively affected manufacturing production (Business Day, 2003). The Growth Employment and Redistribution (GEAR) macroeconomic policy emphasized the need for a 'competitive' exchange rate. Moreover the Accelerated and Shared Growth Initiative in South Africa (ASGISA) initiative has identified exchange rate volatility as a significant constraint to growth.

Poor export performance in South Africa has been blamed on strong rand by stakeholders. The way the South Africa Reserve Bank monitors exchange rate developments has been blamed for the volatility of the rand. Others argue that the Reserve Bank also does not intervene in the market of foreign exchange to defend any specific level of the rand but rather left it to demand and supply conditions in the foreign exchange market.

Brenton (2007) and Clark (1973) concluded that exchange rate volatility decreases trade as they believed that this happens because of imperfect markets particularly in developing countries. On the other hand, some studies provide evidence supporting a positive relationship between exchange rate volatility and trade flows.

South Africa's need for high export growth in an environment of freely floating exchange rates and increased volatility of the rand calls for an understanding of the effect of this highly fluctuating rand on South Africa's exports and consequently, its impact on the economy.

The problem of exchange rate volatility has given rise to a broad debate but there is no consensus on whether exchange rate volatility influences trade volumes or on whether any such influence is negative or positive. Aziakpono *et al.* (2005) has been credited for saying that high exchange rate volatility complements trade if exporters are sufficiently risk averse as a rise in an increase in exchange rate variability leads to an increase in an expected margin of utility of export revenue which act as an incentive for exporters.

The critical question for South African policy makers is to whether managing exchange rate volatility can improve export performance? To what extend does real exchange rate volatility affects export performance? In particular does exchange rate volatility influence export volumes or whether such influence is positive or negative? These questions remain unanswered in the South African context and there is need to provide answers to these questions. In other words there is need to empirically establish the impact of exchange rate volatility on export performance.

This study adds on to the on-going debate about the impact of exchange rate volatility on export performance in South Africa. The general public will benefits from this research in the sense that they

will know in detail the real impact of real exchange rate volatility which may be different from their presently held perception.

This paper is structured as follows: Section 2 provides a brief overview of trends in the behaviour of exchange rate volatility and export performance in South Africa over the period 1998-2011. Section 3 presents an overview of supporting theoretical and empirical literature. Section 4 discusses the methodology and the sources of data, whereas Section 5 uses the Garch model and discusses the results of the study. Section 6 concludes the study and presents some policy recommendations.

## 2. An Overview of Exchange Rate and Exports in South Africa

South Africa has been using a floating exchange rate as its exchange rate policy. This means that the rand exchange rate is determined by market forces of demand and supply in the foreign exchange rate market. The policy the South African Reserve Bank is to stay out of the market and allow the market forces to determine the exchange rate of the rand to other currencies. In recent, the SARB has been building up foreign exchange reserves and this involves buying of foreign exchange from the market in a bid to control international liquidity. However this activity can somehow influence the exchange rate by increasing the demand of foreign exchange even though the activity is not viewed as foreign exchange policy.

South Africa adopted a floating exchange rate regime despite its exposure to exchange rate volatility which is a threat to the growth of international trade and macroeconomic stability (Lira, 2007). It is commonly believed that high exchange rate volatility leads to high uncertainty which eventually increases trading risks.

The way the South Africa Reserve Bank monitors exchange rate developments has been blamed for the volatility of the rand. "The Reserve Bank also does not intervene in the market of foreign exchange to defend any specific level of the rand. This is rather left to supply and demand conditions in the foreign exchange market" (Van Der Merwe, 2009).

The freely floating exchange rate of the rand has accordingly resulted in substantial fluctuations in the external value of the rand. This has also caused the problem of exchange rate risk. Exchange rate risk, or currency risk, is the risk that a business's operations or an investment's value will be affected by changes in exchange rates (Vaidya, 2006).

The South African Export Structure has been dynamic since trade regime in 1980. There were various factors contributing to such a pattern. The chief reason was the differing policies that were employed after the apartheid era as measures to stimulate economic growth. In 1994, the new democratically elected government inherited an economic system characterized by declining economic and employment growth. In response to such pressures the government initiated a number of policies to stimulate growth and employment creation. The macro economic reforms were encapsulated in the Growth, employment and redistribution macroeconomic policy (GEAR) strategy.

In addition to encouraging growth and employment, this strategy aimed to transform South Africa into a competitive, outward oriented economy (RSA, 1996). Measures to reduce unit costs and exchange rate policy to keep the real effective exchange rate policy stable at a competitive level formed key components of the strategy. To distinguish it from the previously protectionist government, the new government also embarked upon an ambitious trade liberalization process that commenced with the government's formal offer in 1995 WTO (Bell, 1997).

The levels of manufacturing exports have responded to these initiatives in the 1990s. The success of these polices in generating exports has been mixed. We find that exports of the manufactures has increased but not enough to initiate export led growth as those of the Asian markets and a few other emerging markets. South African exports remain resource based and the country has lagged others in diversifying into new and fast growing export sector. The inability to restructure exports towards these high dynamic technology products is another explanation for these poor export performance of South African manufacturing exports during the 1990s.

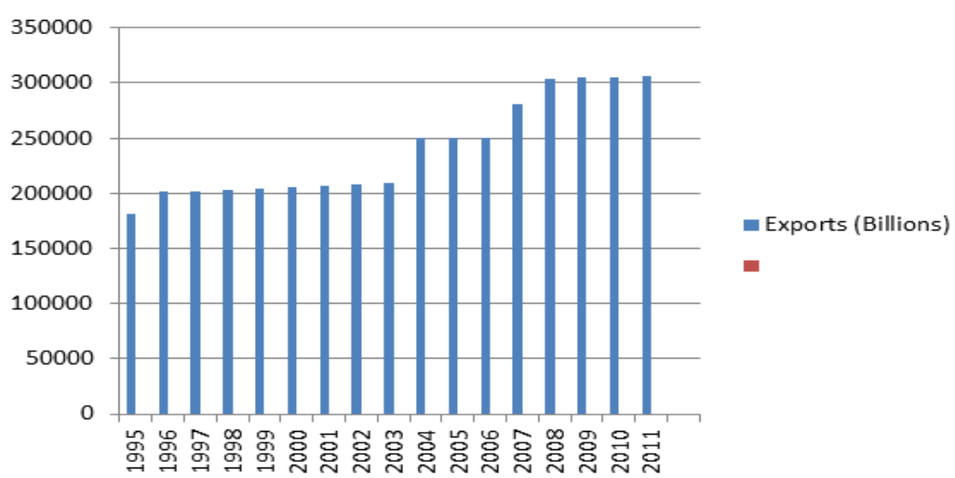


**Figure-1**. Structure of South African Exports from 1995 to 2012

**Source**: Economic Rearch Unit (2011).

Figure 1 show that in real terms exports increased from R180 Billion in 1995 to about R300 Billion in 2011.This was a significant growth in exports which can be attributed to a number of factors. South

Africa has succeeded in scoring a positive result despite depressed world market conditions due financial crisis in the world market and it has managed to diversify its export base in terms of products and trading partners. While the sharp depreciation of the rand has made a significant contribution, it does not fully explain the recent trends.

Although overall export growth has been comparatively low, some progress has been made in diversifying manufacturing exports towards medium and high technology products. This diversification is mainly due to the strong growth in motor vehicle related exports (medium technology), with some minor diversification towards high technology products.

## 3. A Review of Supporting Literature

This study is supported by several economic theories such as The Marshall-Lerner condition, the Monetary Approach to exchange rate model, and the absorption approach. The Marshall-Lerner condition assumed that when currency depreciates exports increases and imports falls resulting in improved net exports. Therefore to improve the net exports there is need to depreciate the rand. The Monetary approach assumed exchange rate as a monetary phenomenon whereby money supply plays a pivotal role in exchange rate determination and export performance. The Absorption approach assumed that that trade balances improves if the nation's GDP improves faster than its domestic spending. It hypothesizes that relative changes in real income or output and absorption determine a nation's balance-of-payments and exchange-rate performance.

Previous researchers carried out studies on the impact of exchange rate volatility on export performance. However different conclusions were made depending on the country researched methodology and the type of data used. Research conducted in South Africa include the works of Todani and Munyama (2005); Edwards and Garlick (2007); Bah and Amusa (2003) and Lira (2007). Research conducted in developing countries include the work of Nwidobie (2011); Rey (2006); Verena and Nawsheen (2011). Resarch conducted in developed countries include the works of Hericout and Poncet (2013); Murray *et al.* (1996) and Hasan (2001).

## 4. Methodology Used in the Study

To estimate the impact of exchange rate on export performance in South Africa, the study shall make use of the Garch Model. The data is first tested for stationarity using the Philips Peron test, Dickey Fuller test and the Augmented Dickey Fuller test.

### 4.1. Model Specifications

To determine the impact of exchange rate volatility on export performance in South Africa, this study shall modify the Guerin and Lahreche-Revil (2001) methodology. Guerin and Lahreche-Revil (2001) examined the relationship between currency volatility and growth in Europe. This study shall modify the Guerin and Lahreche-Revil (2001) model by putting trade openness measured by exports plus imports divided by GDP, Real Effective Exchange rate, and capacity utilisation. Using GARCH, the model will be represented as a system of equations for export supply ($X^s$) and export demand ($X^d$) which simultaneously determine export price and export quantity.

### 4.2. Export Demand Function

The study shall use a standard deviation of exports and the export demand function will be modelled as a function of real effective exchange rate, real foreign income, and domestic prices of exports. This can be expressed as follows;

$$X^d = \alpha_0 + \beta_1 REER_t + \beta_2 Y_t + \beta_3 GDP_t = u_t \quad (4.1)$$

All the variables are converted to logarithms. This is done in order to remove trends and obtain elasticity coefficient of these variables. The model in (4.2) above thus assumes the form:

$$lX^d = \alpha_0 + \beta_1 lREER_t + \beta_2 lY^t + \beta_3 lGDP_t = \mu_t \quad (4.2$$

We postulate the following export adjustment mechanism for export demand.

$$lX_t - lX_{t-1} = \delta(lX^{dt} - lX_{t-1}) \quad (4.3)$$

Where $\delta$ is equal to a coefficient of adjustment $0 \leq \delta \leq 1$. By substituting (4.2) into (4.3) the following model is derived

$$lX^{dt} = \alpha_0 + \beta_1 lREER_t + \beta_2 lY^t + \beta_3 lGDP_t + (1-\delta)X_{t-1} + \mu_t \quad (4.4)$$

LREER is the logarithm of the real effective exchange rate of the rand, measured in foreign currency terms. The REER of a country *i* is normally calculated as a geometric weighted average of weighted bilateral exchange rates.

LGDP is the logarithm of Gross value added at basic prices of manufacturing Gross Domestic Products.

LY is the logarithm for foreign income and is defined as income arising from outside South Africa.

$\mu$ is the error term.

### 4.3. Export Supply Function

On the supply side, the desired level of exports are assumed to be influenced by real exchange rate (REER), price of other inputs apart from labour (PI), and capacity factors(CU). This can be expressed as follows: On the supply side, the desired level of exports are assumed to be influenced by real exchange rate (REER), Trade openness (TO), and capacity utilisation (CU). This can be expressed as follows:

$EX^s = \alpha_0 + \beta_1 REER + \beta_2 TO + \beta_3 CU_t + \mu_t$ .....(4.5)

The variables above are converted to logarithms to become;

$LEX = \alpha_0 + \beta_1 lREER + \beta_2 lTO + \beta_3 lCU = \mu$ .....(4.6)

***LEX$^s$***= is the logarithm of exports

***LREER***= is the logarithm of the real effective exchange rate of the rand, measured in foreign currency terms. The REER of a country *i* is normally calculated as a geometric weighted average of weighted bilateral exchange rates.

***LTO*** = is the logarithm of trade openness.

***LCU*** = is the logarithm of capacity utilisation (infrastructure and the level of technology).

This specification assumes that the desired level of exports supplied is equal to the level of exports supplied. To get a disequilibrium export supply function, a partial adjustment mechanism is needed. It is postulated in the following adjustment mechanism for exports:

$\Delta lX_t = \lambda(lX_t - lX_{t-1})$.....(4.7)

Where $\lambda =$ is equal to coefficient of adjustment $(0 \le \lambda \le 1)$. By substituting equation (4.6) into equation (4.7) the following general export function is derived.

$EX^s = \alpha_0 + \beta_1 REER + \beta_2 TO + \beta_3 CU_t + (1-\lambda) lX_{t-1} + \lambda u_t$ .....(4.8)

By substituting (5) into (8) then the following general export function for South African exports is derived as follows:

$LEX_t = \alpha_0 + \beta_1 lREER + \beta_2 lTO_t + \beta_3 lCU_t + \beta_4 lGDP + \beta_5 lY + \mu_t$.....(4.9)

This will give us potentially important relationships among expected determinants and trade growth on which the estimation will apply.

## 4.5. Definition of Variables

**LEX** is the natural logarithm of exports. Exports are goods and services produced domestically and sold to buyers in another country.

**LREER** is the logarithm of the real effective exchange rate of the rand, measured in foreign currency terms. The REER of a country *i* is normally calculated as a geometric of weighted bilateral exchange rates. The weighted bilateral exchange rate is calculated as follows:

$$REER_i = \prod_{i \neq j} \left( \frac{P_i e_{i1}}{P_j e_{j1}} \right) x_{ij}$$

Where $ej$ indicates the exchange value of country $j's$ currency against the US dollar, $xij$ is the country *j's* weight in country *i's* index and *pj* is price index of country *j*. Under this study a rise in REER represents a real depreciation of the rand.

**LTO** is the logarithm of trade openness. Trade openness is associated with positive trade outcomes. More open economies must experience more trade growth. Trade openness can improve exports as there will be limited hindrances to trade between countries.

**LCU** is the logarithm for capacity utilization. Capacity utilization (infrastructure and technology) is the extent to which the productive capacity of plant, firm, country is being utilized in generating goods and services for exports. More capacity utilization by firms would result in more goods and services being produced at a lower cost because fixed costs and total costs decreases as more units are produced. Higher capacity utilization generally results in more output and more exports.

**LGDP** is the logarithm of the country's growth domestic product. The GDP measures a country's economic growth. It indicates the total output produced per year. Since net export is a component of GDP, this variable has been dropped from the South African export equation because it results in collinearity.

**LY** is the logarithm for foreign income and is defined as income arising from outside South Africa. Since Net foreign income is a component of GDP, the variable has also been dropped out of the equation because it results in collinearity.

## 4.6. Expected Priori

### Real Effective Exchange Rate

There is a larger variety in what countries can expect from using the exchange rate as a policy to boost their trade balance and growth. The sign of the real effective exchange rate is expected to be positive for countries that expect an improvement in trade balance through depreciation of the real effective exchange rate. The countries that expect a larger gain in trade from depreciating their currency to boost exports and growth can adopt a policy of depreciating their real effective exchange rate. South Africa is likely to benefit from real exchange rate depreciation than a country like Japan since Japan has a higher IIT index.

### Trade Openness

Trade openness affects growth volatility**.** Trade openness is associated with positive trade outcomes and hence a positive relationship is expected. More open economies are expected to result in increased growth in trade. Trade openness can improve exports as there will be limited hindrances to trade between countries.

### Capacity Utilization

A positive sign is expected on capacity utilization. More capacity utilization by firms would result in more goods and services being produced at a lower cost because fixed costs and total costs decreases as more units are produced. Higher capacity utilization generally results in more output and more exports. As more capacity is utilized, more output is expected and there will be enough output to export to other countries.

### 4.7. Data Sources

The study shall use data on exports of goods and services, real effective exchange rate, trade openness and capacity utilisation, prepared from Statistics South Africa and Reserve Bank of South Africa. Nominal figures shall be used for the study. The study employs monthly South African data for the period 2000/01 – 2012/11 so that there will be adequate observations so as to get reliable conclusion. The data shall be test for stationary first or the order of integration of the data series in order to eliminate spurious regression results. This shall be done using the Augmented Dickey Fuller method and the Phillip Peron test.

### 4.8. Research Techniques

The study uses Dickey Fuller test, Augmented Dickey Fuller test and Phillip Peron unit root tests for stationarity. Variables are tested for stationarity because most economic series are not stationary in their levels which lead to estimations being meaningless. In this section the techniques used to test for stationarity are reviewed.

## 5 Results

### 5.1.Testing for Collinearity

Collinearity was performed to see if there is no linear between explanatory variables. Logic behind assumption of no multicollinearity is that if two variables are collinear it becomes difficult to separate the individual effect of each variable on the dependent variable. In order to check multicollinearity among independent variables, a correlation analysis was performed. The closer the r coefficient approaches +-1, regardless of the direction, the stronger is the existing association indicating a more linear relationship between the two variables. However. A suggested rule of thumb is that if the pair wise correlation between two regressors is very high, in excess of 0.8 multicollinearity may pose a serious problem. The correlation analysis results are reported below.

**Table-1.** Matrix of correlation of independent variables.

| Variable | LEX | LREER | LTO | LCU |
|---|---|---|---|---|
| LEX | 1.000000 | 0.261826 | 0.305787 | 0.270083 |
| LREER | 0.261826 | 1.000000 | 0.099201 | 0.391755 |
| LTO | 0.305787 | 0.099201 | 1.000000 | 0.135676 |
| LCU | 0.270083 | 0.391755 | 0.135676 | 1.000000 |

Table 5.1 shows that the highest correlation coefficient value is 0.3912 which is relatively low. It is well below 0.8. Since the highest correlation numbers are lower than 0.8 the results clearly show that none of the independent variables are highly correlated and no multicollinearity amongst independent variables exist.The correlogram of squared residuals was also conducted to complement the ARCH test in detecting heteroscedasticity.

**Table-2.** Correlogram of squared residuals

| Sample: 2000M01 2011M12 | | | | | | |
|---|---|---|---|---|---|---|
| Included observations: 144 | | | | | | |
| Autocorrelation | Partial Correlation | | AC | PAC | Q-Stat | Prob |
| .\|***** \| | .\|***** \| | 1 | 0.655 | 0.655 | 63.120 | 0.000 |
| .\|** \| | *\|. \| | 2 | 0.318 | -0.195 | 78.121 | 0.000 |
| .\|. \| | **\|. \| | 3 | -0.013 | -0.245 | 78.145 | 0.000 |
| .\|. \| | .\|** \| | 4 | -0.000 | 0.330 | 78.145 | 0.900 |
| .\|. \| | *\|. \| | 5 | 0.002 | -0.128 | 78.146 | 0.000 |
| .\|. \| | *\|. \| | 6 | 0.005 | -0.127 | 78.149 | 0.000 |
| .\|. \| | .\|** \| | 7 | 0.009 | 0.224 | 78.162 | 0.000 |
| .\|. \| | *\|. \| | 8 | 0.008 | -0.107 | 78.171 | 0.000 |
| .\|. \| | *\|. \| | 9 | -0.008 | -0.113 | 78.181 | 0.000 |
| .\|. \| | .\|* \| | 10 | -0.036 | 0.132 | 78.382 | 0.000 |
| .\|. \| | *\|. \| | 11 | -0.056 | -0.090 | 78.873 | 0.000 |
| *\|. \| | *\|. \| | 12 | -0.068 | -0.097 | 79.612 | 0.000 |
| *\|. \| | .\|* \| | 13 | -0.069 | 0.101 | 80.371 | 0.000 |
| .\|. \| | .\|. \| | 14 | -0.065 | -0.065 | 81.050 | 0.000 |
| .\|. \| | *\|. \| | 15 | -0.058 | -0.076 | 81.591 | 0.000 |
| .\|. \| | .\|. \| | 16 | -0.059 | 0.062 | 82.158 | 0.000 |
| *\|. \| | *\|. \| | 17 | -0.069 | -0.073 | 82.955 | 0.000 |
| *\|. \| | *\|. \| | 18 | -0.092 | -0.097 | 84.360 | 0.000 |
| *\|. \| | .\|. \| | 19 | -0.102 | 0.055 | 86.119 | 0.000 |
| *\|. \| | .\|. \| | 20 | -0.101 | -0.053 | 87.836 | 0.000 |

Table 2 provides evidence of arch effects as shown by the autocorrelations of the squared residuals. There is no autocorrelation up to the 4th lag, thereafter autocorrelation is present. The test p-values are all significant, and resultantly the no ARCH hypothesis is rejected.

**Table-3.** Augmented Dickey Fuller unit test

| **Level** | | | | **First Difference** | | |
|---|---|---|---|---|---|---|
| **Variables** | **Constant** | **Constant and Trend** | **None** | **Constant** | **Constant and trend** | **None** |
| LEX | -1.60 | -2.28 | 1.28 | -7.35* | -7.4* | -7.05* |
| LGDP | -0.73 | -2.59 | 1.93*** | -4.88* | -4.85* | -4.23* |
| LCU | -1.95 | -1.96 | -0.28 | -4.33* | -4.30* | -4.36* |
| LREER | -2.33 | -2.23 | -2.2** | -4.11* | -4.18* | -4.15* |
| LTO | -1.44 | -2.20 | -1.41 | -9.12* | -9.14* | -8.97* |
| CV (1%) | -3.53 | -4.10 | -2.60 | -3.54 | -4.11 | -2.60 |
| CV (5%) | -2.91 | -3.48 | -1.95 | -2.91 | -3.49 | -1.95 |
| CV (10%) | -2.59 | -3.17 | -1.61 | -2.60 | -3.17 | -1.61 |

**Source:** http://www.resbank.co.za/Research/Statistics/Pages/OnlineDownloadFacility.aspx
**Notes**

(1) The Null Hypothesis, $H_o$ = variables have one roots.

(2) *,**and*** represent a stationary variable at 1%, 5% and 10% level of significance respectively.

**Table-4.** Phillips-Peron (PP) Unit Root Test

| **Level** | | | | **First Difference** | | |
|---|---|---|---|---|---|---|
| **Variables** | **Constant** | **Constant and Trend** | **None** | **Constant** | **Constant and trend** | **None** |
| LEX | -1.78 | -3.42 | -2.58 | -13.97* | -21.55* | -10.70* |
| LGDP | -0.68 | -2.10 | 2.84 | -4.38* | -4.33* | -4.30* |
| LCU | -1.84 | -1.88 | -0.49 | -6.36* | -6.31* | -6.39* |
| LREER | -2.48 | -2.38 | -0.18 | -7.73* | -7.73* | -7.80* |
| LTO | -1.84 | -1.88 | -0.49 | -6.36* | -6.31* | -6.40* |
| CV (1%) | -3.53 | -4.10 | -4.10 | -3.53 | -4.10 | -2.60 |
| CV (5%) | -2.90 | -3.48 | -3.48 | -2.91 | -3.48 | -1.95 |
| CV (10%) | -2.59 | -3.17 | -3.67 | -2.60 | -3.17 | -1.61 |

**Source data:** http://www.resbank.co.za/Research/Statistics/Pages/OnlineDownloadFacility.aspx
**Notes**

(1) The Null Hypothesis, $H_o$ = variables have one roots.

(2) *,**and*** represent a stationary variable at 1%, 5% and 10% level of significance respectively.

(3) CV represents Critical value.

**Table-5.** Presentation of results

| **Variable** | **Coefficient** | **Standard error** | **z-statistic** | **P-value** |
|---|---|---|---|---|
| C | 2.198244 | 0.573746 | 3.831389 | 0.0000 |
| LCU | 1.750573 | 0.182538 | 9.590184 | 0.0000 |
| LTO | 0.037012 | 0.006310 | 5.865599 | 0.0000 |
| LREER | 0.550590 | 0.063148 | 8.719043 | 0.0001 |

**Table-6.** Variance Equation

| **Variable** | **Coefficient** | **Standard error** | **z-statistic** | **P-value** |
|---|---|---|---|---|
| C | 0.064155 | 0.066387 | 0.966373 | 0.3339 |
| RESID(-1)^2 | 2.419967 | 0.315017 | 7.682020 | 0.0000 |
| GARCH(-1) | -0.004952 | 0.032312 | -0.153244 | 0.8782 |
| LREER | -0.006409 | 0.007305 | -0.877374 | 0.3803 |
| LCU | -0.010078 | 0.023422 | -0.430268 | 0.6670 |
| LTO | 0.003315 | 0.001208 | 2.744001 | 0.0061 |

R-squared 0.145729
Adjusted R-squared 0.127423
Durbin-Watson stat 0.676449

As expected, the sign of capacity utilization is positive. One percent increase in capacity utilization (LCU) increases export volumes by 1.75%. This result shows that there is a positive relationship between manufacturing capacity utilization and export volumes. The value of capacity utilization is statistically significant and it's positive. This means that an increase in capacity utilization will result in increase in export volumes. A country's capacity utilization is its total possible production capacity that is actually being used.

Trade openness has a positive sign. One percent increase in trade openness will result in 0.037% increase in exports. The coefficient of trade openness is positive and it is statistically significant. Trade openness can improve exports as there will be limited hindrances to trade between countries.

LREER has a positive coefficient. This is consistent with economic theory. Exchange rates movements affects export competitiveness according to the flow oriented model. When the rand depreciates, the demand for South Africa's exports increases. A depreciation of the rand will cause the demand for South African exports to increase as they will become more competitive in terms of lower prices to international buyers. This will result in them gaining competitiveness on the international market.

### 5.2. Discussion of Results

The main aim of this section was to present results of this study. In order to achieve this objective, the section began by looking at the descriptive statistics of the two major variables, REER and Exports. The variables also showed excess kurtosis and not normally distributed. This, however, raised questions about the stationary of the variables of the study. Stationary tests were conducted and all the variables were not stationary at levels. However, they were stationary after first differencing.

Furthermore collinearity test was performed to see if there was any correlation between the explanatory variables. The collinearity test denoted that the variables LGDP and LTO were correlated and this resulted in one of the variables with highest p value being dropped from the equation.

The GARCH model was chosen for estimation purposes. The normal GARCH was chosen in place of the non-normal GARCH because it modelled well the problems of fat tails and asymmetry in the variables. The normal GARCH appeared to be better than the non-normal GARCH. This was proved by the normality tests and the Q-statistics test. The normality test showed that the normal GARCH model reduced the problems of non-normality in the variables seven times than the non-normal GARCH model. Furthermore normal GARCH model eliminated the problem of serial correlation. Diagnostic tests conducted in this study showed that the model was good. The Q-statistic test also showed that there was no serial correlation in the residuals. The GARCH model also eliminated the problems of the ARCH. Trade Openness was shown to have a positive 3, 7 percent but insignificant impact on export performance but the exchange rate has a strong positive impact of 55.5 percent on export performance. Capacity utilisation has a positive impact on export performance of 17.5 percent. Results obtained from this study were all supported by existing empirical studies and by prevailing economic theory

## 6. Policy Recommendations

Results in this study show a number of policy implication. A major caution is that exchange rate be carefully managed to ensure a stable non-volatile behaviour of the rand so as not to hamper export growth. If policymakers wish to target exports, it is likely that policies which enhance the level of economic activity for exporters be implemented. Export Marketing Assistance Scheme (EMA), Export Marketing and Investment Assistance Scheme (EMIA) should receive sound funding from government so that such schemes can effectively assist exporters in penetrating new markets.

Fluctuations in exchange rate have a significant negative impact on the performance of exports. Since most South African exporters are risk averse, the government should consider developing hedging facilities and institutions that can protect its exporters against exchange risk.

Furthermore, the current objective of South Africa in ensuring sustainable economic growth through increased exports should be substantiated by a stable and competitive exchange rate, viable fiscal and monetary policies as well as structural reforms that contribute to decline in per unit cost of production and the improvement in international competitiveness of South African exporters

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