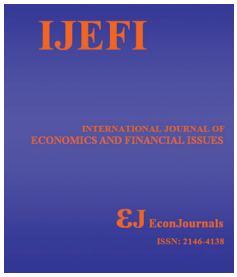

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An Analysis of the Effects of Monetary Policy and Price Stability on the Economic Growth of South Africa

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ABSTRACT

Economic growth is regarded as one of the key determinants which is utilized by developed and developing countries to measure economic activities success through Gross Domestic Product (GDP). The purpose of this study was to investigate the effects of monetary policy and price stability on the economic growth of South Africa from 1997 to 2023. South Africa is failing to meet its inflation goals, for instance, in the last decade it missed 5 times of opportunities, which raises concerns about the efficiency of using inflation targeting as a monetary policy framework to achieve price stability and sustainable economic growth. Time series data was used, sourced from the World Bank data platform. The autoregressive distributed lag (ARDL) technique was used based on the unit root test outcomes which display a mixture of I (0) and I (1) on variables. The findings showed that money supply, inflation, and exchange rate are negatively related to GDP growth while interest rate reveals a positive influence towards economic growth in the long run. This study has contributed to the academic literature by providing an in-depth analysis of how different aspects of monetary policy, specifically money supply and interest rates affect economic growth in South Africa.

Keywords: Economic Growth, Monetary Policy, Inflation, Price Stability, Interest Rate, Exchange Rate, South Africa
JEL Classifications: E31, E52, O40, O47, 055

1. INTRODUCTION

In the history of development economics, monetary policy and price stability have been increasingly recognized as economic growth crucial determinants. In recent years, monetary authorities have actively pursued viable monetary strategies to guide their economies toward achieving both price stability and sustainable economic growth (Meyer et al., 2018). In evaluating the effectiveness of monetary policy on economic growth, key indicators such as interest rates, inflation, money supply fluctuations, and exchange rate movements serve as fundamental measures. According to Meyer et al. (2018), monetary policy ensures that there is price stability in the economy by maintaining stability in prices over the long term. Furthermore, it promotes the effective distribution of resources by eliminating obstacles towards sustainable economic growth and helps in building confidence in the economy by ensuring that there is enduring stability of the value of money in the long run. Primarily, the South African Reserve Bank (SARB), main goal is to ensure that they maintain price stability in the economy. Henceforth, SARB has been embracing wide scope that is commonly understood to signify a consistent and moderate level of prices or inflation to remain sustained for an extended duration.

Having established the role of SARB, it is worthwhile to note that South Africa is obliged to maintain a robust and forward-thinking monetary policy capable of forecasting and mitigating internal and external market disturbances to ensure overall economic stability as well as encourage economic growth (Van Wyngaard, 2019). However, the significance of monetary policy to ensure price stability in fostering a conducive environment for economic growth cannot be overstated because when prices

are stable, businesses and consumers are better off to make informed decisions about spending, investment, and production. It is worthwhile, to note that inside the South African context, fluctuations of prices, particularly in key sectors such as mining, and agriculture reveal a far-reaching effect. For that reason, understanding the relationship between monetary policy and price stability on the overall economic growth is of paramount importance. It is worth noting that, besides the central bank's primary concern of maintaining price stability, it is crucial to consider other objectives like assisting with government economic strategies and promoting employment in pursuit of the long-term goal (Fabris, 2024). The SARB also provides other supporting duties such as the regulation of monetary, concerning price stability and sustainable economic growth. The implementation of monetary policy and the maintenance of price stability are vital components in the pursuit of sustainable economic growth. As South Africa is striving to maintain economic stability and foster sustainable economic growth, the intricate interplay between monetary policy decisions, price stability measures, and overall economic performance remains the focal point of analysis. According to Milanzi et al. (2024), the paradox is that developing countries' economic growth proportionally reveals a lesser extent than their developed counterparts. South Africa is failing to meet its inflation goals, for instance, in the last decade it missed 5 times or opportunities, which raises concerns about the efficiency of using inflation targeting as a monetary policy framework to achieve price stability and sustainable economic growth. Having established these challenges with the theoretical and empirical evidence as a basis regarding monetary policy, it can be firmly concluded that a central bank should opt for rule-based monetary policy to maintain price stability and hence achieve sustainable growth in the economy also alluded by Hossain (2023).

According to Honohan and Orphanides (2022), South Africa appears to have experienced a reduction in its neutral real interest rate, nevertheless, with current projections around 2% (in contrast to nearly zero in several developed countries such as India, Brazil, and Mexico), this rate remains sufficiently high to minimize the risk of encountering the lower bound problem frequently, especially when aiming for an inflation rate of 3% annually. Furthermore, Honohan and Orphanides (2022) argued that for the SARB to effectively fulfil its mandate, it needs to start by maintaining a strong understanding of macroeconomic conditions. Therefore, this study seeks to investigate the effects of monetary policy and price stability on the overall economic growth of South Africa. Specifically, the research will investigate how the implementation of various monetary policies and the maintenance of price stability influence key economic indicators such as Gross Domestic Product (GDP) growth, inflation rates, and money supply in the South African economy. To date, there has been little agreement as to whether the mechanism that South Africa is applying through the monetary policy decisions and price stability measures either hinders or fosters sustainable economic development and growth. The scenarios that the researcher has given above led to the assumption that economic growth is a problem for many countries, including South Africa. The question concerning the effects of monetary policy and price stability on economic growth over time is a key debatable issue with no consensus around the world. As the government shifts the blame to the SARB officials and policymakers. This study investigates the effects of monetary policy and price stability on the economic growth of South Africa. Investigating the effects of monetary policy and price stability on economic growth in South Africa holds significant importance in shaping the country's economic trajectory. By delving into this relationship, this study has deepened the understanding of how policy decisions impact key economic indicators. Against this backdrop, the study aims to investigate the effects of monetary policy and price stability role on the economic growth of South Africa from 1997 to 2023. The current study has used money supply and interest rate as proxy of monetary policy. Inflation was used as a proxy of price stability and exchange rate was employed as a control variable. The first objective is to analyse how changes in the money supply affect the economic growth of South Africa in both the short and long terms. The second objective is to investigate how inflation (consumer prices) influences economic growth in South Africa. Finally, the third objective is to determine the impact of lending interest rates and exchange rate fluctuations on the economic growth of South Africa.

2. LITERATURE REVIEW

2.1. Theoretical Literature

The analysis of the effects of monetary policy and price stability on the economic growth of South Africa is grounded on the following theories: Quantity Theory of Money, Keynesian economic theory, and the monetarism theory. The exploration of how money supply links to inflation typically commences with an analysis of the QTM (Lee and Huruta, 2021). The classical monetary theory is distinguished as the original well-known theory for monetary policy that encapsulated in Fisher's view of the QTM, to establish the relationship between monetary policy (in the form of money supply) and economic growth factors (Fisher, 1911). This theory assumes that both the velocity of money and output remain constant; therefore, any increase in the money supply can ultimately lead to a proportional increase in prices, in line with the quantity theory (Twinoburyo and Odhiambo, 2018).

The quantity theory of money is commonly explained using the exchange equation, represented as follows:

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

Hence, the central bank can influence the money supply, denoted as M, while the velocity of currency circulation shown by V represents how frequently money is used for buying goods and services within a year. P and Y represent the current price level and indicate the actual level of GDP respectively (Hlongwane and Daw, 2022). For instance, holding the velocity constant as indicated by equation 1 indicates a direct link between fluctuations in the money supply and variations in national income (Chipote et al., 2014). Consequently, during the circulation process, equation 1 evolves into equation 2, where it indicates that k is the constant variable that plays a role in this transformation process.

$$MV = kPY \quad (2)$$

The monetarist perspective, as reflected in the QTM, suggests that if the money supply expands faster than the economy and income, it can lead to a rise in nominal demand and inflation due to the inability to meet the demand with more goods and services (Meyer et al., 2018).

$$MV = PT \quad (3)$$

Fisher explains that when the average price in the economy P is multiplied by the total transaction amount T and then divided by the money supply M, it results in a component related to choice, which is referred to as money velocity V. This relationship is expressed in the Fisher equation $MV = PT$. Fisher concluded that if the money supply is doubled, the price level also double, assuming that the total transactions T and money velocity V remain unchanged. Furthermore, based on Fisher the stated equation demonstrates that there is a direct and one-to-one connection between the money supply and the price level (Aliyu and Dodo, 2021). The QTM assumed that there is no trade-off between inflation and output. However, Keynes was of the view that the velocity of money is not constant but rather fluctuates (Keynes, 1936). Keynes further argued that the process of adjusting monetary quantities is quick due to the rationalization of fixed prices. Moreover, the theory posited that money demand is intrinsic, influenced by variables like interest rates and income, as highlighted in the liquidity of preference theory, which assumes that the money supply is fixed and an increase in the money supply leads to a decrease in interest rates until the supply matches the demand for money (Dlamini, 2020).

Keynesians argue that there is a strong connection between the money supply and real GDP (Hlongwane and Daw, 2022). In proposition, the theory states that by increasing the availability of loanable money through banks, interest rates can be reduced. As a result, lowering interest rates typically leads to increased investment and spending on interest-sensitive consumer goods, which in turn can be used to boost economic growth. According to Antonio (2019), Keynesians challenged the idea that the economy is always at or close to its natural level of real GDP (Y), suggesting that Y, remains unchanged in the exchange equation. Furthermore, Keynes also disputed the belief that the velocity of money circulation is constant.

The monetarist school of thought was founded by Milton Friedman in 1968. This approach offers a contemporary interpretation of traditional macroeconomics as also discussed by Isibor et al. (2018). The theory advanced and refined the QTM. In 1968, Friedman, like other economic schools, the monetarism theory recognized the significance of money supply in influencing economic well-being and emphasized the necessity of adopting a sound monetary policy to stabilize the economy (Friedman, 1968).

In the current economic theory, it is generally agreed that once the adjustments to the money supply have settled in the long run, there are fluctuations in the price level, while the level of production and employment are not expected to undergo permanent changes (Fabris, 2024). According to Friedman (1989), cited by Buthelezi (2023), the amount of money in circulation in an economy tends to have an opposite relationship with both the money supply and the price level. However, by managing the money supply effectively, the South African government can influence economic growth and stability in the South African context.

2.2. Empirical Literature

The empirical results on the effects of monetary policy which is measured by money supply and price stability which is measured by inflation, real interest rate, and exchange rate on economic growth range from positive, to negative and show no significant relationship between the variables. A study was conducted by Dingela and Khobai (2017) to investigate the dynamic impact of money supply on economic growth in South Africa, using the Autoregressive Distribution Lag (ARDL) approach. The study results showed that there is indeed a statistically significant and positive relationship between money supply and economic growth. The positive findings were also confirmed by Hussain and Haque (2017), who explored the empirical link between money supply and the per capita GDP growth rate in Bangladesh. The study employed a vector error correction model (VECM) to analyse the relationship. The findings of their research study indicated that money supply plays a significant role in influencing the growth rate of the country. A study by Van Wyngaard (2019) used the ARDL approach to analyse the monetary policy and its effects on inflation and the economic growth of South Africa. The results showed a negative long-run relationship between inflation and economic growth. Mandeya and Ho (2021) used the ARDL estimation technique on quarterly data from 1961Q1 to 2019Q4 to examine the effects of inflation and inflation uncertainty on economic growth in South Africa. Unlike prior research conducted in South Africa, this study combined the influence of inflation and inflation uncertainty on economic growth to emphasize that inflation adversely affects economic growth in both the short and long-term period. However, inflation uncertainty appears to be a short-term issue in South Africa and does not impact growth during the long term due to poor focus and maintenance on strategies that should promote price stability.

A study by Hlongwane and Daw (2022) investigated the impact of monetary policy in South Africa by exploring how repo rates and inflation affect economic progress. The analysis utilizes annual time series data spanning from 1966 to 2020. The research employs a VECM model and Granger causality tests to examine the short-term, and long-term, and to check the causal effect connections between the variables and the analysis. The results showed that interest rates were slightly positively related to economic growth future. Yet, notable reactions were exposed which reveals an inverse relationship in the long term. However, another study conducted by Gwantshu (2020) analyses how the exchange rate influences the economic growth of South Africa between 1990Q1 and 2016Q4.

The VECM method was used to reveal the connection between the exchange rate and economic growth. The analysis reveals that short-term economic growth is positively affected by the real exchange rate, but, in the long term, a negative correlation was observed in South Africa. Furthermore, the study emphasized that the exchange rate provides a detrimental impact on economic growth in the short term.

The empirical literature has identified some key findings from various studies that highlight the complexities of these relationships and the varying impacts of monetary policy measures on the economy. Ultimately, the literature review underscores the necessity for effective monetary policies as a priority for price stability to support sustained economic growth. The study has offered a theoretical and empirical backdrop for the research undertaken, which increases the novelty of the current study based on the selected period.

3. RESEARCH DESIGN

3.1. Data

To analyse the effects of monetary policy and price stability on the economic growth of South Africa, the study employed secondary time series data from 1993 to 2023. The annual data were sourced from the World Bank database. The following model was estimated. Economic growth is the dependent variable in the model. The independent variables are money supply, inflation, lending interest rates, and official exchange rate.

3.2. Model Specification

The study uses the Autoregressive Distributed Lag (ARDL) technique to determine the long-run relationship between the monetary policy and price stability on the economic growth of South Africa and transform them into the Error Correction Model (ECM). The functional form of the model estimated for South Africa is presented as follows:

$$ECON = f\ (MS3, Inflation, LINT, LOER) \quad (4)$$

Where:
ECON = Economic growth
MS3 = Money supply (M3)
Inflation = Inflation (consumer prices)
LINT = Lending interest rate
LOER = Logarised Official exchange rate

In alignment with economic and statistical theory, data that is presented using logarithms is refined and precise. According to Gujarati (2014), cited by Ratombo (2019), equation 4 met the classical linear model, and the values were calculated using OLS.

Equation (4) is transformed to natural logarithm as follows:

$$ECON_t = \beta_0 + \beta_1 MS3_t + \beta_2 Inflation_t + \beta_3 LINT_t + \beta_4 LOER_t + \varepsilon_t \quad (5)$$

Where ECON represents economic growth, MS3 is broad money (money supply), inflation represents inflation (consumer prices), LINT is the lending interest rate, and LOER represents the logarised official exchange rate. The constant is indicated by β_0, and the coefficient estimates are β_1, β_2, β_3, and β_4. ε_t is the error term and it captures all other variables that are not included in the model. Therefore, as per economic theory, the study expects monetary policy and price stability to have a positive impact on South Africa's economic growth in the long run, because implementing a tight monetary policy to maintain price stability is expected to lead to lower economic growth in the short run, but potentially result in long term sustainable growth by curbing inflationary pressures and promoting stability (Ratombo, 2019).

3.3. Estimation Techniques

Descriptive statistics was the first test before unit root to display central tendency on variables. The study utilized the Autoregressive Distributed Lag (ARDL) approach established by Pesaran and Shin (1999) and Pesaran et al. (2001). This approach effectively identifies the cointegration among a group of variables in both the long run and short run concurrently. Within the ARDL framework, the following methodologies are utilized: testing for unit roots, analysing cointegration, estimating ARDL models for both short-term and long-term dynamics as well as testing for diagnostic and stability in the model.

3.3.1. Descriptive statistics

Descriptive statistics are characterized as a visual or tabular method for representing the distribution of data (Lane et al., 2019). The primary aim of conducting these analyses is to examine the central tendency within a dataset. Additionally, this test is vital to assess the extent of dispersion in the data and quantify its variability. The key components of descriptive statistics include measures such as the mean, median, minimum, and maximum values, standard deviation, skewness, kurtosis, and the Jarque-Bera test values.

3.3.2. Unit root tests

According to Arltova and Fedorova (2016), there are several unit root tests to determine the stationarity process. However, the current study has selected the Augmented Dickey-Fuller (ADF) and the Phillips-Perron tests as the most appropriate tests depending on the subjective judgment they provide on the analysis.

3.3.3. ARDL bound cointegration test

Cointegration is a statistical and econometric method used to examine the connection between non-stationary variables over time, and it indicates that two or more variables are cointegrated if they fluctuate in sync with each other (Milanzi, 2021). The ARDL method for cointegration assists in determining the cointegrating vectors. In other words, each of the original variables represents an individual long-term relational equation. Once a cointegrating vector is recognized, the ARDL model for that vector is transformed into the Error Correction Model (ECM). This transformation provides insights into both the short-term dynamics and long-term relationships among the variables in a unified model as exposed by Gujarati (2004).

3.3.4. Diagnostic and stability test

To make sure the model fits well, the diagnostic tests were carried out to assess serial correlation/autocorrelation, normality (Jarque Bera), and heteroskedasticity. These tests help to extract insights about the data's characteristics, especially through checking some distinguished tests like the Breusch-Godfrey test as underlined by Breusch and Godfrey (1978). The Ramsey Reset test was performed to assess the stability of the model's estimates over time. It is a way to detect potential inaccuracies in the model, such as White's test for determining the correct functional form. Also, the cumulative sum (CUSUM) and the cumulative sum of

squares (CUSUMSQ), were used to assess the stability of the model in this study.

4. RESULTS AND DISCUSSION

4.1. Empirical Test Results

4.1.1. Descriptive statistics

The study's descriptive statistical analysis, based on 27 observations, reveals several key findings shown on table 1. The mean and median represent the central point and midpoint of the data, respectively, while the maximum and minimum values indicate the highest and lowest observations in the samples. The kurtosis values show that variables MS3 and LOER a have a kurtosis <3, suggesting a relatively flat to normal distribution, whereas ECON, LINT, and Inflation have a kurtosis >3, indicating a more peaked distribution with fatter tails. Skewness analysis reveals that ECON, MS3, and Inflation are negatively skewed, while LINT and LOER are positively skewed. The Jarque-Bera test results suggest that the data for MS3 and Inflation are not normally distributed, as their P-values are below the 5% significance level. This abnormal distribution raises concerns about the impact of money supply (MS3) and inflation on South Africa's economic growth.

4.1.2. Unit root tests

Table 2 presents the results of Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) stationarity tests for various variables.

Table 1: Descriptive statistics

	ECON	MS3	INFLATION	LINT	LOER
Mean	2.230184	62.97995	5.464971	11.94676	0.970848
Median	2.485468	66.14477	5.679418	10.62500	0.928072
Maximum	5.603806	73.96950	10.07458	21.79167	1.266002
Minimum	−5.963358	47.36436	−0.692030	7.041667	0.663509
Standard deviation	2.385756	8.633012	2.181560	3.718450	0.166312
Skewness	−1.410753	−0.629935	−0.355234	1.098885	0.173571
Kurtosis	6.347745	1.952264	4.343902	3.525582	1.878956
Jarque-Bera	21.56433	3.020652	2.599692	5.744730	1.549403
Probability	0.000021	0.220838	0.272574	0.056565	0.460481
Sum	60.21497	1700.459	147.5542	322.5625	26.21290
Sum Sq. Dev.	147.9876	1937.751	123.7393	359.4986	0.719152
Observations	27	27	27	27	27

Source: Authors' Calculation

The results show that economic growth (ECON) is stationary at level, while money supply (MS3), lending interest rate (LINT), and logarised official exchange rate (LOER) are stationary at first difference I(1). Inflation is stationary after the first difference I(0). The ADF and PP tests generally agree, but in cases of discrepancy, the ADF results are prioritized. According to Arltova and Fedorova (2016), and Letsoalo and Ncanywa (2020), it was suggested that the ADF test is a dependable choice for evaluating unit roots. Furthermore, the ADF was selected based on its emphases that it yields superior results compared to other unit root testing methods. Moreover, it provides clear results particularly in scenarios involving time series with large number of observations. Therefore, upon conclusion variables employed in this study are integrating at different orders, indicating that the study model qualifies to employ the Autoregressive Distributed Lag (ARDL).

4.1.3. ARDL bound cointegration test

Lower bound and upper bound significant levels are shown as follows:

Table 3 and 4 shows the bounds testing results and the significant levels for both lower and upper bound respectively. By conducting the ARDL bounds test on four variables, with k = 4, the results are divided into two sections based on the order of integration, zero and one. The analysis revealed that the F-statistic of 8.50 exceeds the critical values at various levels (10%, 5%, 2.5%, and 1%). The calculated F-statistic of 8.50 exceeds the lower bound I(0) critical value of 3.29 and the upper bound I(1) critical value of 4.37, at 0.05 level of significant. These outcomes suggests that there is cointegration amongst the variables of this study as argued by Pesaran (2001) that the general guideline suggests that when the calculated F-statistic exceeds the upper critical bounds test, the study rejects the null hypothesis that there is no cointegration, suggesting the presence of cointegration. Cointegration indicates the presence of a sustained relationship between variables in the long run (Letsoalo and Ncanywa, 2020).

The bound testing method has shown sufficient proof of a long-run relationship among the variables within the model. Following this, the study moves forward to determine the long-run coefficients of the model. The results indicate that the F-statistic is above the upper bound, allowing for the rejection of the null hypothesis that

Table 2: ADF and PP test results at the level and at the 1st difference

Series	Model	Augmented Dickey-Fuller (ADF)	Order of integration	Phillips-Perron (PP)	Order of integration	Conclusion
ECON	Intercept	***0.0034	I (0)	***0.0035	I (0)	Stationary
	Trend and intercept	***0.0026	I (0)	***0.0027	I (0)	
MS3	Intercept	***0.0013	I (1)	***0.0013	I (1)	Stationary
	Trend and intercept	***0.0064	I (1)	***0.0065	I (1)	
Inflation	Intercept	***0.0029	I (0)	**0.0210	I (0)	Stationary
	Trend and intercept	**0.0103	I (0)	*0.0950	I (0)	
LINT	Intercept	***0.0009	I (1)	**0.0156	I (1)	Stationary
	Trend and intercept	***0.0036	I (1)	**0.0181	I (1)	
LOER	Intercept	***0.0050	I (1)	***0.0015	I (1)	Stationary
	Trend and intercept	*0.0887	I (1)	***0.0044	I (1)	

***0.01, shows critical value at 1% significance level
**0.05, shows critical value at 5% significance level
*0.10, shows critical value at 10% significance level
Source: Authors' Calculation

states that there is no cointegration. Therefore, it becomes essential to estimate the long-run coefficients and the error correction model (ECM), in addition to the short-run parameters (Ratombo, 2019).

4.1.3.1. ARDL short-run and long-run coefficients

$ECON = 22.89594 - 0.007887MS3 - 2.290748INFLATION + 0.308523LINT - 11.53196LOER$

Table 5 provides a summary of the results from the long-run ARDL model examined in the study. More comprehensive findings for the long-run ARDL model can be found in Appendix C. The coefficient of −0.007887 for MS3 (money supply) shows that there is a negative, and insignificant long-run relationship between MS3, and economic growth. A 10% increase in economic growth will lead to a 0.079% decrease in money supply ceteris paribus. The overall money supply, which serves as the alternative variable to represent monetary policy, did not exert a substantial significance on economic growth in the same way as the policy rate expected. Furthermore, the study outcomes are in agreement with the monetary theory discussed under the theoretical literature section. Moreover, these findings concur with Buthelezi (2023), who emphasized that the amount of money in circulation in an economy tends to have an opposite relationship with both the money supply and the price level and hence affect economic growth.

Inflation was also noted as another potent channel of economic growth which shows a coefficient elasticity of −2.290748. This outcome suggests that there is a negative long-run relationship between economic growth and inflation, although it is significant. This suggests that a 10% increase in economic growth will lead to a 22.9% decrease in inflation ceteris paribus. An increase in economic growth means that the economy is doing well. Whereas the price level tends to decrease when the economy is not doing well. The above notion is supported by an argument made by Munyeka (2014) who argued that empirical literature and economic theory reveals a negative relationship between inflation and growth of the economy. Furthermore, economic activities as well as the growth of the economy can be lowered by inflation uncertainty. LINT (lending interest rate) with the coefficient elasticity of 0.307523 shows a positive and insignificant long-run relationship between lending interest rate and economic growth ceteris paribus. A 10% decrease in economic growth will lead to a 3.08% increase in the interest rate. Although lending interest rates have a positive incentive towards economic growth, its influence has less impact.

The LOER elasticity is measured by −11.53196 indicating that there is a negative long-run relationship between the log of the official exchange rate and economic growth, although is significant. C represents a constant, which shows that this model consists of a constant, with a coefficient of 22.89594. It is significant and positively related to economic growth in the long run. The ARDL long-run results confirm that there is cointegration in the model by showing the long-run relationship between the variables.

Table 6 shows the short-run outcomes of the model. It indicates a negative relationship between economic growth and MS3 (money supply), which is statistically significant at 1%, 5%, and 10% levels

Table 3: Bounds test results

Equation	F-statistic	Lower bound I (0)	Upper bound I (1)	Outcome
Economic growth	8.50	3.29	4.37	Cointegration
Number of independent variables: K=4				

Source: Authors' Calculation

Table 4: Significant levels for lower bound and upper bound

Significant level (%)	I (0) or lower bound	I (1) or upper bound	Results
10	2.2	3.09	Cointegration
5	2.56	3.49	Cointegration
2.5	2.88	3.87	Cointegration
1	3.29	4.37	Cointegration

Source: Authors' calculation

Table 5: ARDL long-run coefficients

Variables	Coefficients	Probability value
MS3	−0.007887	0.9281
INFLATION	−2.290748	0.0214
LINT	0.308523	0.3648
LOER	−11.53196	0.0021
C	22.89594	0.0237

Source: Authors' Calculation

Table 6: ARDL short-term coefficients

Variable	Coefficient	Probability
D (MS3)	−0.529777	0.0000
D (Inflation)	−0.150136	0.3171
D (LINT)	0.677325	0.0013
D (LOER)	−19.72459	0.0004
CointEq(−1)	−0.786447	0.0000

Source: Authors' Calculation

of significance. A 10% increase in economic growth is expected to lead to a 5.29% decrease in money supply in the short run. Inflation elasticity is −0.150136. These outcomes also indicate that there is a negative and insignificant relationship between economic growth and inflation in the short run period. The LINT (lending interest rate) rate has a positive, and significant relationship with economic growth at all levels in the short run. LOER elasticity is measured at −19.72459, hence this shows that there is a negative and significant relationship between economic growth and the official exchange rate in the short run. The CointEq(−1) of −0.786447 shows the speed of adjustment that the model will use to converge back towards equilibrium. Meaning the model will use a speed of 78.6%, which is equivalent to one period as a pace of convergence. The study ECM results confirm how quickly the model will converge toward the equilibrium following a shock. These outcomes are in line with economic theory and satisfy the ECM expectation which emphasizes that it should be below one and negative, with statistical significance as also stated by Letsoalo and Ncanywa (2020).

4.1.4. Diagnostic and stability test

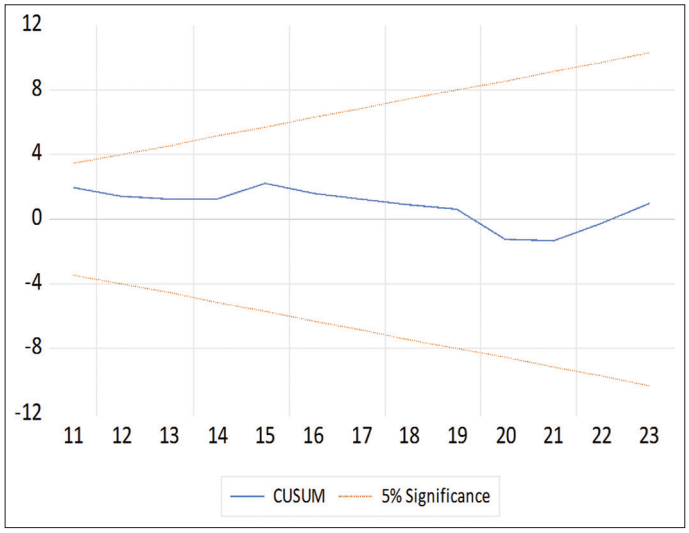
The study's residual diagnostics, shown in Table 7, indicate no heteroskedasticity or serial correlation. The Breusch-Godfrey test shows no serial correlation (P = 0.7573), and the Breusch-

Table 7: Diagnostic and stability testing results

Test	Null hypothesis (H_0)	Test statistic	Probability value	Conclusion
Breusch-Godfrey serial correlation LM test	There is no serial correlation	0.555901	0.7573	The study fails to reject H_0, as the probability value is above the level of significance at 5%, indicating that there is no serial correlation.
Normality test: Jarque-Bera	Residuals are normally distributed	0.763095	0.6828	The study fails to reject H_0 as the probability value is above the significance level at 5% which indicates that the residuals of the model are normally distributed.
Heteroskedasticity test: Breusch-Pagan-Godfrey	No heteroskedasticity	4.932353	0.4242	The study fails to reject H_0, as the probability value is above the 5% level of significance, indicating that the model has no heteroskedasticity
Heteroskedasticity test: ARCH	No heteroskedasticity	0.974604	0.3235	The study fails to reject H_0 as the probability value is above the significance level at 5% indicating that the model has no heteroskedasticity
Heteroskedasticity test: Harvey	No heteroskedasticity	3.623540	0.6048	The study fails to reject H_0 as the probability value is above the stated level of significance at 5%, indicating that the model has no heteroskedasticity
Ljung -Box Q	No Autocorrelation up to order k	10.175	0.601	The study fails to reject H_0 as the probability value is above the significance level at 5%, indicating that the model has no autocorrelation up to order k.
Ramsey Reset	No misspecification	0.144301	0.7031	The study fails to reject H_0 as the probability value is above the significance level at 5%, indicating that the model is correctly specified.

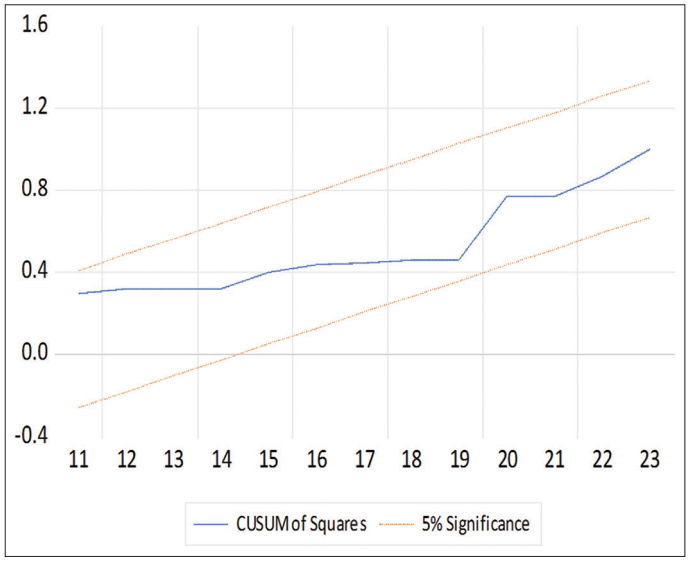
Source: Authors' Calculation

Figure 1: CUSUM



Source: Authors' calculation from E-views

Figure 2: CUSUM of squares



Source: Authors' calculation from E-views

Pagan-Godfrey test indicates no heteroskedasticity (P = 0.4242). the Arch test also confirms no heteroskedasticity (P = 0.3235), as does Harvey's analysis (P = 0.6048). Additionally, the Ljung-Box Q test shows no autocorrelation (P = 0.601). Therefore, we fail to reject the null hypotheses of no heteroskedasticity and no autocorrelation. The Ramsey Reset test' null hypothesis posits that the model is accurately specified. Since the P-value exceeds the significance level at 5%. Hence, we accept the null hypothesis, indicating that the economic growth model is indeed correctly specified as supported by the Ramsey Reset test outcome.

The analysis in Figure 1 shows that the CUSUM line remains within the 5% significance level, indicating model stability. Similarly, Figure 2's CUSUM of squares also stays within the 5% boundaries, suggesting no abrupt changes or parameter instantly. Overall, the results imply that the model is steady and reliable, with no significant deviations or patterns indicating instability.

4.2. Discussion of Empirical Test Results

4.2.1. Outline of results

This study analysed the effects of monetary policy and price stability on the economic growth of South Africa, focusing on four main objectives. The first objective was to analyse how changes in the money supply affect the economic growth of South Africa in both the short and long terms. The second objective aimed at investigating how inflation (consumer prices) influences economic growth in South Africa. The third objective was to determine the impact of lending interest rates and exchange rate fluctuations on the economic growth of South Africa. The analysis was conducted using the ARDL method. Before the ARDL bounds cointegration analysis, a variety of econometric tests, including descriptive

statistics and unit root tests, were carried out to identify the properties of the variables This approach was informed by Nielsen (2011), cited by Milanzi (2021)'s concept of the general-to-specific framework, which suggests that it is important to first establish a suitable statistical representation of the data. Following this, hypotheses can be tested to connect the statistical model with economic theory by examining cointegration and analysing the long-term relationships.

The data for this study was obtained from the SARB, and the World Bank. To assess stationarity, the ADF, and the PP analytical methods were utilized. Additionally, the ARDL model was applied in the analysis to meet the study's research objectives. Findings indicated that, over the long term, the primary factors influencing economic growth in South Africa were the money supply and inflation. Additionally, the current study research revealed that while the coefficient associated with the money supply exhibited a negative relationship with economic growth, it is also followed by statistically insignificant probability in the long term. On the other hand, the coefficient of inflation is negative, showing a negative relationship between inflation and economic growth, however, the relationship is statistically significant.

4.2.2. Practical implications

This analysis has provided valuable insights into the relationship between an open economy, currency stability, and growth, particularly in the context of international trade, investment, and related fields. Based on the outcomes of this analysis, the study has provided practical recommendations for policymakers aimed at optimizing monetary and fiscal policies. These recommendations can focus on strategies for balancing money supply, controlling inflation, and setting interest rates to promote sustainable economic growth. By using the ARDL to test for cointegration, Granger causality tests, and other statistical methods, the study has contributed to the empirical evidence avenues and the findings can be utilized to support or challenge existing economic models concerning monetary policy and price stability effects starting from South Africa to the world. These contributions are significant for economists and academics who develop predictive models for economic behaviour in response to monetary policy changes.

5. CONCLUSION AND RECOMMENDATIONS

5.1. Limitations and Recommendations

The research was unable to examine every facet and variable that influences economic growth. Its focus was specifically on the effects of monetary policy, and price stability on economic growth within the South African context. Additionally, the conclusions drawn from the study are constrained by the time series data collected, which spans from 1997 to 2023 due to available updates from SARB and World Bank.

The study recommends conducting additional studies to explore the underlying factors that contribute to the ineffective relationship of money supply and interest rates with economic growth. Understanding these dynamics may uncover new avenues for policy intervention and can amplify the measures used by central banks globally to harvest unique economic growth benefits. By addressing these recommendations, South Africa in particular can create a more conducive environment for sustainable economic growth that aligns with its monetary policy objectives and price stability goals.

We also recommended that policies that promote exchange rate stability be established or tested for the benefit of the country's economic growth. This could include interventions in the foreign exchange market to curtail excessive currency fluctuations, which may negatively impact economic stability and growth. Furthermore, interest rates must be reviewed by setting mechanisms to ensure that they adequately reflect the underlying economic conditions, ensuring that interest rates are conducive to growth without fuelling inflation. Additionally, the study suggests conducting comparative analyses with other emerging markets that have successfully stabilized their economies. Learning from their experiences can provide valuable insights into South Africa's monetary policy strategy. Lastly, further research is recommended to assess the evolving dynamics of monetary policy, price stability, and economic growth in South Africa. Aligning policy decisions with current research findings and economic indicators will help enhance the effectiveness of policy interventions and support long-term economic growth.

5.2. Conclusion

The research indicated that GDP growth, money supply, inflation, interest rates, and exchange rates are the key factors influencing economic growth fluctuations in South Africa. Interestingly, other potential growth determinants, such as money supply, did not align with the findings of many existing empirical studies, such as a study by Dingela and Khobai (2017), which reported a positive significant relationship between money supply and economic growth. This suggests that policymakers in South Africa should prioritize managing the identified key variables, such as GDP growth, inflation, interest rates, and exchange rates to foster economic stability and growth. Additionally, the limited impact of other factors highlights the need for a focused approach in economic strategy, potentially downplaying less significant variables and dedicating more resources to understanding and optimizing the critical ones.

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