

Impact of Monetary Policy on Economic Growth: A Case Study of South Africa

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Doi:10.5901/mjss.2014.v5n15p76

Abstract

This paper explores the role played by monetary policy in promoting economic growth in the South African economy over the period 2000-2010. The study employs the Augmented Dickey-Fuller and Phillips Perron unit root tests to test for stationarity in the time series. The Johansen co-integration and the Error Correction Mechanism are employed to identify the long-run and short-run dynamics among the variables. The study shows that a long run relationship exists among the variables. Also, the core finding of this study shows that money supply, repo rate and exchange rate are insignificant monetary policy instruments that drive growth in South Africa whilst inflation is significant. The study therefore recommends that monetary policies should be used to create a favourable investment climate that attracts both domestic and foreign investments thereby promoting a sustainable economic growth. The government should also increase government spending on the productive sectors of the economy so as to promote economic growth as monetary policy alone is unable to effectively spur economic growth.

Keywords: Monetary Policy, Economic Growth, Vector Error Correction Model, South Africa.

1. Introduction

Monetary policy is one of key drivers of economic growth through its impact on economic variables. Economic growth is essential in an economy as it reduces poverty as well as improving livelihoods. The growing importance of monetary policy has made its effectiveness in influencing economic growth a priority to most governments. Despite the lack of consensus among economists on how monetary policy actually works and on the magnitude of its effect on the economy, there is a remarkable strong agreement that it has some measure of effects on the economy (Nkoro, 2005)

Monetary policy as a combination of measures designed to regulate the value, supply and cost of money in an economy, in consonance with the expected level of economic activity (Folawewo and Osinubi, 2006). For most economies, the objectives of monetary policy include price stability, maintenance of balance of payments equilibrium, promotion of employment and output growth, and sustainable development. The pursuit of price stability invariably implies the indirect pursuit of other objectives such as economic growth, which can only take place under conditions of price stability and allocative efficiency of the financial markets. Monetary policy aims at ensuring that money supply is at a level that is consistent with the growth target of real income, such that non-inflationary growth will be ensured. Monetary policy is used as inflation is generally considered as purely a monetary phenomenon. In South Africa, the monetary policy is conducted by the South African Reserve Bank (SARB). Monetary policy influences economic growth through aggregate spending. Changes in money supply and interest rates influence consumer spending as well as investment decisions. Consequently, aggregate demand changes in response to monetary policy adjustments.

Given the crucial role played by monetary policy in pursuit of a sustainable economic growth, this study therefore seeks to assess the impact of monetary policy on economic growth with reference to the South African economy for the period 2000-2010. The remainder of the paper is organised as follows. Section two gives a brief overview of the various monetary policy frameworks in South Africa since 1960s, section three reviews various related literatures, section four discusses the methodology, section five presents the data analysis and interpretation of findings and section six provides conclusion, and recommendations.

2. Monetary Policy Frameworks in South Africa

In South Africa, the central bank has the authorization to conduct the monetary policy. Monetary policy frameworks have been continuously changing since the 1960s. Various frameworks have been adopted as weaknesses in one framework

led to the adoption of another framework.

During the period of 1960 to 1981, the Reserve Bank focused on quantitatively controlling interest rate and credit using the liquid asset requirements (Aron and Muellbauer, 2006). Controlling the liquid asset requirements affects the commercial banks' ability to create money as they are required to hold a certain amount of liquid assets as reserves. This will constrain the money supply in an economy, thereby controlling inflation. In the period 1981 to 1985, the De Kock Commission (1978) was appointed to evaluate the monetary policy framework, and they recommended the use of pre-announced monetary target range for a broad definition of money (M3) in South Africa. M3 money comprises of M2 plus large-denomination time deposits at all commercial banks; term repurchase agreements at commercial banks and saving and loan associations and institution only money market mutual fund balances (Mishkin, 2008).

Following the recommendation by the De Kock Commission, the cost of cash reserves-based system with pre-announced monetary targets system was adapted from 1986 to 1998. The intention was to have control over the cost of cash reserves and the reserve bank controlled the discount rate. According to Casteleign (2003), the short term interest rate became the main monetary policy instrument during this period because of its influence on the cost of overnight lending and market interest rate thereby reducing the demand for credit. The eclectic approach was used from 1998 to 1999. It involved monitoring wide range of indicators, such as changes in the bank extension, overall liquidity in the banking sector, the yield curve, changes in official foreign reserves, changes in the exchange rate of the Rand, and inflation movements and expectations. The growth in money supply and bank credit extension were used as intermediate guidelines for the determination of short-term interest rates.

In 2000, the SARB adopted an inflation targeting framework through using interest rates as the policy instrument with the view of achieving price stability. Van de Merwe (2004) states the following as the motivations for adopting this framework: the role of inflation targeting to discipline monetary policy and increase the central bank's accountability; uncertainties among the public about the monetary stance adopted by the authorities when informal inflation targeting is used; better coordination of monetary and other economic policies; and the ability of inflation targeting to affect inflationary expectations. The inflation targeting framework was adopted with an objective of maintaining CPIX¹ inflation between 3 and 6 % by the year 2002, using discretionary changes in the repo rate as its main policy instrument (Uwilingiye, 2010).

The SARB employs various instruments of monetary policy to influence interest rates, most of which is the accommodation instrument, supplemented by various open market operations (Gidlow, 2002). Most instruments used by SARB focus on market-oriented policy measures which seek to guide or encourage financial institutions to take certain actions on a voluntary basis rather than compelling financial institutions. The reserve bank uses the repo rate as the accommodation instrument. Other major instruments used by the central bank include the open market operations, reserve requirement ratios and the discount window policy.

3. Literature Review

There are two extreme cases of theoretical literature regarding the ability of monetary policy in influencing economic growth. The Keynesians propose that "money does not matter", hence unable to impact on economic growth. They propose that the link between the monetary sector and the real sector of the economy is very weak, and therefore suggest that there is an indirect link (Khabo, 2002). On the other hand, the Monetarists believe that "money matters", thereby advocating for the use of monetary policy in influencing economic growth. They argue that there is a direct link between the monetary sector and the real sector of the economy.

The link between the monetary sector and the real economic sector ensue through the transmission mechanism. Two steps are involved in the transmission mechanism. First, an increase in real balances generates portfolio disequilibrium (Dornbusch et al, 1998). If money supply increases, there will be disequilibrium in the money market caused by excess money supply. To correct this disequilibrium, consumers will purchase other financial assets such as bonds thereby bidding their prices up. Due to the negative relationship between bond prices and interest rates, increases in bond prices will lead to decreases in interest rate. Consequently, the second stage of the transmission mechanism will be activated. Lower interest rates will positively affect aggregate demand thereby increasing output. Monetary policy through changes in money supply thus function by stimulating interest-responsive components of aggregate demand, primarily investment spending.

There are two crucial links that must exist so that changes in real money stock will effect changes on income or output. Firstly, interest rates must be responsive to changes in money stock and secondly changes in interest rates must

¹ CPIX is defined as Consumer Price Index (CPI) and it excludes mortgage costs.

bring out changes in aggregate demand. The existence of these two links will enable changes in money stock to convey changes to output levels in an economy

Conflicting views between the Keynesians and the Monetarists economists concerning the impact of monetary policy on economic growth build up from the explanation of the transmission mechanism presented above. The Keynesians propose a situation whereby the portfolio imbalance does not lead to a decrease in interest rate. If increases in money supply do not lead to a reduction rates in interest rates, a situation known as the liquidity trap will result (Khabo, 2002). Liquidity trap is experienced when the prevailing interest rates are close or equal to zero and the monetary authority is unable to stimulate the economy through the monetary policy. Money supply can become insensitive to interest rate changes if interest rates are extremely low such that further decreases will not motivate investors to purchase bonds since their rate of return will be low. Investors would rather hold on to money, thereby making money demand insensitive to interest rate changes. The Keynesians therefore argue that monetary policy will be ineffective in impacting on economic growth, but advocate on fiscal policy to bring about changes in economic growth.

A horizontal LM curve and downward sloping IS curve illustrates the liquidity trap. The IS curve represents the relationship between the interest rate and the level of income that arises in the market for goods and services whereas the LM curve represents the relationship between the interest rate and the level of income that arises in the money market (Mankiw, 2002). Consequently, changes in the level of output can only be effected by changes in the IS curve. Therefore according to the Keynesians, monetary policy will be ineffective in impacting on economic growth and they support the use of fiscal policy to bring about changes in economic growth.

Opponents of the Keynesian pointed out the extreme unlikelihood of liquidity trap, and the lack of evidence that it has ever occurred (Ajisafe and Folorunso, 2002). Among the critics of the Keynesians are the Monetarists who dismiss the idea of a liquidity trap. They argue that the LM curve is downward sloping as opposed to the horizontal LM curve proposed by the Keynesians. Consequently, changes in the level of output can only be affected through changes in the LM curve. This makes the monetary policy effective in bringing about changes in economic growth.

Monetarists again support their argument of the effectiveness of monetary policy in impacting on economic growth using the equation of exchange proposed by Irvin Fisher. They do convert this equation of exchange into quantity of money theory, which is stated as follows:

$$MV = PY \dots\dots\dots (1)$$

Where M denotes the supply of money over which the South African Reserve Bank (SARB) has some control over, P denotes the price level, Y denotes the level of output and V denotes velocity of circulation. Monetarists assume that velocity is constant, and when V is constant equation (1) indicates a one-to-one relationship between changes in the stock of money and changes in the value of national income. As a result, equation (1) will be transformed into equation (2) below, where k represents a constant.

$$M = kPY \dots\dots\dots (2)$$

According to equation (2) changes in output can only be brought through changes in money supply. Therefore the direct link between the monetary sector and the real sector of the economy comes from the argument of a constant velocity. This explains the basis for the monetarist's argument that changes in monetary policy will impact economic growth.

Nevertheless monetarists do also acknowledge that the economy may not always be operating at the full employment level of real GDP. Monetarists therefore believe that in the short-run, expansionary monetary policies may increase the level of real GDP by increasing aggregate demand. However, in the long-run when the economy is operating at the full employment level they consent that the classical quantity theory remains a good approximation of the link between the supply of money, the price level, and the real GDP.

The Keynesians conversely holds that the link between the money stock and the level of national income is weak. Keynes detects a major error in the theory of assuming that changes in the quantity of money have a direct influence on the level of prices without affecting other variables (Cittadino et al, 2007). Although Keynesians admit that this might be true in the long run, they however state that what is experienced in reality is that variations in the quantity of money do bear upon the way people use money and banks, and on the employment of reserves by banks. Keynes rejects the notion that the economy is always at or near the natural level of real GDP so that Y (output) in the equation of exchange can be regarded as fixed. They also decline the assumption that velocity is constant as proposed by the classical. As a result, changes in the stock of money cannot lead to changes in output. As a result, the Keynesians argue that there is an indirect link between the money supply and real GDP.

Khabo (2002) evaluated the impact of monetary policy on a small and open economy in the case of the South Africa for the period 1960-1997. He used M3 to measure monetary policy. The ordinary least square (OLS) method was employed, as well as the Augmented Dickey Fuller test to check for stationarity. Results of the study indicate that

economic growth is significantly influenced by money supply.

Starr (2005) used the Granger causality test to investigate the relationships between monetary-policy variables and both output and prices in the post-stabilization period, in four core CIS countries (Russia, Ukraine, Kazakhstan and Belarus) using quarterly data from 1995 to 2003. Results of the study provide little evidence of real effects of monetary policy in the four core CIS countries with the notable exception that interest rates have a significant impact on output in Russia. The findings complement the study of Uhlig (2005) whose findings show that contractionary monetary policy shocks have no clear effect on real GDP in the United States.

Dele (2007) employed the generalized least squares (GLS) method in his study of monetary policy and economic performance of West African Monetary Zone Countries (Gambia, Ghana, Guinea, Nigeria and Sierra Leone) from 1991-2004. Using the variables money supply (M2), Minimum Rediscount Rate, banking system credit to private sector, banking system credit to central Government and exchange rate of the national currency to the US dollar, findings of the study indicate that monetary policy was a source of stagnation as it hurt real domestic output of these countries

Rafiq and Mallick (2008) examined the effects of monetary policy on output in the three largest euro area economies (Germany, France and Italy) using the new VAR identification procedure. Quarterly observations from 1981-2005 were used. Results suggest that monetary policy innovations are at their most potent only in Germany. Apart from Germany, it remains ambiguous as to whether a rise in interest rates concludes with a fall in output, thereby showing a lack of homogeneity in the responses.

The study of Berument and Dincer (2008) measured the effects of monetary policy for Turkey through structural VAR (SVAR) technique covering the period 1986-2000. Empirical results show that a tight monetary policy has a temporary effect on output, causing output to decline for three months in a statistically significant fashion. The findings confirm the work of previous studies (Sousa and Zaghini, 2008; Sims, 1992; Eichenbaum and Evans, 1995). Employing the same estimation technique, Bhuiyan (2008) examined the effects of monetary policy shock in Canada by using the overnight target rate as the monetary policy instrument. Using monthly data from 1994-2007, findings of the study indicate that the transmission of the monetary policy shock to real output operates through both the interest rate and the exchange rate

Using money supply as a measure of monetary policy, Nouri and Samimi (2011) examined the impact of monetary policy on economic growth in Iran adopting ordinary least squares (OLS) technique and data covering the period 1974-2008. A positive and significance relationship between money supply and economic was established in the study.

Fasanya, Onakoya and Agboluaje (2013) examined the impact of monetary policy on economic growth using time-series data covering the period 1975-2010. The effects of stochastic shocks of each of the endogenous variables were explored using Error Correction Model (ECM). Findings of the study reveal a long run relationship among the variables. Also, the core finding of the study shows that inflation rate, exchange rate and external reserve are significant monetary policy instruments that drive growth in Nigeria.

Literature is inconclusive regarding the impact of monetary policy on economic growth. Whereas Keynesians argue that monetary policy is ineffective in impacting on economic growth, Monetarists are of the view that changes in monetary policy will impact economic growth. Various studies give different results due to differences in country(s) of study, time period and methodology used.

4. Methodology

The study adopts an econometric model in determining the impact of monetary policy on economic growth in South Africa. Long and short run dynamics are established using different techniques such as the Augmented Dickey-Fuller (ADF) and Phillips Perron (PP) Unit Root test, Johansen Co-integration test and Vector Error Correction Mechanism (VECM).

4.1 Model Specification and Definition of Variables

The model employed in this study is built based on the modification of the model in Dele (2007). The model specifies the endogenous variable (Gross Domestic Product) as a function of the money supply, repo rate, inflation and exchange rate. The model is specified as follows:

$$GDP = f (MS, REPO, CPI, EXC) \dots \dots \dots (3)$$

Where:

GDP = Gross Domestic Product

MS= Money supply measured by M3

REPO = Repo Rate

CPI = Consumer Price Index

EXC = Exchange Rate

f = functional relationship

The econometric form of equation (3) above is represented as:

$$GDP_t = \beta_0 + \beta_1 MS_t + \beta_2 REPO_t + \beta_3 CPI_t + \beta_4 EXC_t + \mu \dots \dots \dots (4)$$

Where:

β_0 = Intercept of relationship in the model/constant

β_1 - β_4 = Coefficients of each independent or explanatory variable

μ = Error term

4.2 Data Sources

The study gathered time series quarterly data for the period covering 2000 to 2010 from the South African Reserve Bank (SARB) publications, South African Department of Statistics (StatsSA) and World Bank publications.

5. Data Analysis and Interpretation of Findings

5.1 Unit Root Test

Since this study involves time series data, the Johansen technique cannot be applied unless it is established that the variables concerned are stationary. Data is tested for stationarity so as to avoid the problem of spurious regression. For this study, the Augmented Dickey-Fuller (ADF) and Phillip-Perron test (PP) are used for unit root test to check the stationarity of the variables. Both tests test the null hypothesis of a unit root and the null hypothesis of a unit root is rejected in favour of the stationary alternative in each case if the test statistic is more negative than the critical value. A rejection of the null hypothesis means that the series do not have a unit root. Table 1 presents results of the unit root tests. Results of unit root tests reported in Table 1 below show that when considering the ADF test, the variables GDP and MS are stationary at level series whilst the variables EXC, CPI and REPO are not stationary at level series but however become stationary after first difference. When using the PP test, all variables are stationary after first differencing except for the variable CPI which is stationary at level series. Considering results of the much stricter PP test, variables are thus integrated of order 0 and 1.

Table 1: Unit root tests 2000Q1- 20010Q4 at levels and first differences (Δ)

	GDP	MS	EXC	CPI	REPO
ADF					
Level	-3.228029*	-4.178733**	-2.260465	-2.403507	-2182617
First Difference			-3.174193**	-5.548346***	-3.369273**
PP					
Level	-2.090200	-1.574085	-1.576060	-2.606956*	-1.393391
First Difference	-3.197683**	-5.816582***	-3.284369**		-3.107152**

***, ** and * represents stationary at 1%, 5% and 10% level of significance respectively

5.2 Co integration Analysis Result and Interpretation

After establishing stationarity, the next step is to test for cointegration. Cointegration exists if two variables have a long-term, or equilibrium, relationship between them. This study employs the Johansen maximum likelihood approach to test for co-integration as it more desirable to the other methods due to its properties (Wassell and Saunders, 2000). As a requirement of the Johansen co-integration technique, the optimums lag length, the appropriate model regarding the deterministic components in the multivariate system and the numbers of cointegrating vectors were all determined before establishing the long and short run coefficients. Table 2 below presents results an optimal lag length. As indicated in Table 2, all methods except the SC chose 6 lags, whilst 2 lags were chosen by the SC method. Brooks (2008) explains that when choosing the optimum number of lags using the information criteria, the chosen number of lags is that number minimising the value of the given information criterion. To add on, various literature for example Wahid (2008), Asghar

and Abid (2007) as well as Mahlo (2011) support the selection of the optimum number of lags chosen by the SC. Accordingly the Johansen cointegration test is employed using 1 lag for the VAR in this study.

Table 2: VAR lag order selection criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-533.4579	NA	175764.5	26.26624	26.47521	26.34233
1	-376.7503	267.5495	287.9182	19.84148	21.09531*	20.29806*
2	-348.2651	41.68562*	257.0806	19.67147	21.97016	20.50853
3	-317.5905	37.40805	226.7194*	19.39466*	22.73822	20.61220

* indicates lag order selected by the criterion, FPE: Final prediction error, AIC: Akaike information criterion, SC: Schwarz information criterion, HQ:Hannan-Quinn information criterion

In determining the number of co-integrating vectors, the study applied trace test and maximum eigenvalue test using the more recent critical values of MacKinnon *et al.* (1999). The assumption of no deterministic trend and restricted constant is used for all the variables as determined by the Pantula Principle test results. The result for both trace test and maximum eigenvalue for unrestricted co-integration rank test are presented in Table 3.

Table 3: Johansen-Juselius Co-integration Test Results

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob**	Max- Eigen Statistics	0.05 Critical Value	Prob**
None*	0.638056	93.21853	76.97277	0.0017	42.68318	34.80587	0.0047
At most 1	0.464987	50.53535	54.07904	0.0998	26.26946	28.58808	0.0961
At most 2	0.320832	24.26589	35.19275	0.4457	16.24927	22.29962	0.2809
At most 3	0.116520	8.016619	20.26184	0.8230	5.203233	15.89210	0.8701
At most 4	0.064791	2.813386	9.164546	0.6162	2.813386	9.164546	0.6162

Trace test indicates 1 co-integrating eqn(s) at the 0.05 level; Max-eigenvalue test indicates 1 co-integrating eqn(s) at the 0.05 level; * denotes rejection of the hypothesis at the 0.05 level

The trace statistic tests the null hypothesis of r co-integrating vectors against the alternative hypothesis of n co-integrating relations. The null hypotheses of no co-integrating vectors is rejected since the test statistic of about 93.21853 is greater than the 5% critical value of approximately 76.97277. However the null hypothesis of 1 co-integration vector cannot be rejected as the test statistic of 50.53535 is less than 54.07904. Consequently the trace statistic indicates that there exists 1 co-integrating relationship at 5% level of significance. The maximum eigenvalue tests the null hypothesis of r co-integrating vectors against the alternative hypothesis of $r+1$ co-integrating relations. The null hypothesis of no co-integration is rejected as the value 42.68318 is greater than 34.80587. However it fails to reject the null hypothesis of 1 co-integrating vector as the figure 26.26946 is less than 28.58808. Henceforth the maximum eigenvalue test indicates 1 co-integration vector. This study therefore concludes that there is 1 co-integrating vector as indicated by both methods.

5.3 Vector Error Correction Model

Vector Error Correction Models (VECM) are the basic Vector Auto Regression (VAR), with an error correction term incorporated into the model. The reason for the error correction term is that it measures any movement away from the long-run equilibrium. Table 4 presents results of the VECM long run relationships.

Table 4: Results of long run relationship model of the variables

Dependent: GDP			
Variable	Coefficient	Std. Error	t-Statistic
C	-54.45129		
MS(-1)	0.057759	0.07220	0.80004
EXC(-1)	9.258925	7.10324	1.30348
CPI(-1)	0.833870	0.13748	6.06523
REPO(-1)	0.311406	0.29807	1.04474

Results from Table 4 above show that the long run co-integrating equation will be as follows:

$$GDP_t = -54.45123 + 0.05776MS_t + 0.31141REPO_t + 0.83387CPI_t + 9.25893 EXC_t + \mu_t \dots \dots \dots (5)$$

From equation (5), if all independent variables are held constant, GDP will reduce by 54.4513 units in the long run. Results indicate that MS has a positive and insignificant long run effect on economic growth. A unit increase in MS increases economic growth by approximately 0.05776 units. From the estimation, we find that the repo rate has an insignificant positive impact on GDP. It is shown from the value 0.311406 that an expansionary monetary policy in term of increase the repo rate increases GDP by approximately 31.14%.

Exchange rate has positive impact on output as indicated by the value of approximately 9.258925. It can be deduced that in the long run, if exchange rate should increase by a unit; it will cause GDP to increase by approximately 9.258925 units. The results back up findings by Amarasekara (2007) who found out that exchange rate appreciation almost always lead to an increase in GDP growth.

The coefficient of CPI is 0.833870. The positively signed coefficient signifies that inflation has a positive and significant impact on output in the long-run, whereby an increase in inflation by one unit increases GDP by 83.39%. Although the findings contrast with the expected priori, they support the results of Mallik and Chowdhury (2001) who found a positive relationship between inflation and economic growth in the South Asian countries.

5.4 Short-Run Analysis: An Error-Correction Model

The error correction mechanism is the speed or degree of adjustment i.e. the rate at which the dependent variable adjust to changes in the independent variables. The purpose of the analysis is to discover whether the short-run dynamics are influenced by the estimated long-run equilibrium conditions, that is, the co-integrating vectors. Table 5 below show the results of the short run vector error correction model. The negative coefficient of the Error Correction Mechanism implies that there is a feedback mechanism in the short run. The error correction helps to correct any disequilibrium in the short run. Results from Table 5 show that all variables have an automatic adjustment mechanism and that the economy responds to deviations from equilibrium in a balancing manner. As a result, if in the short run variables deviate from equilibrium, they tend to re-adjust themselves back to equilibrium in the long run.

Table 5: Results of short run relationship model of the variables

Variable	Coefficient	Std. Error	t-Statistic
D(GDP)	-0.133630	0.03438	-3.88649
D(M3)	0.014044	0.14019	0.10018
D(EXC)	0.000435	0.00156	0.27794
D(CPI)	-0.533753	0.12702	-4.20208
D(REPO)	-0.006872	0.03644	-0.18859
R-squared	0.612820		
Adj. R-squared	0.5559044		

The coefficients of the error terms indicate the speed of adjustment. From Table 5, the coefficient of D(GDP) is 0.133630 showing that the speed of adjustment is approximately 13.36%. This indicates that if there is a deviation from equilibrium, only 13.36% is corrected in one quarter as the variable moves towards restoring equilibrium. This shows that there is slow speed of adjustment of GDP which maybe reflect little pressure on the variable in restoring to the equilibrium in the long run due to any disturbance. The speed of adjustment is statistically significant with a t-value of 3.88649. The slow speed of adjustment of GDP maybe interpreted as that there are other variables other than the ones specified in the model that affects GDP such as fiscal policy, investment levels, and trade openness among others. The result obtained from the dynamic model indicates that the overall coefficient of determination (R²) shows that 61.28 % of growth rate of GDP is explained by the variables in the equation. As the adjusted (R²) tends to purge the influence of the number of included explanatory variables, the adjusted R² of 0.5559044 shows that having removed the influence of the explanatory variables, the dependent variable is still explained by the equation with 55.59 %.

5.5 Diagnostic checks for the VECMs

The diagnostic checks are very important to the model because they validate the parameter evaluation outcomes achieved by the estimated model. This arises because, if there is a problem in the residuals from the estimated model; it

is an indication that the model is not efficient such that parameter estimates from the model may be biased. The VAR was tested for serial correlation using the langrage multiplier (LM) test, heteroskedesticity using the White test and normality by employing the Jarque-Bera. Table 6 presents the diagnostic tests results and they all reveal the suitability of the model hence the results from this research can be relied on.

Table 6: Diagnostics test results

Test	Null hypothesis	t-statistic	Probability
Langrage Multitplier (LM)	No serial correlation	27.79220	0.3175
Jarque- Bera (JB)	There is a normal distribution	0.002429	0.9607
White (CH-sq)	No conditional heteroskedesticity	196.3438	0.1917

6. Conclusion and Recommendations

Monetary policy plays a significant role in the well-being of an economy through its stabilizing role. This paper focuses on investigating the effects of monetary policy on economic growth. Findings of the study show that in South Africa, adjusting the monetary policy through the repo rate and money supply has an insignificant impact on economic growth. Although all variables indicate a positive impact on GDP, only inflation is significant.

Rather the government should embark on other measures besides monetary policy to promote economic growth. Such policies include increasing government spending on the productive sectors of the economy so as to promote economic growth, encouraging foreign direct investment (FDI) to boost domestic investments among others. To add on, monetary policies should be used to create a favourable investment climate that attracts both domestic and foreign investments thereby promoting a sustainable economic growth.

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