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Evaluating the Effects of Inflation on Economic Growth in South Africa

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Abstract

This study investigates interaction between inflation and economic growth in South Africa during 1970-2021 periods. Utilizing Autoregressive Distributed Lag (ARDL) model, it finds that inflation, long-term interest rate and money supply have negatively impact on South African economic growth.

Furthermore, the study conducts causality tests which reveal a bidirectional relationship between money supply and South African economic growth. On the other hand, it documents a unidirectional causality running from inflation to economic growth and from long-term interest rate to economic growth. The study found no causal relationship between real effective exchange rate and South African economic growth. As a result, the study recommends a more aggressive inflation targeting policy in order to improve economic growth in South Africa.

Keywords: *Gross Domestic Product; Consumer Price Index; Interest Rate; Money Supply; Exchange Rate; Macroeconomic Policy.*

JEL Classification: *E31, E39.*

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1. Introduction

In developing economies such as South Africa, economic growth is regarded as a much-needed solution for improving the employment rate and sustainable development across marginalised communities. Hence, the major goal of monetary authorities is to ensure a sustainable and rapid economic growth of the nation (increasing the production of goods and services). However, attaining this goal may be hindered by the impact of inflation rate, being a central influencer of macroeconomics policy in determining economic growth. The dynamics of inflation in a country may also be described as the reflection of its economic structures and policy choices. Inflation varies from one country to another; the South African economy has not been exempted from these variations as the economy is continuously plagued with persisting challenges of increasing inflation rates that have maintained the range of 3% to 6% since 2000, despite declining from the 1970s (Madito and Odhiambo, 2018, Dingela and Khobai, 2017). However, according to the Bloomberg African Edition in Economics (2022), by June 2022, South Africa annual inflation rate had reached an all-time high of 7.4%, being the highest level attained since the global financial crisis. The interaction between inflation and economic growth is a significant factor underlying different debates between economists and policy makers, given the controversy on whether inflation positively or negatively affect economic growth. The study examines and analyses the effect of inflation on the South African economy by examining if inflation has a detrimental effect on the South African economy via the short-run and long-run relationships as well as measurements of real long-term interest rate, real money supply (M2) and exchange rate against economic growth.

Inflation is regarded as one of the vital macroeconomics considerations for the advancement of a nation, arising from too much money chasing too few products, which occurs when economic expansion originates from factors that increase the money supply above the real production (Adaramola and Dada, 2020, Denbel et al., 2016). There have been varying viewpoints on the interaction between inflation and economic growth regarding the nature of the relationship and the direction of causality, as noted by Mkhatshwa et al. (2015). The argument was that the structuralists view inflation as beneficial while monetarists consider it bad for growth. The authors further indicated that there is a positive relationship between inflation and growth in the short term but negative in the long term. The level of inflation determines whether it will have a favourable or unfavourable impact on growth. A high and unstable inflation can be harmful to the economy as a whole, as well as to businesses and consumers, and the effects on society and the economy can take many different forms and are challenging to

quantify, such as eventually slowing down economic growth, and leading to economic instability and inefficiency. These words were resonated in the review of Madito and Odhiambo (2018) that a high and unpredictable inflation rate creates uncertainty about future relative prices and thus lowers the competitiveness of a country's exports.

The interaction between inflation and economic growth is also known to be nonlinear, and evidence has suggested that when inflation reaches a particular level, the beneficial impact on growth turns negative (Mkhatshwa et al., 2015). There are arguments that low levels of inflation boost the efficiency of an economy are used to explain the long-term negative correlation between inflation and economic growth. In developing economies, elevated inflation rates interfere with the price signalling system and cause a reallocation of resources (Hodge, 2006). Hence, inflation needs to be kept within a goal range that can be quantified as appropriate for an economy's growth (Meyer et al., 2018).

Hodge (2006) contended that the reduction in the South African inflation rate is a crucial part of the government's economic strategy for improvement that propelled the 2000 monetary policy framework that aimed to target levels of inflation in South Africa. One of the likely factors influencing the South African government's decision to set a inflation target of between 3% and 6% annually was the purported longer-term growth benefits of low inflation. Considering the historical factors of inflation in South Africa, this was a lofty goal, and despite repeated calls to action from Reserve Bank Governors and succeeding Finance Ministers, the annual consumer price inflation rate has never dropped below 6% since 1970, according to a five-year moving average. While the interaction between inflation and economic growth is still up for debate, policymakers are forced to strike a compromise between stabilising prices and growth, despite the measures that have been made to limit inflation through monetary policy (Mkhatshwa et al., 2015). Many studies have investigated the interaction between macroeconomic variables such as inflation, interest rate, monetary supply and exchange rate against economic growth.

It is known among scholars that high level of inflation rates has a negative effect on the transformation of any economy, especially South African as it is a developing economy. These high inflation rates limit macroeconomic policy implementation as the presences of structural inflation make it hard to target inflation. However, the current inflation targeting regime provides some control over inflation in South Africa (Meyer et al., 2018). According to Meyer et al. (2018), the monetary authorities must develop the necessary reaction to effectively deal with the structural features of inflation in order to establish a

balance between stimulating the economy that enables investment and job creation while also ensuring price and financial stability. This might include creating two target systems, one for a cost-push inflation environment and the other for a demand-pull inflation one.

Monetary policy is a known force behind economic growth; given that, it controls the price, and availability of money in an economy which is in relation with level of economic activity (Precious and Makhetha-Kosi, 2014). Interest rates are regarded as an important financial market indicator that has a significant impact on the whole economy. Diverse studies have investigated the relationship between interest rate and economic growth between 2003 and 2019. Many countries also use exchange rate as a key indication for evaluating their monetary policies. According to Klutse et al. (2002), exchange rates are considered to server as a common denominator between two trading countries as the appreciation and depreciation of the currency are affected extensively and diversely by interest rates. These include the flow of imports and exports as well as the transmission of foreign-goods prices to domestic prices.

2. Literature Review

Empirical literature show that impact of inflation on economics growth is wide examined with Autoregressive Distributed Lag (ARDL) methodology due to the fact that the method comprises both short-run and long-run impacts effectively. For instance, Adaramola and Dada (2020) use the ARDL model to investigate the effect of inflation on Nigerian economic growth for the period of 1980 to 2018. The findings of the study indicate that inflation and real exchange rate exerted a significant negative impact on the Nigerian economy. Similarly, Madito and Odhiambo (2018) also examine the determinants of inflation in South Africa using ARDL approach. They document that both internal factors such as inflation expectations and government consumption spending and external ones such as currency rates and import prices are major predictors of inflation in South Africa between 1970 and 2015. However, predictors such as monetary policy, inflation, exchange rates, and other variables affect economic growth. South Africa officially implemented the inflation targeting monetary policy from 2000.

Mkhatshwa et al. (2015) examine the effect of inflation on Swaziland economic growth during the period 1980 to 2013 utilizing ARDL model in order to determine the long-run and causality relationships. The study finds a unidirectional relationship between inflation and economic growth in the long-run. Similarly, Denbel et al. (2016) investigate the interaction between money

supply, inflation and economic growth in Ethiopia using the ARDL model and the study finds that inflation has a negative effect on economic growth during the research period.

According to Meyer et al. (2018), the monetary authorities must develop the necessary reaction to effectively deal with the structural features of inflation in order to establish a balance between stimulating the economy that enables investment and job creation while also ensuring price and financial stability. This might include creating two target systems, one for a cost-push inflation environment and the other for a demand-pull inflation one.

In a more recent study, Dingela and Khobai (2017) use the ARDL model to determine the dynamic impact of inflation on economic growth in South Africa using time-series data from 1980 to 2016. They proxy inflation with broad money supply (m3) and find out that statistically significant positive relationship between money supply and economic growth both in short run and long run. These findings are inline with Galadima and Ngada (2017) who determine a significant interaction between money supply, interest rates, inflation, and GDP in Nigeria for a period of 34 years using the Vector Error Correction Model (VECM). They also underline a unidirectional causality between inflation and economic growth during the sample period. On contrary, Ezako (2023) examine relationship between inflation and economic growth in Burundi across the period from 1990 to 2020 utilizing ARDL appreach and documents a significant negative relationship between inflation and economic growth in the short run. In addition, the study also documents that investment, household consumption, and exchange rates exhibit a positive and significant relationship with economic growth in the long-run.

On the other hand, several other methodologies are also conducted in examining impact of inflation on economic growth. For instance, Saymeh and Orabi (2013) investigate the effects of inflation, interest rates, and money supply on GDP from 2000 to 2010 in Jordan using Johansen cointegration test. They identify a lag relationship between interest rates and economic growth, where the previous year's interest rate influences the current year's economic growth.

Likewise, Eggoh and Khan (2014) explore the interaction between inflation and economic growth using the PTSR and dynamic GMM models, finding that inflation has a nonlinear effect on economic growth. Aslam (2016) studies impacts of the money supply on economic growth in Sri Lanka during 1959-2013 using OLS methodology. As a result, they find out that the money supply has a positive impact on Sri Lanka's economic growth at 1% significance level. These findings contradicts with Gatawa et al. (2017), who use VAR Model and Granger Causality

techniqueto investigate the effects of money supply, interest rates, and inflation on Nigeria's economic growth during 1973-2013. Their study finds that interest rates, inflation, and money supply negatively influence economic growth.

In this study, we also consider several macroeconomic control variables, such as exchange rates and interest rates, given the evidence in the existing literature of their impact on economic growth. For instance, Hatmanu, Cautisanu, and Ifrim (2020) examine the influence of interest rates and exchange rates on monetary policy within the Romanian business climate using short-run ARDL models. Their review indicates that interest rates affect economic growth in both the long and short term. In the short term, rising interest rates prevent people from taking out loans or making investments, thereby lowering economic activity and slowing growth. Hatmanu et al. (2020) conclude that interest rates have a negative influence while exchange rates have a positive influence.

Bosworth (2014) argues that in making long-term economic predictions, it is essential to question whether interest rate projections should be incorporated into a larger model that considers their relationship with other variables or should be based solely on their historical trends. Sergey et al. (2017) maintain that the impact of interest rates on economic growth varies and can be conveyed through various channels, such as household consumption decisions and business investment levels. Jordaan (2013) notes that when investments are highly sensitive to interest rate fluctuations, an increase in interest rates raises the cost of borrowing and may crowd out private demand.

In a more recent study, Adegoke et al. (2021) examine the interaction between interest rates and economic growth in Nigeria using secondary time series data and the ARDL model. They find a long-run relationship between interest rates and economic growth.

3. Methodology

3.1. Data

This study utilizes annual data to investigate whether inflation had a detrimental impact on South Africa's economic growth during the period from 1970 to 2021. The chosen sample period allowed for an examination of the inflation targeting policy implemented by South Africa. The dependent variable is Real Gross Domestic Product (GDP), while the independent variables are Inflation Rate (LnCPI, proxied by the Consumer Price Index), Real Long-term Interest Rate (LnINT, proxied by the yield on the 10-year government bond), Real Money Supply

(LnMS, proxied by M2), and Real Effective Exchange Rate (LnEX). The selection of these variables is consistent with the findings of Naicker (2017), who identified a significant relationship between inflation and other macroeconomic variables such as interest rates, money supply, and the real effective exchange rate. The empirical model and associated tests are estimated using EViews statistical software.

Table 1. Descriptive Statistics

Statistics	GDP	LnCPI	LnINT	LnMS	LnEX
Mean	2.25	8.77	11.38	12.25	4.79
Median	2.44	7.98	9.99	12.5	4.8
Maximum	6.62	18.65	18.09	15.12	5.14
Minimum	-6.43	-0.69	7.37	8.56	4.51
Std. Dev.	2.49	4.42	3.23	2.08	0.13
Skewness	-0.82	0.26	0.54	-0.29	0.24
Kurtosis	4.31	2.16	1.83	1.76	3.12
Jarque-Bera	9.58	2.13	5.48	4.06	0.51
Probability	0.01	0.34	0.06	0.13	0.77
Sum	117.11	456.22	591.89	637.21	249.16
Sum Sq. Dev.	315.58	997.01	532.2	220.26	0.87
Observations	52	52	52	52	52

Table 1 provides the descriptive statistics of GDP, inflation, long-term interest rate, money supply and real effective exchange rate. It is evident that money supply rate has the highest average followed by long-term interest rate, inflation, real effective exchange rate and GDP. The variable with the highest and lowest standard deviation is inflation and real effective exchange rate. This suggests that inflation is the series that models the level of discrepancy. The skewness of the variables suggests the rate is asymmetrical. It is evident that inflation, long-term interest rate and real effective exchange rate have positive coefficients. This indicates that variables have long right tails and GDP and money supply have long left tails. The kurtosis of the series provides pawedness and flatness of the series. It is seen that GDP and real effective exchange rate are leptokurtic because the value exceeds 3, whereas the remainder variables are platykurtic as the values are less than 3. The Jarque-Bera statistical is used to determine if the series is

normally distributed. The results show that the null hypothesis cannot be rejected. Hence, the series are normally distributed.

3.2. Stationarity Tests

According to Datta and Kumar (2011), the estimation of non-stationary data leads to spurious and biased results. Given that macroeconomic variables are categorised by the random work progress, it is essential to test for stationarity in either levels or first difference. The augmented Dickey-Fuller (ADF) technique developed by Dickey and Fuller (1979) is used to determine if the selected variables are stationary in levels or first difference. The testing of stationary further guided the research study as it provided the basis of the estimation technique. That being, if the data were found to be integrated of I (0) and I (1) then the ARDL model would be suitable. The general form of the ADF test with an intercept was given by:

$$\Delta Y_t = \beta_0 + \lambda Y_{t-1} + \beta_i \Delta Y_{t-1} + \mu_{ti} \quad (3)$$

Where, Y_t is the macroeconomic variable, Δ is the first difference (I (1)), μ_{ti} is the error term for the period i, and Y_{t-1} is the one period lag for the metronomic variable.

Table 2. ADF Unit Root Test

Variables	ADF t-stat.	Critical Values (5%)	Prob.	Order of Integration
GDP	4.98	-2.92	0	I(0)
LnCPI	-6.58	-2.92	0	I(1)
LnINT	-9.24	-2.92	0	I(1)
LnMS	-3.5	-2.92	0.01	I(0)
LnEX	-6.29	-2.92	0	I(1)

3.3. Model Specification

The ADF test indicates that our series are not integrated at same degree as GDP and LnMS are I(0), stationarity at level, while other variables are I(1). Therefore, we decide to use Autoregressive Distributed Lag (ARDL) cointegration framework which is applicable for series with mixture of I(0) and I(1) variables, but none of them should be I(2) (Sovbetov, 2018). This cointegration model was first introduced by Pesaran, Shin and Smith (1996) and it combines autoregressive (AR)

and distributed lag (DL) components. It typically involves regressing a dependent variable on its own past values (autoregressive part) and past values of one or more independent variables (distributed lag part). Moreover, the model allows estimation of both short-run and long-run effects between series. Thus, the error correction model (ECM) could be estimated by a linear regression, which incorporates short-run adjustment with long-run equilibrium and simultaneously no long-run information is lost.

The bound approach is used in ARDL to determine whether co-integration exists between series or not. The bound test is associated with two parts of critical values that are adjusted, the lower bounds and upper bounds. The lower bounds consider all variables are I (0) whereas the upper bounds consider all variables are I(1). If the F-statistic is greater than the upper bound critical values, then the null hypothesis of no co-integration is rejected. If the F-statistic is less than lower bound critical values, then the null hypothesis cannot be rejected, and it is concluded that there is no co-integration among macroeconomic variables. Moreover, if the F-statistic lies between the upper bound and lower bound critical values, then the findings are inconclusive. In order to determine the linear relationship between GDP and macroeconomic variables, the following linear ARDL model is constructed:

$$\Delta GDP = \alpha_0 + \sum_{i=1}^{n} b_i \Delta y_{t-i} + \sum_{i=0}^{n} c_i \Delta LnCPI_{t-i} + \sum_{i=0}^{n} d_i \Delta LnINT_{t-i} + \sum_{i=0}^{n} e_i \Delta LnMS_{t-i} + \sum_{i=0}^{n} f_i \Delta LnEX_{t-i} + \varphi_{1ln_{t-1}} + \varphi_{2LnCPI_{t-1}} + \varphi_{3LnINT_{t-1}} + \varphi_{5LnMS_{t-1}} + \varphi_{6LnEX_{t-1}} + \in_{1t} \quad (1)$$

The above equation indicates the change in GDP and the change in the natural log of inflation, long-term interest rate, money supply rate and real effective exchange rate is represented by LnCPI, LnINT, LnMS, LnEX respectively. The short-run estimates are given by a, b, c, d, e, f, whereas φ_i is the long-run estimates and $\in_{1t}$ is the error term. If the study finds evidence of a long-run relationship between GDP and macroeconomic variables, a ARDL error correction model will be used to determine the short-tun relationship. This is given by:

$$\Delta GDP = \alpha_0 + \sum_{i=1}^{n} b_i \Delta y_{t-i} + \sum_{i=0}^{n} c_i \Delta LnCPI_{t-i} + \sum_{i=0}^{n} d_i \Delta LnINT_{t-i} + \sum_{i=0}^{n} e_i \Delta LnMS_{t-i} + \sum_{i=0}^{n} f_i \Delta LnEX_{t-i} + \delta_{\varepsilon t-1} + \mu_t \quad (2)$$

Where δ is the error correction estimate that considers the speed of the adjustment to equilibrium.

Table 3. Hypothesised Relationship based on Theories

Dependent variable	Independent variable	Hypothesised relationship
Real gross domestic product (GDP)	Inflation rate (LnCPI)	Negative
	Real long-term interest rate (LnINT)	Negative
	Real money supply (LnMS)	Positive
	Real effective exchange rate (LnEX)	Positive/Negative

We also examine robustness of our ARDL over its three essential requirements. That being the ARDL model should not have serial correlation within the error terms of the data set, there should be no heteroscedasticity, such that the variance means must remain constant over time, and the data set should follow a normal distribution. In addition to the three requirements, we also employ the cumulative sum (CUSUM) test to establish the fitness of the model.

3.4. Granger Causality

For further robustness of ARDL results, we conduct the Granger (1988) causality test which shows causlity direction between two variables. This test can yield three outcomes, namely: no causality (no variables relate); unidirectional casualty (one variable has an influence on other variables); and bidirectional causality (two variables influence each other). The decision of the test is determined in relation to the F-statistic and probability values associated with each estimation. The Granger causality equations are given by:

$$GDP_t = \sum_{i=1}^{n} \beta_i GDP_{t-1} + \sum_{\mathrm{j}=1}^{n} \alpha_{\mathrm{j}} LnCPI_{t-j} + \mu_{\mathrm{t}} \quad (3)$$

$$LnCPI_t = \sum_{i=1}^{n} \delta_i LnCPI_{t-1} + \sum_{\mathrm{j}=1}^{n} \varphi_{\mathrm{j}} GDP_{t-j} + \mu_{\mathrm{t}} \quad (3')$$

$$GDP_t = \sum_{i=1}^{n} \delta_i GDP_{t-1} + \sum_{\mathrm{j}=1}^{n} \varphi_{\mathrm{j}} LnINT_{t-j} + \mu_{\mathrm{t}} \quad (4)$$

$$LnINT_t = \sum_{i=1}^{n} \beta_i LnINT_{t-1} + \sum_{j=1}^{n} \alpha_j GDP_{t-j} + \mu_t \quad (4')$$

$$GDP_t = \sum_{i=1}^{n} \delta_i GDP_{t-1} + \sum_{j=1}^{n} \varphi_j LnMS_{t-j} + \mu_t \quad (5)$$

$$LnMS_t = \sum_{i=1}^{n} \beta_i LnMS_{t-1} + \sum_{j=1}^{n} \alpha_j GDP_{t-j} + \mu_t \quad (5')$$

$$GDP_t = \sum_{i=1}^{n} \delta_i GDP_{t-1} + \sum_{j=1}^{n} \varphi_j LnEX_{t-j} + \mu_t \quad (6)$$

$$LnEX_t = \sum_{i=1}^{n} \beta_i LnEX_{t-1} + \sum_{j=1}^{n} \alpha_j GDP_{t-j} + \mu_t \quad (6')$$

The equation 3 is built to measure Granger causality running from LnCPI to GDP considering their lagged values; where as the equation 6' measuares inverse causality. Likewise, equations 4-6 are built with the same logic.

4. Results

Initially, we determine lag length of our ARDL model. Table 4 presents lag selection criteria test where clearly shown that LR, FPE and AIC indicate the optimal lag of 1, whereas SC and HQ depict 0 lags as optimal. According to Brooks (2014), when there are dissidences in the findings, one needs to consider the number of observations. If the number of observations is small, then AIC should be considered and when the number of observations is large, then SC should be used. Given that the study considered 52 observations, AIC is the preferred measure.

Table 4. ARDL Lag Length Selection Test

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-101.13	NA	5.91	4.61	4.81*	4.69*
1	-100.01	1.95*	5.89*	4.61*	4.85	4.7
2	-99.68	0.57	6.07	4.64	4.92	4.74
3	-99.48	0.33	6.29	4.67	4.99	4.79

After determining lags length of our model, we run ARDL test and compare F-statistics of the model with critical values of I(0) and I(1). At Table 5, the F-statistic of 7.23 exceeds both I(0) and I(1) bounds at 1% statistical significance level. This suggests the presence of a strong long-run relationship between the dependent and independent variables.

Table 5. ARDL Bound Test

F-Statistic	Significance	I(0) Bound	I(1) Bound
6.02	10%	2.2	3.09
	5%	2.56	3.49
	2.50%	2.88	3.87
	1%	3.29	4.37

The ARDL test gives short-run and long-run models. In table 6, the short-run relationship illustrates the effect the chosen variables have on gross domestic product in South Africa. The error correction term (ECM) given by CE(-1) is negative and significant and therefore suggests co-integration among variables in the study. More specifically, the coefficient value is given to be -0.90 and indicates that approximately 90% of previous years' disequilibrium is corrected in the current year. Hence, ECM adjusts quickly to changes in the long run. The long-run relationship demonstrates the effect of the given macroeconomic variables on GDP. It is evident from the table that inflation, long-term interest rate and money supply have a negative and significant effect on GDP. This suggests that if inflation, long-term interest rate and money supply increase by 1%, GDP will decrease by 0.06, 0.12 and 0.25, respectively. Real effective exchange rate has a positive and insignificant effect on GDP. That being, for a one unit increase in real effective exchange rate, the GDP will increase by 0.45.

Table 6. Error Correction Model (Short-run ARDL Model)

Variable	Coefficient	t-statistic	Prob.
ΔLnCPI	-0.314**	-2.39	0.02
ΔLnINT	-0.11	-0.54	0.60
ΔLnMS	15.84***	2.84	0.00
ΔLnEX	0.04	1.31	0.20
CE(-1)	-0.90***	-6.30	0.00
intercept	6.70***	1.30	0.00

Note: The ***, **, and * implies significance levels at 1%, 5%, and 10% respectively.

Table 7. Long-run ARDL Model

Variable	Coefficient	t-statistic	Prob.
LnCPI	-0.06***	-4.48	0.00
LnINT	-0.12***	-2.83	0.01
LnMS	-0.25***	-3.11	0.00
LnEX	0.45	1.13	0.90
intercept	4.45***	3.24	0.00

Note: The ***, **, and * implies significance levels at 1%, 5%, and 10% respectively.

For robustness of our ARDL model, we run various diagnostics test and present their results at table 8. The results confirm robustness of our model with no presence of serial correlation and heteroskedasticity issues in residuals of ARDL equation.

Table 8. Diagnostics Tests for ARDL Model

Tests	Statistics	Value	Prob.
Normality Test	Jarque-Bera	0.63	0.82
Serial Correlation LM Test	F-Statistics	0.30	0.57
Heteroskedasticity Test	F-Statistics	0.70	0.70

Additionally, we assess the model's stability using the CUSUM test, which monitors changes in the cumulative sum of recursive residuals over time. Figure 1, it is evident in Figure 1 that the CUSM test (blue line) lies within the two 5% significance level (red dotted line). Thus, the model is stable and not spurious.

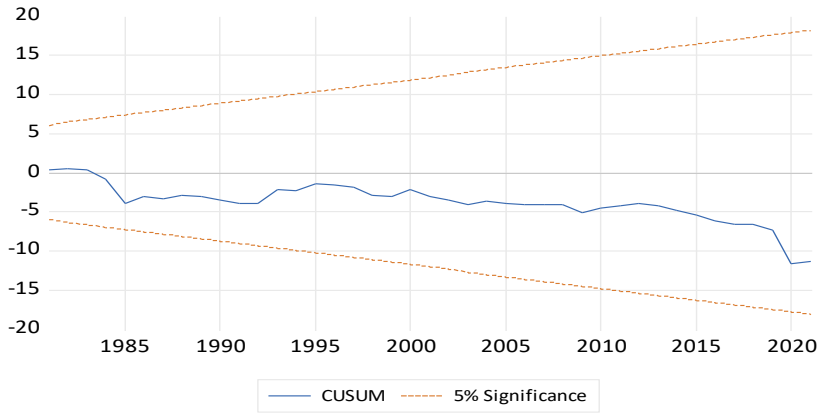

Figure 1. Cumulative Sum (CUSUM) Test

Lastly, we employ Granger causality test in order to further checks on potential bidirectional relationships. Table 7 shows results of Granger causality test where it reveals that there is a unidirectional relationship between inflation and GDP at a 1% significance level, indicating that causality runs from inflation to GDP. This suggests that changes in inflation significantly impact GDP, but not the reverse. Secondly, a unidirectional relationship is also observed between the interest rate and GDP at a 5% significance level, with causality running from the interest rate to GDP. This indicates that fluctuations in interest rates influence GDP, while GDP does not significantly affect interest rates.

Additionally, the results highlight a bidirectional relationship between money supply and GDP. Causality runs from money supply to GDP at a 1% significance level, and from GDP to money supply at a 5% significance level. This bidirectional causality implies that changes in money supply significantly affect GDP, and changes in GDP also significantly influence the money supply, though with varying levels of statistical significance. These findings underscore the dynamic interactions between these economic variables and their critical roles in influencing each other within the economy.

Table 9. Granger Causality Test

Granger relationship	F-Statistic	Prob
LnCPI does not Granger cause GDP	13.30***	0.00
GDP does not Granger cause LnCPI	0.66	0.42
LnINT does not Granger cause GDP	10.38**	0.03
GDP does not Granger cause LnINT	0.00	0.97
LnMS does not Granger cause GDP	12.75***	0.00
GDP does not Granger cause LnMS	11.75**	0.03
LnEX does not Granger cause GDP	0.02	0.89
GDP does not Granger cause LnEX	0.34	0.56

5. Discussion

The ARDL long-run evidence for the focal variable (inflation rate) suggests a negative significant relationship with economic growth. This is in line with studies conducted by Mohseni and Kouzaryan (2016), Gatawa, Abdulgafar and Olarinde (2017), Karahan and Colak (2020), and Moodley (2020). The results suggest that inflation has a detrimental effect on economic growth in the long run. The results

are supported by the findings of the Granger causality tests, such that a unidirectional relationship was found between inflation and economic growth. This is due to inflation reducing the purchasing power of money, which results in reduced investments. The increased investments could have been channelled into economic growth but the degrading of the purchasing power of money does not allow for such channelling. The findings nullify the monetarist views and studies conducted by Chude and Chude (2015), Enejoh and Tsauni (2017), and Anidiobu, Okolie and Oleka (2018).

The long-term interest rate variable depicted a negative significant relationship with economic growth in the long-run. The findings are supported by those of Pradhan, Arvin and Ghoshray (2015), Arshad, Zakaria and Junyang (2016), and Adegoke, Azeez, Ogiamien and Osasona (2021). Moreover, the Granger causality test confirmed the findings, such that a unidirectional relationship is seen between long-term interest rate and economic growth. The hypothesised relationship is confirmed by the findings and in line with the theoretical justifications. However, the negative significant relationship found between money supply and economic growth is contrary to the hypothesised relationship but supported by the Granger causality tests. The findings suggest that as the flow of money increases in circulation there will be a negative effect on financial resources in the economy, which reduces economic growth. The findings of the ARDL long-run model and Granger causality tests indicate that no significant relationship exists between real effective exchange rate and economic growth. The findings are supported by the prior hypothesised relationship and a study conducted by Iamsiraroj (2016).

6. Conclusion

This study examines impact of inflation on economic growth in South Africa over 1970-2021. The findings demonstrate that inflation is one of the selected variables that have a detrimental effect on the economic growth of South Africa. Thus, South African Reserve Bank attempts to mitigate these effects by imposing inflation targeting has not yielded positive long-run results. The study further reveals that long-term interest rates and money supply have a significant negative relationship with South African economic growth, whereas the real effective exchange rate has no significant effect.

The Granger causality test indicates a bidirectional relationship between South African economic growth and money supply. Additionally, a unidirectional relationship exists between inflation and economic growth and between long-

term interest rates and economic growth. However, there is no causal relationship between the real effective exchange rate and economic growth.

Given these findings, the study recommends that the South African Reserve Bank revisits its current inflation targeting policy, which is set at 3%–6%, and urges to reduce the target in order to stimulate economic growth in South Africa.

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