The Impact of Macroeconomic Variables on Stock Returns: A Case of the Johannesburg Stock Exchange

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ABSTRACT

The study assessed association of macroeconomic variables: inflation (INF), Money supply growth (M3), Interest rates (IR) and USD ZAR exchange rate (EX) using quarterly data from the year 1981Q1 to 2016 Q4 on stock price for the Johannesburg Stock Exchange South Africa. The study employed co-integration tests, vector error correction model, a variance decomposition and an impulse response function to understand the relationship of the variables. In the long run, interest rates, money supply and inflation have a positive relationship with the share price while the exchange rate have a negative effect to the stock prices. Unidirectional causality was found running from exchange rates and interest rates to the share price and also the interest rates and the exchange rates have a causality to the money supply. The variance decompositions established that shocks to the share price account for majority of the changes in itself for all periods during the shortrun and long-run while also cementing results of the causality shocks in the stock price and exchange rate shocks have an impact on changes in themselves, also the impulse response function further confirmed causal relationships between the variables and the stock price.

Keywords: *macroeconomic variables, Johansen cointegration, VECM, Impulse response.*

JEL Classification Codes: *C32, C58, F36, G1, G12.*

1. INTRODUCTION

The relationship between the stock market and macroeconomic forces has been widely analyzed in the finance and macroeconomic literature. The relationship between equity prices and variables such as money supply, inflation and industrial production are of crucial importance not only in analyzing equity returns, but also in understanding how expected returns affect the economy.

This study seeks to understand the relationship between macroeconomic variables and the South African stocks listed on the Johannesburg Stock Exchange by deriving a multi-factor model that will make easy to understand future association. Employing 4 macroeconomic variables: Inflation, Money Supply Growth, Interest rates, US Dollar SA Rand exchange rate. Thus in a way results help provide a way to re-engage and correct disequilibrium's in case of shocks in the economy.

The study will provide reference and a clear sıgnal to equıty fund ınvestors on how to allocate funds and restoring equilibrium. The strategy employed here is one known as the active portfolio management strategy and will help portfolio managers optimize returns in a volatile market like that of South Africa.

The APT has survived several years of fairly intense scrutiny and thus gradually has gained appreciation from the investing community and will be adopted in the near future as the logical appeal and also of most importance its implications will practically become apparent. The APT was developed by Ross (1976) as an alternative to the Capital Asset Pricing Model (CAPM) which he condemned of its dependency on the market index of risky assets that are currently unavailable.

According to CR&R (1986) individual asset prices tend to be affected by different types of events of which some largely impact assets prices much better compared to the latter. Also from their papers they did provide evidence supporting APT and also most cases established results from APT that are better than those provided by CAPM.

2. LITERATURE REVIEW

Studies have been done for the South African stock market, relationship with macroeconomic variables. Among those included are Shawtari et al. (2015) found a relationship between macroeconomic factors: industrial production, money supply, inflation, and exchange rates and the stock price using monthly data from 1998 to the year 2010 and established

that among the variables industrial production had much impact in the stock returns. Gupta and Reid (2012) looked at monetary policy and macroeconomic news using daily data from 2002 to 2011 and established that the CPI and PPI had a negative impact on stock returns. Coovadia (2014) derived a long run relationship between macroeconomic variables: short and long term interest rates, inflation, the dollar exchange rate, industrial production money supply growth, GDP, gold and oil prices using quarterly data from 1994 to 2012 and established a positive relationship for inflation and GDP while a negative relationship was found for money supply. On the other hand this research looked at a broader scope and covered recent trends encompassing the period of the falling rand against the dollar, triggering the inflationary pressures and volatilities in interest rates and how also money supply has played a role recently given the current trends taking place.

In a comparative analysis by Jugu and Amodu (2014) results obtained from APT were superior to those of CAPM since APT encompasses all relevant details which the classical CAPM has failed to capture.

A recent study conducted done by Rjoub et al. (2017) rather a case of how micro and macro variables impact stock returns major concentration made on the Turkish banking sector using quarterly data from 1995 3rd quarter to 2015 4th quarter. Applying the fixed panel data analysis and a Pairwise Dumitrescu-Hurlin Panel Granger causality tests they established that the variables are relevant in pricing the stocks also a negative reaction to economic shocks was found.

On the other hand also Türsoy (2017) studied causality between the stock price and exchange rate for Turkey using ARDL bounds test and combined cointegration. Using monthly data from 2001-2016 the study found a long-run bidirectional causality and a short-run unidirectional causality while the error correction mechanism indicated a long-run relationship between the two.

Barakat et al. (2015) studied the relationship between macroeconomic variables and stock returns for Egypt and Tunisia using VAR and Granger causality tests for period 1998- 2014. Findings from the study indicated a causal relationship between the macroeconomic variables and share price for Egypt while for Tunisia only consumer price index which had no causal relationship with stock returns. Results also revealed that the four macroeconomic are co-integrated with the stock market in both countries.

Mahmood et al. (2015) examined the relationship between inflation and stock returns for Pakistan using 6year data from 2005 to 2010. They applied VAR in estimating the results and found a negative relationship between the two.

Chen and Hu (2015) analysed the relationship between monetary policy and share price for China using structural autoregressive model (SVAR) comparing with the US. They study found that interest rates have a negative impact on the share price.

Barnor (2014) used data from 2000 to 2013 to examine the impact of macroeconomic variables on stock returns using time series data analysis for Ghana. Findings from his study suggested that interest rates and money supply affected stock returns negatively while exchange rate had a positive relationship with share price while inflation had no significant effect on stock returns.

For Pakistan Kibria et al. (2014) used descriptive analysis, regression analysis correlation analysis and Granger Causality tests using annual data from 1991 to 2013 to examine the impact of macroeconomic variables on stock returns. Their regression results established a positive relationship between macroeconomic variables and stock returns while Exchange rate and GDP were found to unidirectional granger cause money supply on the other hand GDP savings unidirectional granger caused the stock market index.

Vena (2014) analyzed the effect of inflation on stock returns for the Kenyan Nairobi stock exchange for the period 1998 to 2013 using GARCH to analyze the impact of inflation and EGARCH to analyze the effect of asymmetric shocks. From the study it was established that inflation has a negative impact on share price.

Talla (2013) studied the impact of macroeconomic variables on share price for Stockholm stock exchange using monthly data for the period from 1993 to 2012. The study estimated using the ordinary least squares method, and Granger causality tests and found that of the variables inflation, interest rate and exchange rate negatively affected returns while money supply was positively related though not significant in the study. Furthermore the study found unidirectional Granger causality between all the variables except inflation.

Naik and Padhi (2012) examined the impact of macroeconomic variables on share price for period 1994 to 2011 using Johansen Co-integration tests and Vector Error Correction Model. Their results suggested that the macroeconomic variables were co-integrated and thus have a long run relationship and also there exist a positive relationship between money supply and share price while there is a negative relationship with inflation.

Jawaid and Haq (2012) in their research paper using GARCH model and monthly data from 2004 to 2010 for Pakistan studied effects of volatility in interest rate and exchanges rate on share price. They discovered that the exchange rate effect was more complex than that of interest rates.

Hamrita and Trifi (2011) using 3 months American Treasury securities and S&P 500 index used wavelet analysis with monthly data from 1990 to

2008 and in conclusion established that stockreturns and interest rates were independent of each other while exchange rate have a bidirectional relationship with stock returns.

3. METHODOLOGY

3.1 **Data**

Under study the research considered the impact of the macroeconomic variables: Money supply growth, Inflation, Interest Rates and the Dollar Rand exchange rate on Stock Prices. The study used quarterly data from first quarter 1981 to last quarter 2016 for analysis. As a proxy for interest rates the research used 3 month Treasury bill rate, while the exchange rate represents the value of one Dollar to the South African Rand. Quarterly data was obtained from the Economic Co-operation and Development (OECD) data website. The study analyzed in any given year stocks that will be listed encompassing all details there available in prior periods.

The study adopted the Ross model but rather than daily this research used quarterly data and also the research established sectorial sensitivities (factor loadings) by regression analysis.The study employed macroeconomic factor models as a mode of inquiry since from the literature most studies as will be discussed.

3.2 **Unit root test**

In most cases regression variables is at all cases not stationary and thus does not give true reflection of the behavior between variables as such it is important to convert the variables to stationary before conducting the tests. The study employs the Augmented Dickey Fuller test from Dickey and Fuller (1979) as illustrated below:

$$\Delta y_t = \gamma_0 + \gamma_1 t + (\beta - 1) y_{t-1} + \delta_1 \Delta y_{t-1} + e_t$$

Thus for data to be converted to stationary form, a unit root test has to be done in which case the model employed in the study is one developed Augmented Dickey Fuller from Dickey and Fuller (1979). All the variables are converted into their natural logarithms to eliminate the potential heteroscedasticity, if there exists. (Faisal et al. (2017), Tursoy and Faisal (2017), Faisal et al. (2018))

3.3 Co-integration Test

Cointegrated variables associate with each other in future and after establishing the manner to which they are co-integrating a long-run relationship

is crafted for the variables share price and the four explanatory variables in the study. When the variables are then converted to stationary a test for Co-integration is done and this study employed the Johansen Co-integration test. It must be ensured that all the variables must be *I*(1) (Faisal et al. (2018), Tursoy and Faisal (2017), Faisal et al.(2016))

The Johansen co-integration test takes the following form:

$$X_{m,t} = \propto_m + \omega_1 Z_{1,t} + \omega_2 Z_{2,t} + \cdots + \omega_p Z_{p,t} + \epsilon_{m,t}$$

According to Tursoy and Faisal (2017), we can test the implied restrictions derived from the Johansen co-integration's Trace and Maximum Eigen value statistics and they apply formula as given below:

$$Maximum\ Eigen\ value: LR\ (r0;\ r0\ +\ 1)\ =\ -T\ ln\ (1\ -\ \lambda r0 + 1)$$

$$Trace\ Statistic:\ LR\ (r0;\ n)\ =\ -T\ \sum_{i=r0+1}^{n} \ln(1 - \lambda i)$$

With LR (r0; r0 + 1); LR (r0; n) being the likelihood ratio test statistic, T is the observations, λ is the estimated values of characteristic roots. The research under consideration employed the Schwarz Information Criterion to determine the optimum lags to be used.

After running the Johansen co-integration test the variables were found to be co-integrating implying that they possess a common stochastic trend and thus grow proportionally and hence have a long-run association (Faisal et al.2017, Faisal, Tursoy and Gunsel. (2017), Sadikova et al. (2017))

3.4 The Vector Error Correction Model (VECM) Granger Causality

The VECM contains information on short and long-run adjustments to the changes in vector combinations via the estimated parameters given. Now given that our variables are co-integrated an error correction model is thus specified (Faisal et al.2017) and estimated as will be discussed.

According to Engle and Granger (1987) if variables are co-integrated of the same order they can be expressed as a vector error correction model (VECM) and a long-run relationship between the variables can be derived and also a study of short-run causal relationships can be studied between the variables. As the variables are co-integrated a vector error correction model will take the following form:

$$A(L)\Delta y_t = \gamma + B(L)\Delta x_t + \alpha(y_{t-1} - \beta_0 - \beta_1 x_{t-1}) + v_t$$

Thus the study applies the VECM assuming that initially the variables are non-stationary but they become stationary after differencing we obtain co-integrated equations and apply the model to the system.

3.5 Variance Decomposition (VDC)

The study developed a variance decomposition analysis under the VECM model for the variables under consideration for quarterly data from 1981 to 2016. Also assuming that the variables are stationary and using the lag selection criterion for the optimal lags we understand how shocks in variables explain for the changes in the respective variables over time, short and long run.

3.6 Impulse Response Function (IRF)

The IRF explains a shock to a VECM system and it identifies the responses of dependent variable in a model when shocks are applied to the error terms as given below. Applying unit shocks to each variable it is determined how the shocks affect the VECM system.

Equation 1 Impulse response function

$$SP = \beta_1 + \beta_2 INF_{t-1} + \beta_3 SP_{t-1} + \mu_1$$

$$INF = \beta_4 + \beta_5 SP_{t-1} + \beta_6 INF_{t-1} + \mu_2$$

And so on for all the combinations, thus a shock in the first random error term will cause volatility in the share price and further cause a change in the consumer price index in the period to follow in that order for all the combinations.

Therefore the IRF gives a shock to the error term so as to establish changes in the whole VECM system model. Assuming that all the variables are endogenous an impulse response is applied to understand the reactions of all the variables.

4. ANALYSIS OF RESULTS

Unit Root Test for Stationarity

This section presents the unit root applied in the study, and in this case the Augmented Dickey-Fuller (ADF) from Dickey and Fuller (1979) and the Philips-Perron (PP) from Perron (1988) tests are used. The unit root was tested at level and at also after taking first difference. The results obtained from the tests are illustrated in table 1 below.

Unit Root Test ADF, PP

Table 1

Variables	Lag	Form	(ADF)		(PP)	
		C	CT	C	CT	
SP	2	Level	-0.620012	-3.724067	-0.456003	-3.690569
		1st Difference	-7.152053*	-7.124548*	-9.064259*	-9.029477*
M3	2	Level	-1.864524	-0.648528	-2.743510	0.141398
		1st Difference	-3.852461*	-4.211764*	-6.371228*	-6.684659*
INF	2	Level	-2.907581	-3.6486	-2.769579	-3.344511
		1st Difference	-7.4488*	-7.43106*	-6.78059*	-6.763135*
IR	2	Level	-2.125199	-3.643029	-1.882305	-3.842313
		1st Difference	-5.834754*	-5.794460*	-6.853941*	-6.832310*
EX	2	Level	-1.657627	-2.398971	-2.050698	-2.691803
		1st Difference	-5.284191*	-5.331274*	-9.667796*	-9.720538*

Note: * represent significance level at 1%, C is Constant while CT represents Constant and Trend.

The results from table 1 indicate significance for both the ADF and PP with intercept, intercept and trend for 1% level of significance. As can be noted at level the variables are not stationary but become stationary after first differencing. Thus therefore since the variables become stationary after first differencing a test for cointegration can be done for the variables to establish whether they have future association.

Cointegration Tests

After the variables have been checked for unit root and established that they convert to unit root at the same level a cointegration test will follow that illustrates how variables are associated. Illustrated in Table 2 are the Johansen (1988) Cointegration Tests results obtained from the tests.

Johansen Cointegration Test

Table 2

Hypothesis	R=0	R=1	R=2	R=3	R=4
Trace	75.487333*	44.04896	26.26578	11.57476	4.928312
Critical Value	69.81889	47.85613	29.79707	15.49471	3.841466
Max-Eigen	31.43836	17.78319	14.69101	6.646451	4.928312*
Critical Value	33.87687	27.58434	21.13162	14.26460	3.841466

Note: * indicates significance at 5% level of significance.

The asterisked numbers indicates significance at the chosen level of confidence thus as can be seen from the table the results obtained from the Trace statistic and Maximum-Eigen value. Thus therefore Table 2 indicates the rejection of the null hypothesis of at no cointegrating equations thus implying that since the variables are cointegrated of the same order a longrun

relationship exist for the variables.Therefore from the Trace and Max Eigen value one cointergating equation exist and since the variables are cointegrated of the same order they can be expressed as a Vector Error Correction Model (VECM) which will be discussed.

Since the variables were found to be cointegrated of the same order Table 3 represents their long-run relationship a Vector Error Correction Model describing the behaviour of the variables in future and how they continue to affect each other.

Long-Run Results

Table 3

Long-Run Elasticity Dependent Variable: LSP			
Variable	Coefficient	Standard Error	T- Statistics
LM3	1.019695	0.10306	-9.89432*
LIR	0.138613	0.15648	-0.88582
LINF	0.396256	0.07781	-5.09281*
LEX	-0.04294	0.16481	0.02605
Note: *, means significance at 1% level.			

The long-run normalized cointegrating equation is estimated as:

$$LSP = 1.019695LM3 + 0.138613LIR + 0.396256LINF - 0.04294LEX + 0.38935$$

The coefficient of money supply growth implies that if money supply is increased by 1% the stock price will increase by 1.02% also in the same direction as such money supply is seen to have had a positive relationship with the stock price meaning increase in money causes stock prices to increase. As such if money supply is increased it will lower the interest rates thereby attracting more investment thereby raising the growth rate and also share value. While if interest rates are increased by 1% the share-price also increase by 0.14% a positive effect meaning increase in interest rates causes the stock price to increase while decrease in interest rates decreases the stock price.

As such high interest rates will give investors a higher return on their invested stakes. The results are consistent with findings by Gatuhi et al. (2015) and Erdogan and Ozlale (2005) for Turkey. An increase in inflation by 1% increases the share-price by 0.4% a positive relationship. On the other hand increase in the exchange rate by 1% decreases share-price by 0.04%. Thus due to the increase in the exchange rate as such local companies cash flows will increase and hence stimulate export growth and thus lead to an increase in the share value.The result is consistent with results obtained by Ahmad et al (2016) for Turkey,Erdogan and Ozlale (2005) for Turkey and Evusa et al. (2015) for Kenya.

VECM Causality Test Block Erogeneity Wald Test

Table 4

Dependent Variable	Independent Variables					ECT_{t-1}
	D(LSP)	D(LM3)	D(LIR)	D(LINF)	D(LEX)	
D(LSP)	-	0.238725	8.663693**	1.389232	10.65412***	0.0055 0.1615
D(LM3)	0.721121	-	5.306537*	2.741150	4.783816*	0.005321 0.563635
D(LIR)	0.287601	3.127407	-	1.341324	0.395180	0.133857 2.680487
D(LINF	0.330716	0.885496	1.609261	-	3.805834	0.234273 1.939492
D(LEX)	1.466571	0.235312	4.571509	0.029619	-	0.085519 1.904619
Note:*, **, *** represent significance at 10%, 5% and 1% levels of significance. T-values are in parentheses while their associated probabilities are displayed under.						

The coefficient of the error correction term is positive thus indicating that an after short-run shock the system will not be able to acquire the equilibrium position. Table 4 indicates that there is a uni-directional causality between the exchange rate and interest rates with the stock price. Due to the increase in the exchange rate it's causing the stock prices to also increase as also confirmed from the cointegrating equation. Also it can be noted that the exchange rate and interest rates have causal effects on the money supply.

As such the more money and lower interest rates stimulate demand for local commodities also being influenced by the depreciation of the lower currency thereby causing inflation to accelerate. These results are consistent with findings from studies of Tursoy (2017) for the Turkish stock market, Patel (2012) for the India stock market, Attari and Safdar (2013) for Pakistan and Masuduzzaman (2012) for United Kingdom and Germany stock markets.

Variance Decomposition Test Results

Table 5

Variance Decomposition of D(LSP):						
Period	S.E.	D(LSP)	D(LM3)	D(LIR)	D(LINF)	D(LEX)
1	0.034130	100	0	0	0	0
5	0.038374	86.54142	0.240015	6.380015	0.483695	6.354854
10	0.038426	86.31224	0.249434	6.409739	0.555221	6.473361
15	0.038427	86.30969	0.249956	6.409772	0.557050	6.473531
20	0.038427	86.30967	0.249966	6.409771	0.557057	6.473534
Variance Decomposition of D(LM3):						
Period	S.E.	D(LSP)	D(LM3)	D(LIR)	D(LINF)	D(LEX)
1	0.006026	1.284837	98.71516	0	0	0
5	0.007606	6.694971	86.80440	3.991931	0.865588	1.643112
10	0.007682	7.022005	86.08202	4.388232	0.875588	1.629723
15	0.007684	7.028443	86.06711	4.396451	0.877926	1.630072
20	0.007684	7.028594	86.06680	4.396603	0.877919	1.630082
Variance Decomposition of D(LIR):						
Period	S.E.	D(LSP)	D(LM3)	D(LIR)	D(LINF)	D(LEX)
1	0.031714	5.981121	0.795691	93.22319	0	0
5	0.038894	7.545836	5.866545	85.12221	1.367809	0.097597
10	0.039069	7.602294	6.202910	84.55674	1.405507	0.232551
15	0.039073	7.605657	6.211811	84.54262	1.406436	0.233476
20	0.039073	7.605741	6.212007	84.54234	1.406435	0.233480
Variance Decomposition of D(LINF):						
Period	S.E.	D(LSP)	D(LM3)	D(LIR)	D(LINF)	D(LEX)
1	0.078129	0.010480	0.00147	4.554647	95.36473	0
5	0.102583	2060465	1.347279	11.59895	81.00347	3.989834
10	0.102929	2.062291	1.415538	11.60363	80.67195	4.246588
15	0.102935	2.064005	1.418451	11.60290	80.66753	4.247113
20	0.102935	2.06043	1.418509	11.60289	80.66743	4.247119
Variance Decomposition of D(LEX):						
Period	S.E.	D(LSP)	D(LM3)	D(LIR)	D(LINF)	D(LEX)
1	0.029028	6.402212	0.012026	5.422735	1.69054	86.99397
5	0.030400	6.960444	0.387072	7.609551	1.591068	83.45187
10	0.030417	6.969280	0.466850	7.612998	1.589437	83.36144
15	0.030417	6.969748	0.468266	7.613356	1.589395	83.35941
20	0.030417	6.969759	0.468297	7.613364	1.589394	83.35919

Variance decomposition of the exchange rate indicates that own shock for the first period accounts for 86.99% of the changes in the exchange rate, while the share price accounts for 6.4%, the interest rates account for 5%. In the tenth period own shock reduces to 83% while share price account for 7% interest rates also account for another 7.6%. During the last period own shocks also remains constant at 83% while also interest rate shocks and share price shocks also remain constant both at 7%. Hence forth from the analysis

the exchange rate is affected mainly by interest rate shocks and the share price shocks. The results also confirms those obtained from the VECM causality test which suggested a causality running from the stated variables, thereby re-enforcing the findings of the study.

The table indicates that for the first period shocks in the stock price accounts for 100% of the changes in itself (own shock) while shocks in other variables account for nothing on changes in share price, thus in the very short run shocks in other variables have no impact on changes in the share price.

During the fifth period own shocks accounts for 86.5% of the changes in share price, while shocks in the exchange rate account for 6.35% of the changes in stock price and interest rate shocks account for 6.38% of the changes. In the long run the 20th period own shock accounts for 86.31% of the changes in the share price, while the interest rate shocks account for 6.40% of the changes and the exchange rate accounts for 6.47% of the changes in the stock price. In short it can be noted therefore that changes in the stock price are to some extent influenced by shocks in the exchange rate, cementing also the causality results that suggested that exchange rate and he interest rate cause the stock price.

Variance decomposition of money supply growth suggests that for the first period money supply shocks account for majority of its changes 98.72% while the other variables have insignificant effect. In the tenth period it can be noted also that majority of changes in money supply are influenced by own shock 86.08% while the share price shocks account for 7% of the changes also the interest rates account for 4% of the changes in money. Also in the long run the 20th period own shock accounts for 86.07% of the changes in share price while the share price shocks account for 7% the interest rates account for 4% while inflation and the exchange rate account for 1.6% and 0.9% respectively. It can be noted thereof that money supply is affected by the shocks in stock prices and interest rates from the above observation.

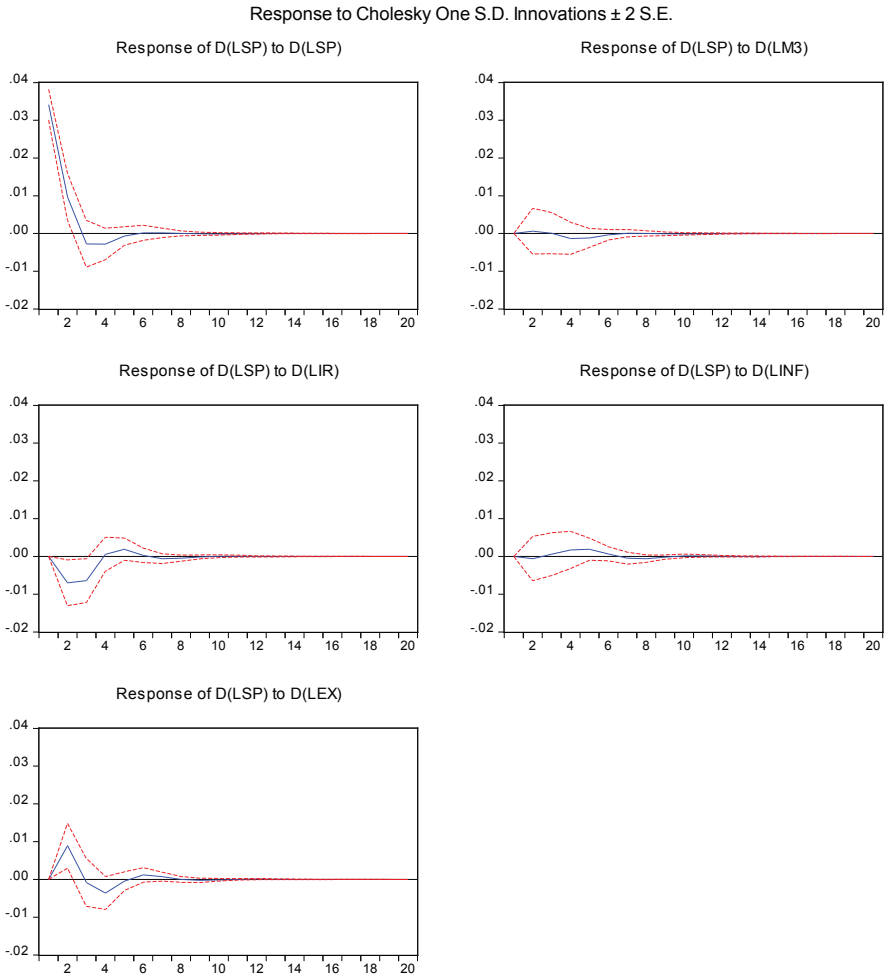
The variance decomposition of inflation indicates that during the first period own shock accounts for 95% of the changes in Inflation while other variables have insignificant effect on stock. In the fifth period own shock reduces to 81% impact while interest rates account for 12% of the changes 2% is accounted for in share price shocks while 1.3% and 4% are accounted for by money supply and the exchange rate respectively. Therefore the results suggest that interest rate shocks do have a noticeable impact on the swings in inflation.

The variance decomposition of the interest rates indicates that for the first period own shock accounts for 93.2% of the changes in interest rates while shocks in share price accounts for 6%. During the tenth period own

shock decreases to 84.5% while share price shocks increase to 7.6% also money supply accounts for 6.2% of the changes in the interest rates. In the long run own shock accounts for 84.5% also while share price accounts for 7.6% and money supply account for 6% while inflation and the exchange rate account jointly for 1.4%. Thus in a nutshell it can be deduced that the share price and money supply have some effect on the interest rates.

Impulse Response Function: Response of SP

Figure 1



The Figure shows response of share-price to impulses in the given variables over 20 periods. It can be noted for the first 3 periods own shock is significant and positive while it will die out in the sixth period.

Response to money supply shocks is constant and also dies out during the sixth period again while response to interest rates is significant and negative for the first 4 periods, response to inflation shocks is significant and positive up to the seventh period while response to the exchange rate is positive for the first 3 periods and negative for periods 4 and 5.

5. CONCLUSION AND POLICY IMPLICATIONS

The study aim was to establish association of macro-economic variables with stock price for the period from year 1981 to 2016 using quarterly data. From the findings it was established that the macroeconomic variables (Inflation, Exchange rate, Money Supply and Interest rates) have a long run association with the stock price as confirmed by the cointegration tests and also by the error correction model causality tests thus indicating robustness of the results obtained.

The variables money supply, interest rates and inflation were found to be positively related to the stock price while the exchange rate have a negative relationship with the stock price in the long run. Inflation is having a positive relationship. While on the other hand we found a negative relationship between the exchange rate and the stock price

The Vector Error Correction Model (VECM) Causality Test Block Exogeneity Wald Test indicated a unidirectional causality between the stock price and exchange rate and also between the interest rates and shareprice. The causality results were also further cemented by the Variance Decomposition function indicating that changes in the stock price are influenced by shocks in the exchange rate and from that from the interest rates. The impulse responses indicated that own shock causes the stock price to drop in the short run but it maintains stable state in the long run, while also exchange rate shocks causes it to increase in the short run, inflation shocks causes a decrease in the short run. The same results were found by Tursoy (2017) for the Turkish stock market. Patel (2012) for the India stock market and Masuduzzaman (2012) for United Kingdom and Germany stock markets. Also it was found that the exchange rate is a leading indicator for shareprice and money supply. This implies that the declining rand value is stimulating growth in the economy thereby influencing more exports and making domestic companies more competitive thus attracting investment and increasing the share value thereof.

Therefore it can be noted that the results suggest how relevant the exchange rate and the stock price are in the South African economy and thus can help predict accurate forecasts to rejuvenate the economy in case of unanticipated shocks in the economy.

Hence the policy makers can thus make use of stock price information together with exchange rate fluctuations past data and make correct estimates of future economic crises and use the mechanism derived from the research to hedge and help insulate the economy. Similar implications were suggested by studies of Tursoy and Faisal (2016) for Turkey.

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