

Table 2: Generalised Forecast Error Variance Decomposition of Realised Volatility

Period	S.E.	RV	IP	TB	M2	IR	ER	INFL
1	0.016101	100.0000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
2	0.016699	96.40281	0.302588	0.030607	0.373478	0.121873	0.003079	2.765563
3	0.017278	94.38611	0.513117	0.186546	0.409083	0.135817	0.407190	3.962139
4	0.018105	93.38189	0.962134	0.459246	0.746677	0.433896	0.394856	3.621300
5	0.018506	89.62883	1.875807	0.502035	2.972420	0.473735	1.016032	3.531138
6	0.019215	87.45350	1.778958	0.642940	2.821009	0.492195	1.037696	5.773700
7	0.019383	85.98716	1.750101	0.633964	4.164929	0.722415	1.020617	5.720812
8	0.019508	85.02041	1.873685	0.780848	4.591837	1.003268	1.058339	5.671616
9	0.019590	84.30821	1.993324	0.970091	4.605921	1.010148	1.059019	6.053286
10	0.019646	83.84022	2.165454	1.029253	4.821101	1.044772	1.073506	6.025696
11	0.019802	82.52716	2.891876	1.023568	4.767501	1.028634	1.683206	6.078060
12	0.019919	81.85438	3.414236	1.098631	4.757896	1.024282	1.723763	6.126808
13	0.019978	81.41788	3.696170	1.097771	4.737653	1.018239	1.935262	6.097027
14	0.020054	80.93723	3.892078	1.092284	4.809306	1.027882	2.178956	6.062263
15	0.020120	80.54149	4.230268	1.112115	4.792311	1.021373	2.271716	6.030722
16	0.020182	80.10530	4.468491	1.115846	4.821020	1.016471	2.400316	6.072558
17	0.020250	79.73235	4.669937	1.167483	4.903543	1.009660	2.408939	6.108089
18	0.020285	79.52370	4.796901	1.200424	4.946971	1.006309	2.421068	6.104623
19	0.020317	79.37247	4.872126	1.203459	4.961708	1.003228	2.432863	6.154144
20	0.020344	79.24476	4.928551	1.200265	4.997983	1.000801	2.432581	6.195057
21	0.020359	79.18728	4.956216	1.199163	5.012843	1.000491	2.433794	6.210211
22	0.020372	79.13981	4.969676	1.201888	5.020469	1.003041	2.434612	6.230508
23	0.020385	79.06404	4.997342	1.203701	5.041303	1.012474	2.434598	6.246545
24	0.020393	79.03252	5.012143	1.203683	5.047606	1.018771	2.432759	6.252514

Cholesky Ordering: RV IP TB M2 IR ER INFL

There is a noteworthy contribution of oil price uncertainty shock to output of 5.01 percent over the 24 months horizon thus oil price uncertainty shock explains between 0.30 and 5.01 percent variations in domestic output. The same pattern is also observed for the all the variables. Similarly there is a notable contribution to money balances over the 24 months horizon where the oil price uncertainty shock explains between 0.37 and 5.05 percent variations in money balances. The variations in money supply are theoretically expected as increased volatility may result in reduced money balances over time for an oil importing country.

Moreover GFEVDs displays that inflation rate is significantly affected by the oil price uncertainty shocks. Similarly the contribution of oil price uncertainty shock to inflation is persistent over the months. The results propose that the contribution to inflation is quite significant between 2.77 and 6.25 percent between 2 month and 24 month forecast horizon. The observed influence of oil price uncertainty shock on inflation implies the quick adjustment of domestic prices in relation to international oil prices when uncertainty is present.

In general, the GFEVDs indicates that the oil price uncertainty shocks contribute substantially to variations in inflation, real output and various macroeconomic variables of South Africa, and persistent impact is observed over the longer forecast horizon. Therefore, SVAR analysis reveals the significant role of exogenous oil prices on the economy of South Africa when price uncertainty shocks exist.

Our results thus far indicate that the economy is significantly affected by the international oil price uncertainty shocks. To investigate the robustness of our results, we re-estimate the SVAR using alternative volatility measures, variable growth rates and incorporating an adjusted sample period. Given that RV seems to exhibit a break in 2008M12 we ran a robustness check using data from 2009 to 2015. These results are presented in Figure 4 and confirm the adverse effect of oil price uncertainty shock. We also use the growth rates of all the variables as a second robustness check since the variables have unit root; for the full sample ranging from 1990-2015. As seen in Figure 5, the conclusions are qualitatively similar to the case of level variables. As a third check we use the CBOE Crude Oil ETF Volatility Index (OVX) instead of the realized volatility also with sample ranging from 2009 to 2015. The results as depicted in Figure 6 though not as precise as the realized oil price volatility measure seems to still support the adverse effect of oil price uncertainty shock. Overall, all the robustness results still indicate the expected immediate response to the oil price uncertainty shock for most of the variables.

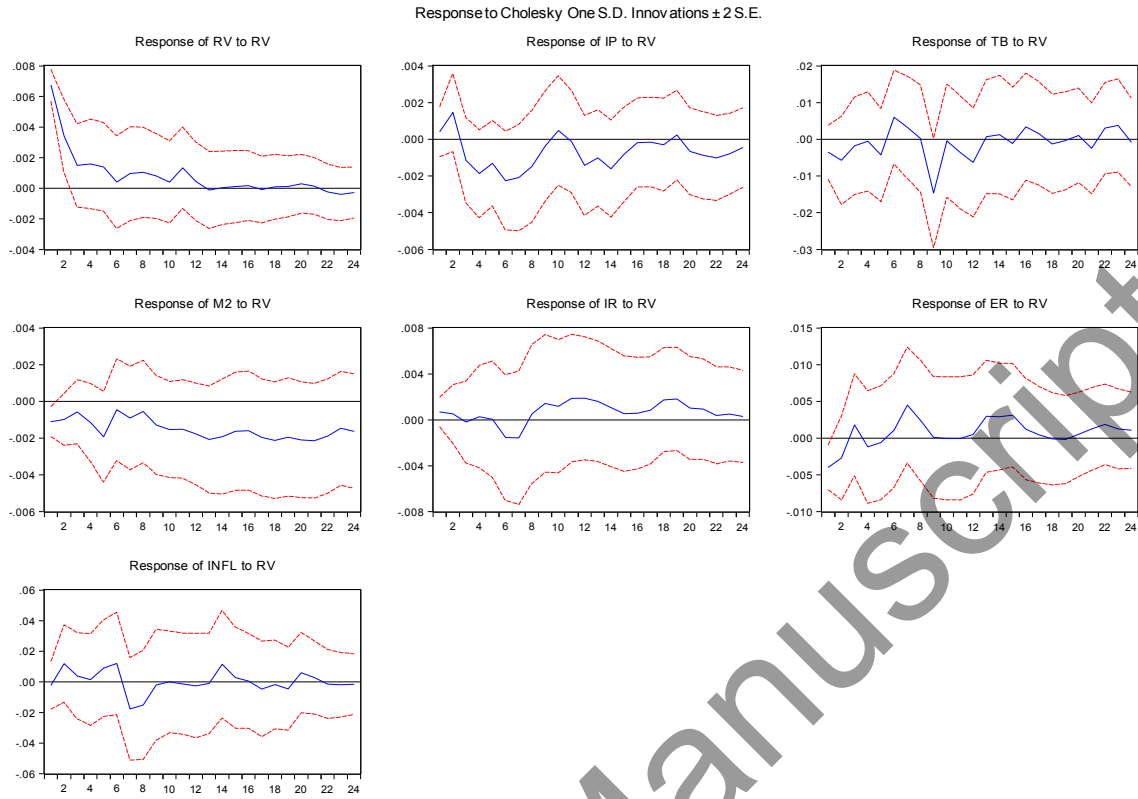


Figure 4: Impulse Response Functions: 2009-2015 data

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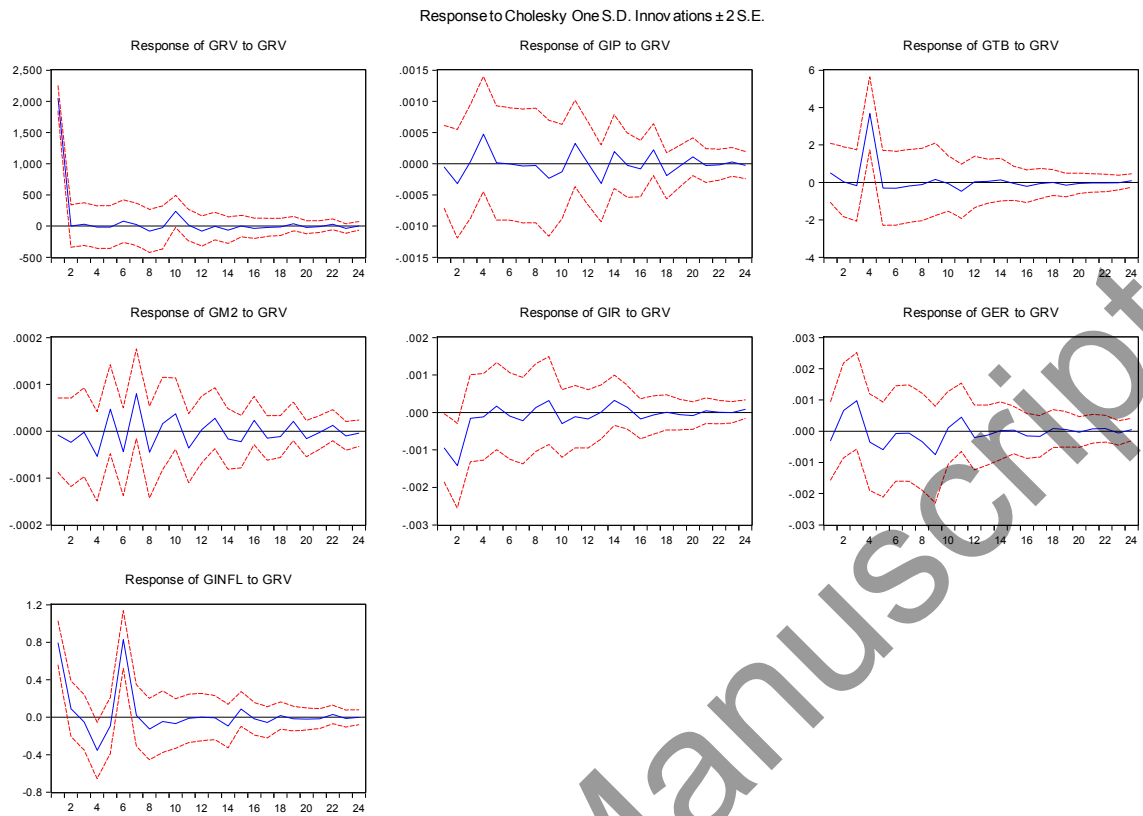


Figure 5: Variable growth rates Impulse Response Functions: 1990-2015 data

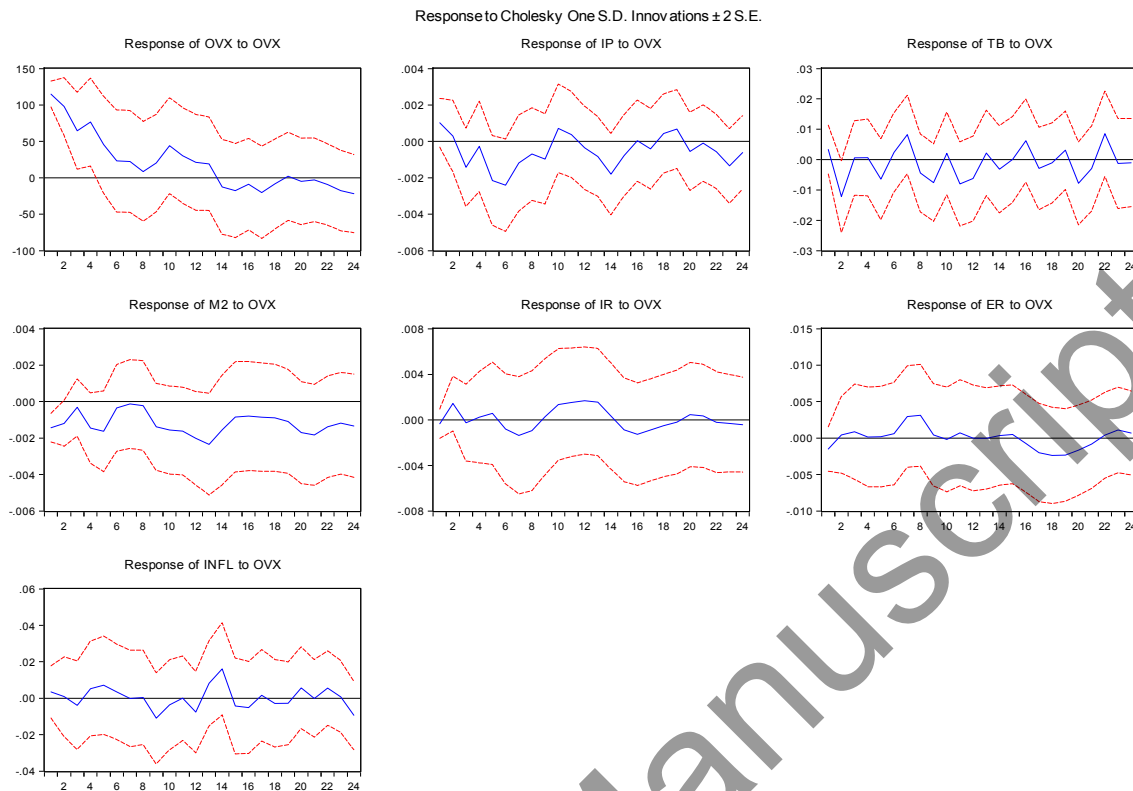


Figure 6: OVX Impulse Response Functions: 2009-2015 data

4 Conclusion and Policy Implications

The study empirically examines the short run effects of oil price uncertainty shock on the macroeconomic variables of South Africa from January 1990 to December 2015. The SVAR methodology is applied incorporating realized volatility as an indicator of oil price uncertainty.

The generalised impulse response analysis reveals that for most of the variables, the oil price uncertainty shocks proxied by realised volatility respond persistently and the impact is significant for output and inflation. It is also visible in the results that oil price uncertainty shocks dampen output due to the postponement of irreversible investments by firms. The GFEVDs analysis also points out that oil price uncertainty significantly contributes to changes in real output and various macroeconomic variables of South Africa with minor impact on interest rate where a marginal contribution is realised. The results additionally suggest that oil price uncertainty shocks transmit mostly through industrial production, inflation, trade and money balances and the exchange rate channels creating significant pressure on South Africa's economic activities.

The findings have important policy implications. South African industries greatly benefit from the locally mined coal which accounts for about 70 percent of the total energy whilst the imported crude oil accounts for about 15 percent of the aggregate energy used in South Africa (Department of Minerals and Energy, 2006). However, as a net crude oil importer the impact on output is quickly noticed because the country imports vast amounts of crude oil which creates a spill over effect on the economy. . Although the fluctuations in world oil prices cannot be controlled at domestic level, South Africa as a country should adopt such policies that can curb the adverse effects of oil price uncertainty shocks. Policy makers should always be alert on matters linked to oil price uncertainty so that they can be able to manage expectations of economic agents in order to steer expected outcomes of the South African economy. The expected outcomes include more emphasis in the prudent macroeconomic policy to deal with output boost when oil price uncertainty exists. Moreover, given the significant impact of oil price uncertainty shock on inflation, South African monetary authority should be more vigilant in their price stabilization policies to curb this effect. Furthermore, since South Africa depend more on non-renewable sources; renewable energy sources could possibly be an essential option to hedge oil price uncertainty shocks. The country for instance can increase developmental efforts towards hydropower, wind, solar and waste energy investments. Other policy decisions may include transitional arrangements and energy subsidy reforms. Regulations, standards, and targets may be implemented more rigorously and effectively to enhance energy efficiency. The need for a policy coordination, not only the macroeconomic and regulatory but also social policy could help to reduce external shocks such as the oil price uncertainty shocks.

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Public Interest Statement

South Africa is an oil importing economy which highly depends on non-renewable energy. It continues to dominate the region's consumption of both petroleum and total energy. The exogenously determined oil prices potentially generate uncertainties in the whole economy. The purpose of this paper is to characterize the impact of the oil price uncertainty shock on a small open economy like South Africa taking a holistic approach focusing on several macroeconomic variables. The study empirically tracks out how the oil price uncertainty shock affects economic activities in the economy using the Structural Vector Autoregressive (SVAR) model. It employs realised volatility as a proxy for uncertainty as volatility is known to display surges of uncertainty following major shocks. The transmission channels through which spill overs from policy specific shocks follow are also observed. The aim is to trigger conversations around the long term energy policies of South Africa to mitigate economic uncertainties.

About the Authors

Junior Chiweza is a graduate with a Master's degree in Economics from the University of Pretoria. She also holds an Honours degree in Economics and undergraduate degree in Business Management and Economics. Her overarching research interests are around Growth and Development, Monetary Theory and Policy, and Applied Econometrics. Recently, her focus has been around evaluating the impact of uncertainty examining context based interventions aimed at improving energy policies by exploring the challenges facing South Africa.

Dr. Goodness C. Aye holds a PhD in Agricultural Economics from University of Pretoria. She obtained her Bachelors and Master's degree in the same field. She is a Senior Lecturer and Researcher with interest in agricultural and economic policy analysis, financial markets, development, energy and environmental economics. She has published widely, presented papers in conferences in many continents, a reviewer and editor for high ranking journals. She teaches and supervises both undergraduate and graduate students.