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THE REAL INFLUENCES OF OIL PRICE CHANGES ON THE GROWTH OF REAL GDP: THE CASE OF SOUTH AFRICA

Abstract:

Oil price fluctuation is a cause of concern for most of the economies of the world including South Africa. The premise is that since oil consumption is regarded as one of the major determinants of the economic activities in any country, therefore the price fluctuations have a potential of slowing down the economic growth. The purpose of this study is to analyse the influences of oil price changes on economic growth in South Africa. Determining such a relationship will not only be helpful to the academic community, but also to the policy makers and the international community. The study utilises secondary data to examine quarterly time series data from the year 1990Q1-2014Q1. Several sources of data (websites) like SARB, Quantec, and International Monetary Funds, among others, were considered to find the most relevant data. The model was estimated by using a cointegrating vector autoregressive frame work and it was passed through a battery of diagnostic and stability test. The Generalised Impulse Response Function was employed to examine the dynamic relations among the variables under study. The results show that there is a positive relationship between economic growth and oil prices fluctuations.

Keywords:

Oil prices, Economic Growth, cointegrating vector autoregressive, Generalised Impulse Response Function, South Africa.

JEL Classification: C50, C54, B41

1. Introduction

A cause for distress for most of the world economies including South Africa is oil price fluctuations. Since the basis that oil consumption is considered as one of the key determinants of the economic activities for any country, consequently economic growth in many countries is hampered by price fluctuations. Pretorius and Naidoo (2011) uphold that the oil market is the most unstable of all the markets in the economy. While controlling only 10% of the world's oil reserves, North America, Europe and Asia-Pacific consume approximately 80% of the world's oil reserves. Simultaneously, South America, Africa, Middle East and Russia while controlling 90%, consume 20% of the remaining oil reserves (Beyond Petroleum, 2008).

The demand for liquid fuels in South Africa of 64% is attained through the import of crude oil. The Middle East is the main exporter with approximately 85%, while the remaining comes mostly from the African region with 15%. The Middle East and some parts of Africa are the two regions that supply South Africa with crude oil although they are highly predisposed to geopolitical instability. South Africa is extremely vulnerable to both national security and economic problems due to extreme dependence on imported oil from high-risk regions. A different strategy is required in reducing this vulnerability to energy security (Wabiri and Amusa, 2011).

Over the years the crude oil market in South Africa has transformed. Pending 1954 all oil products which could not be recycled were imported in South Africa. The country succeeded in developing the synthetic oil and fuel processing facilities since 1954, of which within the African continent only Egypt was able to exceed. The dissolution of the basic service agreement Main Supply Agreement (MSA) in 2003 also brought about an important change in the country's liquid fuels market (Swart, 2009). Since 2006, oil prices have been volatile despite all the advances made (Umar, 2010). With moderate downward trend, the South African Reserve Bank (SARB) upholds that the international crude oil prices have been high though fairly stable in recent years since 2011. For most part of the three years Brent crude oil has traded between US$100 and US$120 per barrel and its price at about US$108 per barrel has been in the bottom half of the range in 2014.

Geopolitical instability in major oil producing countries has hampered growth even though the effect was offset by strong US shale oil growth; consequently international markets have not experienced any supply problems. Due to currency movements which pass through to the basic fuel price completely and quickly, domestic oil prices have been on an upsurge and volatile (Umar, 2010). The basic fuel oil price1 in South Africa has basically increased by a cumulative 71 cents in 2014, and by June 2014 unleaded petrol in Gauteng Province cost R14.02 per litre, up from R13.02 in November 2013. The SARB also points out that the currency appreciation has provided some relief, with the price of 95-octane petrol declining by 37 cents per litre over May and June 2014.

According to Nkomo (2006) in the determination of international crude oil price, there has been three periods historically documented. Prices were determined mainly by multinational companies, until the1970s when the Organisation of Petroleum Exporting Countries (OPEC) affirmed its ability to sway oil prices by means of output decisions. Nonetheless by the late 1980s, world oil price were regulated by a market-related pricing system which linked oil prices to the market price of particular reference crude (Farrell, Kahn and Visser, 2001).

The major players such as PetroSA and SASOL participate in petroleum marketing; storage and refining with locally based energy corporations, who then import crude oil into South Africa through private players. The price of crude oil in the international markets is linked to the price of petrol in South Africa. Consequently with any increase in the price of crude oil like over the past three years, the price of petrol has to increase so that crude oil refineries are able to cover their own costs (Wabiri and Amusa, 2011).

The novelty of this study is that the relationship between oil price and economic growth has received an overabundance of theoretical and empirical research over the past years. However most of these studies concentrated largely on the USA and other developed economies of the world, with less attention given to the emerging ones. This study attempts to take advantage of this research gap in order to extend the existing literature in the South African context. Determining such a relationship will not only be helpful to the academic community but also to the policy makers and particularly oil importing countries such as South Africa. In shaping a portfolio of measures to reduce South Africa's oil-import vulnerability, policy-makers should consider the risks associated with imports from each of the supply sources. High risk-weight implies high costs and potential insecurity of supply, a situation that can imply higher prices on oil-related products. Decision-makers should also consider the effects of different oil-import strategies and the need to foster bilateral relations with less risky oil suppliers (Stringer, 2008).

The South African economy is not an oil producing economy but rather relies heavily on importing from oil producing nations. The implication is that the ever increasing oil prices are the key distress to all developing countries including South Africa. They have a huge impact on the regular consumption pattern of households. Samwel, et al. 2012 argue that oil prices, especially to petroleum oil importing countries, have acted as a major economic burden since the pricing of this crucial commodity is determined entirely by the oil exporting countries.

The consequence is that rising oil prices and price volatility suppress economic activity and diminish asset values. Yang, Hwang and Huang (2002) argue that higher oil prices yield successive recessions in oil-consuming nations, as oil prices are negatively correlated to economic activities. For energy-importing countries like South Africa, oil turns to be the key to the country's energy security. That being the case, the challenge is that high oil prices are a main threat to the economy's overall energy security and lead to high direct costs to consumers. According to Samwel, Isaac and

Joel (2012) the level of petroleum consumed in a country depends on several factors which among them include its prices, the level of economic activity, rate of inflation and the exchange rate, among others. Generally, most of these factors have been constantly fluctuating in developing economies like South Africa.

The specific objective of this study is to analyse the influence of oil price changes on economic growth in South Africa by VECM approach. Other key macroeconomic variables such as exchange rate and consumer price index (CPI) will be added as independent variables to the model. The study draws implications for macroeconomic policy and it estimates a VAR model to determine the macroeconomic relationship between oil prices and the economic performance in South Africa.

2. Theoretical Perspective and Literature Review

Oil is described as a contribution to the production process from the viewpoint of supply side shock effect. Production costs automatically increase as a result of increased oil prices. As a result, the rate of unemployment rises due to a lower productivity which then decreases total output. For oil importing economy the transmission process scenario is typical whereas for an oil exporting economy there is increased revenue due to oil price shocks which contribute to investment opportunities being increased, which then reduce the rate of unemployment and enhances output. Oil is measured as a production output as a result the supply side is expounded from the viewpoint of rising production costs. The production volume is undesirably affected as a result. Furthermore, impacts on investments decisions rely on the expectations of people on the future of changes in oil prices (Schneider, 2004).

According to Gatuhi and Macharia (2013), changes in oil prices impact on economic activity through both demand and supply side channels. The fact that oil is an important production input could be explained through supply side effects.

Consequently, the demand for oil is reduced when oil prices increase, which in turn lowers productivity of input factors that prompt firms to lower output. Moreover, changes in price of oil have demand side effects through investment and consumption. Hunt et al. (2001) note that oil price upsurges transform to increased production costs, most importantly to commodity price increases at which corporations retail their goods in the market. Higher commodity prices then transform to lesser demand for goods and services, consequently dwindling aggregate output and employment level. A rise in oil prices affects aggregate demand and consumption in the economy. The transference of income and resources from an oil-importing to oil-exporting economy is expected to reduce worldwide demand as demand in the former is likely to decline more than it will rise in the latter. The subsequent lower acquiring power of the oil-importing economy translates to a lower demand. Moreover, oil price volatilities pose economic ambiguity on imminent performance of the macro-economy. Societies may perhaps suspend consumption and investment decisions until they see an improvement in the economic situation.

Furthermore Davis (2001) argues that asymmetric responses between oil prices and other explanatory variables such economic growth responses should be acknowledged. One of these consists of sectoral shifts hypothesis. Volatility in oil prices can lead to several costs as employees can lose employment in one sector and will only be slowly rehired in others as costs are marked by net changes in aggregate employment. The other one is the demand decomposition mechanism which operates eventually through employment but begins as a disturbance to sector-specific demand. In this case the demand for durable goods is predominantly hit during recessions because consumers have a habit of smoothing the reduction in consumption of non-durables. Lastly is the investment pause effect in which drops in orders and purchases remain uncertain.

Several researchers argued that the uncertain economic effects of oil prices spikes may considerably be resilient than the favourable economic effects of oil price drops. Every bit of oil price fluctuations can induce sectoral reallocations and create doubts about the returns to irreversible investments. Oil price decreases, unlike increases, have positive real income effects that counterbalance these negative impacts. Various time series modellers include nonlinear, asymmetric oil price specifications to deal with this phenomenon. Hamilton (2000) found a 10% rise in oil prices from 1949:2 to 1980:4 that resulted from four quarters in a level of GDP growth that is 1.4% lesser than it actually would be.

Hamilton's results were verified by the study which postulates that there is a negative correlation between oil price increases and output growth. An alleged linear relationship between economic growth and oil price changes would suggest a stimulation of economic growth by an oil price decrease. In the 1980s however, changes in oil prices decelerated economic growth although oil price declines also followed. Hence, Mork investigated possible asymmetric effects of oil market disruptions.

Oil price increases have an opposing effect on investment by increasing the company's expenditures. Furthermore, to these demand and supply effects oil price fluctuations could impact the economy through foreign exchange markets and inflation (Park, 2007). Economic theory states that oil price fluctuations affect economic movement both through demand and supply channels. Supply side properties could be described centred on the fact that oil is a vital input in production. As a result, oil price increases reduce the demand for oil, decreasing productivity of other input factors which induce firms to lower output (Gatuhi and Macharia, 2013).

Furthermore, oil price fluctuations have demand side properties through consumption and investment as consumption is affected ultimately by its positive relation with income disposal. When oil prices escalate, an income transfer arises from oil importing nations to oil exporting nations. Thus, consumption in oil importing nations decrease and the degree of this effect is greater as the more the shocks are apparent to be long lasting (Gatuhi and Macharia, 2013).

3. Research Method

3.1 Data

Secondary data was utilised in this study to scrutinise attainable data starting from the year 1990Q1-2014Q. A number of sources of data (websites) like SARB, Quantec and the International Monetary Funds (IMF), among others were considered to find the most appropriate data for this study. The readily available data analysis conducted through secondary data analysis makes it more advantageous when coming to time and cost saving. In this study quarterly time sequences are favoured for they give a bigger degree of autonomy.

3.2 Model specification

A VAR model was estimated in this study in order to determine the macroeconomic relationship between oil price, consumer price index (CPI) and economic performance (GDP) in South Africa. Econometric tests are performed by applying Econometric Views (EViews 8) software, while the model of this study was projected by using a cointegrating vector autoregressive (CVAR) frame work. According to Hoover, et al (2008) a simple linear system made available by the CVAR can characterise the possibility of supplying a set of variables. The variables will be tested for the presence of the unit root bby means of the Augmented Dickey-Fuller (ADF) and the Kwiatkowski, Phillips, Schmidt and Shin (KPSS) tests. The Johansen cointegration was applied to determine the existence of the long run economic relationship amongst the variables whereas the short equilibrium relations will be determined by the Vector Error Correction Model (VECM) or vector autoregressive model (VAR). However The VECM/VAR helped to determine the fundamental relationship between the variables. The model will pass through a sequence of diagnostic and consistency tests, Variance decomposition and finally the Generalized Impulse Response functions (GIRF) will then be engaged in examining the vigorous associations among the variables under study. The anticipated model of this study is articulated in its functional form as follows:

$$GDP = f(EXCHRATE, INFLRATE, OILPR) \qquad 3.1$$

Where;

GDP is the level of economic activity of real GDP in R-millions. EXCHRATE is the nominal effective exchange rate adjusted for inflation rate differentials with the US price index as the main trading partner of South Africa. The definition is such that an increase an increase means a real appreciation of the Rand which is meant to hurt the economy's external competitiveness and vice versa for a decrease. OILPR is the quarterly nominal average world oil prices deflated by the US consumer price index (CPI). We use the oil prices in real terms, taking the ratio of the average world nominal oil price in US dollars to the US CPI extracted from SARB database. The definition of

oil prices adopted for the study is symmetric oil price growth rates as well as Mork's asymmetric definition of oil price changes.

4. Empirical Results and Discussion

4.1 Unit root tests

The unit root tests results are reported in Table 1. The variables are expressed in logarithms (logs) to linearise a model that is non-linear in the parameters. The transformed model then becomes linear in parameters and it can be easily estimated using ordinary least squares (OLS) regression (Asteriou and Hall, 2009). Each variable is presented in both level and first difference forms. These results indicate that even though some variables stationary at the level all the variables become stationary at first difference.

Table1 ADF and KPSS Unit Root Tests Results

Variable	ADF				KPSS			
	Without Trend		With Trend		Without Trend		With Trend	
	Level	1st Difference	Level	1st Difference	Level	1st Difference	Level	1st Difference
RGDP	-0.245	-2.816	-3.258	-2.71	1.284	0.285	0.225	0.128#
RXRATE	-0.398*	-8.34***	-7.029	-8.287***	1.276	0.092#	0.183	0.091#
INFL	-0.361*	-9.061***	-3.664	-9.026***	0.636	0.081#	0.152	0.039#
ROILP	-0.351*	-8.884***	-2.691	-8.821***	0.885	0.074#	0.19	0.047#

*Note: *, **, *** represent significance at 10, 5 and 1 % respectively.*

4.2 Cointegration tests

Tables 2 and 3 illustrate the cointegration tests results of both the trace and maximum eigenvalue tests respectively. The trace test indicates the presence of 1 cointegration while the maximum eigenvalue test indicates 2 cointegrating equations among the four variables in model at 0.05% level. This exposes the presence of a long run equilibrium relationship between economic growth (LGDP) and the variables used in the model. The value of cointegrating vectors is then derived from the Table 4.

Table 2 Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.433599	58.44911	47.85613	0.0037*
At most 1	0.360665	29.45799	29.79707	0.0547
At most 2	0.095706	6.644303	15.49471	0.6193
At most 3	0.029243	1.513657	3.841466	0.2186

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level

** denotes rejection of the hypothesis at the 0.05 level*

***MacKinnon-Haug-Michelis (1999) p-values*

Table 3 Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.433599	28.99113	27.58434	0.0328*
At most 1	0.360665	22.81369	21.13162	0.0287*
At most 2	0.095706	5.130646	14.26460	0.7252
At most 3	0.029243	1.513657	3.841466	0.2186

Max-eigenvalue test indicates 2 cointegrating eqn(s) at the 0.05 level

** denotes rejection of the hypothesis at the 0.05 level*

***MacKinnon-Haug-Michelis (1999) p-values*

Table 4 Cointegrating Vector of South Africa

1 Cointegrating Equations	Log likelihood	86.74104	
Normalized cointegrating coefficients (standard error in parentheses)			
LGDP	XRATE	LCPI	LOIL
1.000000	0.008719	0.194683	-0.194658
S.E	(-0.00478)	(-0.05349)	(-0.12912)

The cointegrating equation among LGDP, XRATE, LCPI and LOIL is denoted as follows:

$$LOG\_GDP_t = 0.008743 + 0.008719\ XRATE_t + 0.194683\ LCPI_t - 0.194658\ LOIL_t \quad (4)$$

The signs of the three parameters are as anticipated and greatly significant. The cointegrating vector indicated a stationary long run-relationship in which the level of LGDP depends on the real exchange rate, the inflation rate and real oil prices. Other things being equal, a 1% increase in the exchange rate causes the level of economic growth of South Africa to increase by 0.8743%. At the same time, a 1% increase in the inflation rate causes the level of economic growth to increase by 19.46% and a decrease of 1% in oil prices causes the level of economic growth to decrease by 19.46%. It can be concluded from the above equation that the real GDP of South Africa is more elastic to changes in international oil prices than of real exchange rate and inflation.

4.3 Vector Error Correction Model - Short-run analysis

According to Granger (1969), if evidence of cointegration between two or more variables is present, then a valid error correction model should also exist among the said variables. The error correction model is then a demonstration of the short run dynamic relationship between two variables. This simply suggests that an error correction term will be significant, given that cointegration exists. The estimated bivariate ECM for South Africa then takes the following form:

$$\Delta LOG\_GDP_{it} = \alpha + \Sigma\beta_{1i}\Delta XRATE_{it-1} + \Sigma\beta_{2i}\,\Delta LCPI_{it-1} + \Sigma\beta_{3i}\,LOIL_{it-1} + \varphi\, ECT_{1t-1} + u_{1it}$$

$$(i = 1 \ldots n_1) \qquad (I = 1 \ldots n_2) \qquad (3) \qquad (5)$$

Where Δ is the difference operator, $LGDP_t$, $XRATE_t$, $LCPI_t$ and $LOIL_t$ are as defined above, ECT_{it-1} is the error correction term derived from the long run cointegrating relationship, u_{1it} is the white noise error term, $_t$ denotes the years and n_1 is the lag orders of α's and β's respectively.

The VECM results distinguish between short run and long run Granger causality. The coefficients of the lagged ECT show that there is a long run relationship between economic growth and the independent variables. It also indicates the speed of adjustment to the long run equilibrium relationship. The following ECM was formed using 96 observations:

$$DLGDP_{it} = 0.005 - 0.000DXRATE_{t-4} + 0.001DLCPI_{t-4} + 0.023DLOIL_{t-4} 0.0014ECT_{t-1}$$

Se. (0.001) (0.000) (0.002) (0.009) (0.010) (6)

All coefficients of the model are significant at 1%(*), 5%(**) and 10%(***). The sign of international oil prices are as expected and support the cointegration equation, but the sign for the exchange rate is not as expected. The error correction term is negative and significant at 5%, so the model is stable and supports the cointegration output results. A value of -0.0014 of the coefficient of error correction terms advocates that

the South African economy's 0.14% movement back towards equilibrium following a back towards long run equilibrium, after the shock of oil price or the fluctuation of the exchange rate.

Table 5 VECM output

Dependent variable: DLGDP Method: Least Squares Sample: 1990 – 2013 Observations: 96			
Variable	Coefficient	Std. Error	t-statistic
C	0.005179	(0.00197)	[2.62916]
D_XRATE(-1)	-0.000216	(0.00044)	[-0.49702]
D_LCPI(-1)	0.001761	(0.00284)	[0.62050]
DLOIL(-1)	0.023470	(0.00935)	[2.51012]
ECM(-1)	-0.001438	(0.01042)	[-0.13800]
R squared.....= 0.872026 Adjusted R-squared...= 0.842224 S.E of Regression.....= 0.010646 Akaike.....= 0.481582 Schwarz.....= 2.578564			

4.4 Diagnostic checks

The results of the diagnostic checks are presented in Table 6. The results reveal that a Jacque-Bera value of 2.238 with a corresponding p-value of is 0.326 confirming that the residuals are normally distributed. The Ramsey-reset test results indicate that the model is stable with no error specification and there is no autoregressive conditional heteroskedasticity therefore we accept the null hypothesis. These tests confirm that our model is stable and conforms to CLRM assumption.

Table 6 Diagnostic test results

Test	H_0	Test Statistics	p-value	Conclusion
Jacque-Bera	Residuals are normally distributed	J.B = 2.238	0.326	*Cannot reject H_0 and conclude that the residuals are normally distributed.*
Ramsey Reset test	Model is stable with no error specification	LR = 0.814	0.3667	*Cannot accept H_0*
ARCH LM	No autoregressive conditional heteroskedasticity up to the 1st order	nR^2 = 66.708	0.0000	*Cannot accept H_0 and conclude that there is no autoregressive conditional heteroskedasticity*
Breusch-Pagan-Godfrey	No heteroskedasticity	nR^2 = 12.558	0.0057	*Accept H0 and conclude that the model is stable.*

4.5 Stability tests

Figure 2 and Figure 3 represent the stability tests performed by means of CUSUM test and CUSUM Sum of Squares. This option plots the cumulative sum together with the 5% critical lines. The test finds no parameter instability because the cumulative sum does not go outside the area between the two critical lines. This suggests that there is no coefficient instability which imply that there is no parameter or variance instability.

Figure 2 CUSUM Test

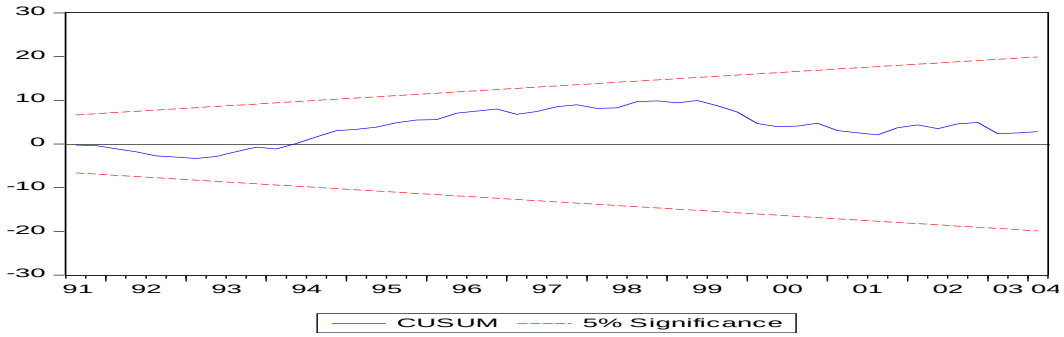
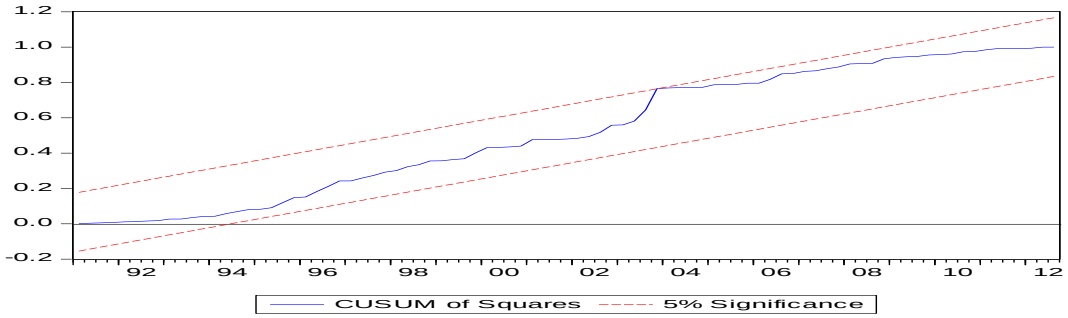


Figure 3 CUSUM of Squares



4.6 Variance decomposition

The results summarized in Table 7 analyses the variance decomposition of all variables. The crux of this test is that it measures the proportion of forecast error variance in one variable explained by innovations in itself and other variables. But it should be noted that the CVAR was estimated with the set of simultaneous structural restrictions specified in equations.

Table 7 Variance Decomposition of LGDP

Quarter	LGDP	LCPI	LOIL	XRATE
Variance decompositions for LCPI				
1	5.519384	94.48062	0.000000	0.000000
4	3.459506	72.09301	4.175747	20.27173
8	2.602572	51.51143	15.94085	29.94515
12	2.603705	50.16153	18.12319	29.11157
Variance decompositions for LOIL				
1	3.825664	0.137678	96.03666	0.000000
4	2.613518	0.343487	94.82413	2.218864
8	5.443248	4.753596	86.40368	3.399477
12	7.498821	8.105785	77.94052	6.454872
Variance decompositions for XRATE				
1	0.313368	0.990066	10.48932	88.20725
4	0.383032	2.847196	17.05586	79.71391
8	0.505137	3.113754	18.06415	78.31696
12	0.625934	3.472148	18.10814	77.79378

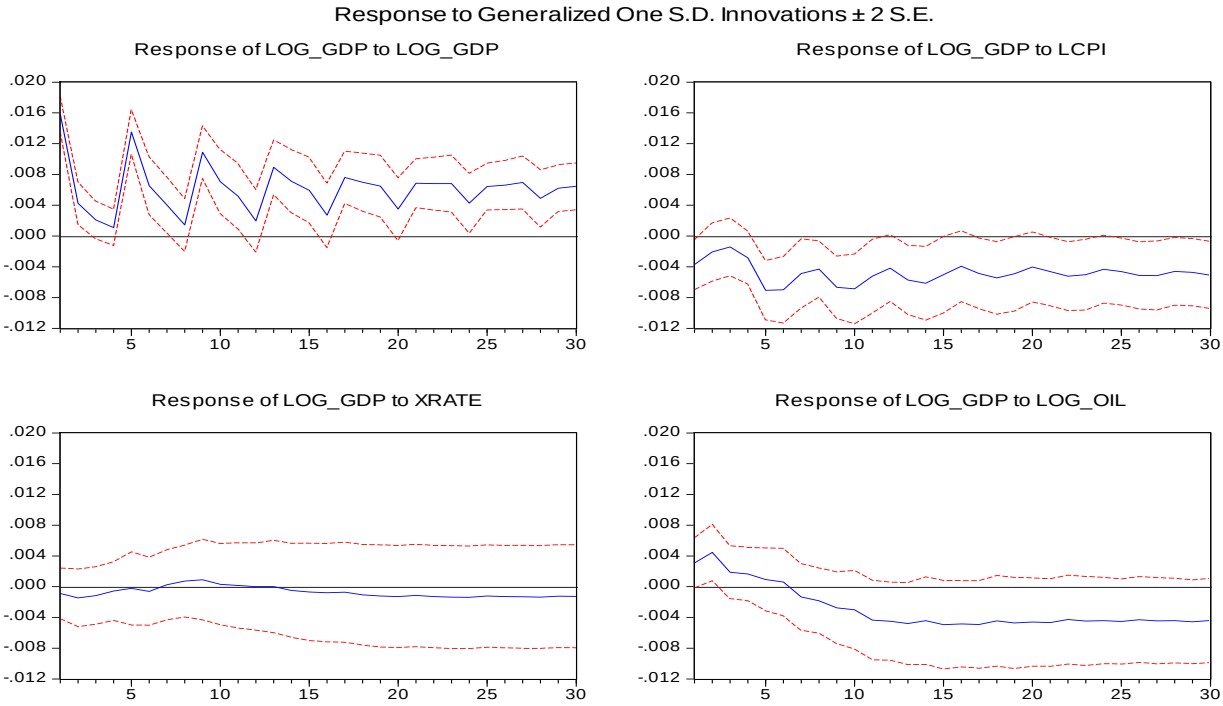
Based on Table 7 the inflationary effects of oil price shocks on the South African economy can be explained by the use of AD-AS model. Increasing inflation contributes to increased levels of economic growth. Inflation rate changes contributed about 5% to changes in economic growth in the 1st quarter, declining through to 3% in the 4th quarter. By the 8th and the 10th quarter the inflation rate had farther decreased to 2% for both the 8th and 12th quarter respectively. As far as the real oil prices is concerned the results show that in the 1st quarter GDP contributed about 3% to oil price shocks, declining to 2% in the 4th quarter, thus steadily increasing to 5% and 7% in the 8th and 12th quarter respectively. Finally the as far as the real exchange rate is concerned the variance decomposition suggests that shocks to GDP as presented in Table 7 is accounted for about by 31% of shocks to real exchange rate in the 1st quarter increasing in effects to about 38% in the 4th quarter, and further increased to 50% and 62% in the 8th and 12th quarter respectively.

4.7 Generalised Impulse Response Function

Findings on the generalized impulse response for up to 30 months as shown in Figure 4 reveal that the shocks in LGDP have a direct and positive effect on economic growth rate. The positive impact persisted throughout the forecast period. The magnitude of the effect continued to increase gradually from the 5th quarter, steadily declined and remained constant until the 30th quarter. On the contrary, the shocks in LGDP have a negative effect on LCPI. The negative effect began from the 1st quarter and continued to the last quarter. Although the negative effect persisted throughout the forecast period, the extent of the effect gradually remained constant all the way through the last period. This rate hovered around 1% point below the equilibrium value. This impact suggests that the effect on inflation is transient through the effect of level of consumer prices is permanent. Similarly, the impact of a shock in LGDP on XRATE suggests that the price shock effect in the second quarter imposes a negative impact on the exchange rate. The response increases by the 9th quarter, drops again by the 15th quarter and remains steady until the last quarter.

Lastly, a shock of LGDP to LOIL shows that an oil price shock has an immediate effect on economic growth. The impulse response suggests that economic growth increases from the 1st to the 2nd quarter, and then sharply declines from the 7th quarter to the 30th quarter.

Figure 4 Generalised Impulse Response Function (GIRF)



5. Concluding Remarks

This study used the co-integration analysis and generalized impulse response functions to empirically asses to what extent oil price increases affect economic growth and the volatile exchange rate in South Africa. The analysis led to the finding that a percentage change in oil prices contributes to the appreciation (depreciation) of the exchange rate by 0.07 in the long run, whereas it leads to a 11.85 (decline) increase.

Similarly a percentage increase in the rate of inflation leads to a decrease (increase) of 0.03% in economic growth. The R^2 of the equation further suggests that the model is a good fit with 89%.

The objective of this paper has been to investigate the direction of causality between oil prices along with economic growth and other macroeconomic variables such as inflation in South Africa using the CVAR approach. From the methodological viewpoint, the main aim of this paper has been to empirically examine the impact of oil price fluctuations on economic growth. In spite of recognizing the limitations of this paper due to data availability, this paper attempted to illustrate that when analysing dynamics among a set of variables it is important to properly identify in the long run.

Following the methods of testing, evidence of stationarity was found using ADF and KPSS test. This was reaffirmed by the Johansen test of cointegration which indicated three cointegrating equations within the model. The ECM also indicated the speed of adjustment of 14.7% to equilibrium, following the cointegration analysis the variance decomposition and GIRF results reaffirm the direct link between oil price fluctuation and economic growth. The results obtained for South Africa are similar to various

other developing countries studies and other small European countries that rely on imported oil.

In light of the reported results in this paper, evidence suggests that the South African economy is very vulnerable to oil price shocks. The country's domestic currency keeps depreciating over the entire observed period of the study. This has become a bothersome factor and calls for intervention by monetary authorities and policy makers alike to ensure proper policy measures are undertaken. Increased transparency will better inform policy makers and consumers alike in the legislative and executive branches about elements that affect the volatility and level of prices for oil products.

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