Scientific Research Publishing

Modern Economy, 2024, 15, 1112-1146
https://www.scirp.org/journal/me
ISSN Online: 2152-7261
ISSN Print: 2152-7245

The Impact of Monetary Policy Dynamics on Economic Growth: A Case Study of Mozambique

Ernesto Munguambe Gabriel[1], Vasco Macarringue Darcilio[2]

[1]School of Economics, Huazhong University of Science and Technology, Wuhan, China
[2]College of Public Admnistration, Huazhong University of Science and Technology, Wuhan, China
Email: gabrielelisa94@gmail.com

How to cite this paper: Gabriel, E. M., & Darcilio, V. M. (2024). The Impact of Monetary Policy Dynamics on Economic Growth: A Case Study of Mozambique. *Modern Economy, 15,* 1112-1146.
https://doi.org/10.4236/me.2024.1511058

Received: July 23, 2024
Accepted: November 18, 2024
Published: November 21, 2024

Abstract

The study explores the repercussions of monetary policy fluctuations on economic growth in Mozambique. Considering Mozambique's history of political instability and economic hardship, assessing this link is imperative. The primary aim is to analyze the relationship between real GDP and the crucial monetary policy variables: real interest rate, money supply, exchange rate, and inflation. The research incorporates annual time series data from 1981 to 2021 and utilizes the Auto Regressive Distributed Lag (ARDL) model to examine simultaneously short-run and long-run dynamics. Descriptive and inferential statistical approaches, including unit root testing and correlation analysis, ensure the dependability of the data. The ARDL bounds test and error correction model (ECM) are utilized to determine co-integration and adjustment mechanisms. The results indicate that monetary policy significantly affects economic growth in Mozambique. The money supply and exchange rate positively impact GDP, whereas the real interest rate and inflation negatively affect it. These findings underscore the vitality of effective monetary policy in promoting economic growth, offering critical insights for policymakers in developing nations.

Keywords

Monetary Policy Impact, ARDL Model Analysis, Macroeconomic Stability, Mozambique

1. Introduction

Background

Economic growth serves as a desirable goal for any economy, as it is one of the most important and comprehensively studied fields in economics. It is a simple

but very effective indicator for the evaluation and comparison of the economic performance of countries (Demir et al., 2022). It refers to the increase in the value of goods and services produced by an economy over some time, usually measured by the percentage change in real gross domestic product (GDP) or gross national product (GNP) (Rastogi, 2023). GDP is the total value of all final goods and services produced within a country in a given year, adjusted for inflation (Stobierski, 2021). The measurement of economic growth can be viewed from a nominal or real lens, but real GDP is normally used as it is a holistic reflection of changes in output rather than prices. It is a reflection of the improvement in the standard of living and welfare of people in a country.

According to the data from the International Monetary Fund (IMF), the global GDP at current prices was estimated to be 100.22 trillion U.S. dollars in 2021 and is projected to increase to 103.76 trillion U.S. dollars in 2022, and 107.48 trillion U.S. dollars in 2023. The global GDP at constant prices was estimated to be 87.26 trillion U.S. dollars in 2021, and is projected to increase to 89.94 trillion U.S. dollars in 2022, and 92.77 trillion U.S. dollars in 2023.

Since 1980, the global GDP has proven somehow relatively consistent generally fluctuating between two and five percent growth from year to year. The most notable exceptions to this were during the Great Recession in 2009, and again in 2020 during the COVID-19 pandemic when the global economy shrank in both of these years (Dyvik, 2021). The global GDP growth rate was estimated to be 6.02% in 2021, a 9.1% increase from 2020, which had a negative growth rate of -3.07%. The global GDP growth is projected to decline to 3.08% in 2022, and 3.14% in 2023 (Dyvik, 2021).

Mozambique is a relatively large Southeast African country with a population of about 33 million people, according to the national statistics office in Mozambique. The country's history is dominated by political instability, tropical cyclones and public health crises, such as the COVID-19 pandemic (2020-2022). These elements have negatively affected the country's economic growth and development, as well as its social and human indicators.

According to the World Bank, Mozambique's real gross domestic product (GDP) declined by 1.97% in 2020, due to the impact of the COVID-19 pandemic and the global economic slowdown. This reflects a sharp reversal from the 5.25% growth recorded in 2019, mainly influenced by the mining sector recovery, especially iron ore exports. The mining sector accounts for about 20% of the country's GDP and 80% of its exports (World Bank Group, 2023). However, the African Development Bank projects that Mozambique's GDP growth will increase to 3.1% in 2023 and 4.8% in 2024, driven by the mining sector and the continued recovery of agriculture, manufacturing, construction, and tourism (African Development Bank Group, 2023).

Economic growth should not be seen as an uncomplicated or unexacting experience. It depends on various factors and conditions, such as the availability and quality of natural resources, human capital, physical capital, technology, institutions,

policies, and the external environment Taha Egri et al. (2021). Moreover, the growth of an economy is not sustainably guaranteed at all times. This is so because it may entail costs and trade-offs, such as environmental degradation, inequality, social unrest, and cultural erosion (Cornwall, 1990).

Economic growth brings gains to a country and its people but on the other hand, poses a series of challenges and trade-offs. Therefore, it is of good essence to comprehend the sources, determinants, and consequences of economic growth for achieving sustainable and inclusive development.

Monetary policy strongly influences economic growth through interest rates, money supply, exchange rates, business confidence, and economic stability. One of the many means through which economic growth is affected by monetary policy is the interest rate. The term "interest rate" refers to the return or yield on equity as well as the opportunity cost of delaying the use of resources until a later time (Uchendu, 1993). Alterations in central bank or government interest rates influence economic consumption and investment; lower rates enhance spending, whereas higher rates diminish borrowing. The money supply is a critical factor in macroeconomic analysis. It does this by ensuring that economic operations in both the public and private sectors are carried out efficiently through the availability of liquidity (Omodero, 2019). Monetary policy impacts economic growth by adjusting the money supply, which increases purchasing power and aggregate demand. Conversely, it decreases purchasing power, leading to decreased aggregate demand and output. Exchange rates also play a role in this process (Squires et al., 2023). By changing the exchange rate, the central bank or the government can affect the competitiveness of domestic goods and services in international markets. A lower exchange rate makes domestic goods and services cheaper for foreigners, which increases exports and improves the trade balance, whilst a higher exchange rate makes domestic goods and services more expensive for foreigners, which decreases exports and worsens the trade balance.

The Bank of Mozambique, established in 1975, is tasked with maintaining price stability and fostering economic growth. The system functions within an inflation-targeting framework, establishing a medium-term inflation target of 5%. The BOM employs multiple instruments to oversee liquidity and mitigate exchange rate fluctuations. Nonetheless, it encounters obstacles including insufficient institutional constraints, limited access to information, significant financial dominance, underdeveloped financial markets, extensive dollarization, victims, and external interference. Monetary policies play a vital role in economic growth; however, empirical methods to assess their impact on Mozambique's economic development are limited. This study evaluates the effect of monetary policy on economic growth, focusing on Mozambique as a case study. It employs empirical methods to deliver quantitative and objective evidence regarding the relationship between these two variables. This study advances the understanding of the contradictory effects of monetary interventions on the economic growth of Mozambique.

Studies regarding the influence of monetary policy on economic growth in Mozambique have predominantly centered on developed nations, with limited studies utilizing panel data from both developed and developing countries. The absence of empirical evidence is illustrated in the 2019 study by Younsi and Nafla, which excluded Mozambique from its sample. Tarawalie and Kargbo (2018) advocate for increased empirical research employing contemporary data and diverse methodologies. Evaluating the influence of monetary policy on the economic growth of Mozambique is essential for enhancing policy design and implementation. Mozambique encounters difficulties including depreciating exchange rates, elevated inflation, erratic production levels, increasing unemployment, and overall macroeconomic instability. This study evaluates the impact of monetary policy on economic growth in Mozambique, contributing to theoretical frameworks, empirical research, policy formulation, academic discourse, and the field of economics.

The remaining of the study is structured as follows: section two addresses the literature review, whereas the third section pertains to methodology. Section four concentrates on results and discussions, whilst section five covers empirical findings, conclusions, and policy recommendations.

2. Literature Review

Through the use of a variety of data analysis techniques, such as cross-sectional, time series, and panel data, several empirical investigations have been conducted to investigate the impact that monetary policies have on the development of the economy. These investigations have produced a wide range of outcomes and inconclusive conclusions. The influence has been evaluated using several different models, including OLS, Panel data models, VAR model, VEC Model, and ARDL Models, among others. According to the findings of the majority of investigations, there appears to be a connection between monetary policy and economic expansion. In order to experience a clear insight into the impact of monetary policy on economic growth, a list of empirical pieces of literature is documented.

3. Theoretical Literature Review

3.1. The Taylor Rule and Monetary Policy

The Taylor rule is a rule invented by American economist John B. Taylor in 1992. This rule has been used by a variety of academics and policymakers as a benchmark for monetary policy. It suggests how central banks should change interest rates to account for inflation and output (GDP) (Taylor, 1993).

As a rule, it implies that the central bank is mandated to raise the interest rate when inflation is above its target or when output is above its potential. Also, it is deemed necessary to lower the interest rate when inflation is below its target or output is below its potential. In the event of inflation being on target and output at its potential, the interest rate is deemed to be neutral. The rule also contains a degree of responsiveness to inflation and output deviations by using 0.5 to multiply

them. The rule can be modified by changing the values of these parameters or by adding other factors, such as the exchange rate or the output gap. The rule is background on the following formula:

$$I = R^* + PI + 0.5\left(PI - PI^*\right) + 0.5\left(Y - Y^*\right)$$

where:

I = Nominal rate;

R^* = Real rate (usually 2%);

PI = Rate of inflation;

PI^* = Target inflation rate;

Y = Logarithm of real output;

Y^* = Logarithm of potential output.

In the early 1990s, the rational expectation theory was popular and Taylor also operated under its assumptions. The theory assumes that future interests are determined based on rational expectations by the Federal Reserve. This proposed model is considered to be somehow looking backward. It justifies that interest rate needs no adjustment if a positive expectation of the economy emanates from individuals, consumers, and firms. Taylor detected and confirmed that not only is the model backward-looking but also ignores long-term economic prospects. It is against this backdrop that the Taylor rule was invented. The Taylor rule has been influential in the transformation of monetary policy since its inception. It has served in the capacity of gauging interest rates, output levels, inflation, and money supply levels. It has provided a simple and transparent framework for evaluating and communicating monetary policy decisions. It has also helped to improve the performance and credibility of monetary policy by reducing the discretion and uncertainty of central bankers. The rule has been applied and tested in various countries and regions, such as the United States, the Eurozone, Japan, and China. The rule has also inspired a large body of literature that explores its theoretical foundations, empirical validity, and policy implications.

For inflation, the rule recommends that the interest rate be 1.5 times. This is a result of assuming an equilibrium rate that incorporates a real inflation rate as against the inflation rate to be expected. In Taylor's view, this equilibrium is termed a 2% steady state. Applying a moving average serves the purpose of appropriately gauging inflation and price levels. In Taylor's view, output is considered to be real GDP. This model aims to stabilize the economy and inflation in the short and long run respectively.

3.2. The Classical Model

Classical economists advocated for a strategic economic approach that emphasized limited roles for public authority and reliance on the market's self-regulating ability. Their emphasis was on fundamental public goods and mechanisms, thereby removing the necessity for fiscal policy to manage the economy. Smith advocated for a family financial strategy characterized by restricted spending and borrowing

solely in emergency situations.

The classical economists whose thoughts and convictions are the reason for the neo-traditional way of dealing with public strategy had unfaltering confidence in the ability of the market to create proficient results to the extent that the use and designation of useful assets are concerned. While fluctuations in economic activity were not ruled out, they would be tended to by the powers of self-remedy enacted by the actual economy. Accordingly, legislatures' endeavor to mediate would add up to infusing the wellsprings of unsteadiness. Fiscal profligacy was considered to be one such source of instability. This methodology, articulated by Smith Ricardo Express, precludes the chance of excess and joblessness as it accepts—rather ridiculously—wage adaptability. The model creates a "zero GNP hole" and thus no macroeconomic instability. If the economy at any point encounters joblessness or excess, it would be a momentary peculiarity as the self-correcting mechanism would become activated (Malthus, among the classical economists, though was in disagreement with this proposition about the impossibility of glut). A reasonable public financial plan was suggested because the manners in which such shortfalls would be supported would deliver mutilations in the economy. All the competitive allocations are supposed to be efficient in terms of Pareto optimality where no one, through reallocation, can be improved off without aggravating somebody. The classical model assumes that prices and wages are flexible and adjust quickly to changes in supply and demand. In this model, monetary policy does not affect real variables such as output and employment, but only affects nominal variables such as the price level and the exchange rate. The classical model implies that the central bank should focus on maintaining price stability and avoiding inflation or deflation. However, this model neglects the role of aggregate demand in influencing the short-run fluctuations of the economy, such as recessions and booms. It doesn't explain how monetary policy can affect real output and employment through the transmission mechanisms, such as the interest rates, the exchange rates, and the expectations channels. No less than two times throughout the entire existence of monetary convention the classical theory confronted serious difficulties. Each time it returned, and the people who aided its restoration came to be called "neoclassical economists" and the policy prescription "the neoclassical approach". The first time when the "marginal revolution" in the latter part of the 19th Century had consigned it to unimportance, particularly regarding the subject of significant worth (but its importance for public strategy stayed undiluted) it was Marshall who revived it through his great synthesis' and restored its relevance. The next serious challenge came in the form of the great depression of the 1930s. The self-correcting capability of the market was put to a severe test by the crises. The issue that arose was not that the market couldn't work but rather the delay engaged with the event of unevenness and its rectification by the market. It was especially critical as individuals were made to experience longer than their resilience level by the economic crises bringing about the tenet of the market economy becoming disparaged.

3.3. The Keynesian Model

Not only that the sort of full work as imagined by classical economists could never be attained by any country (at least it is not documented) there happened a serious gloom in West Europe, the UK specifically, and the USA during 1873-1897. Yet, the adequacy of classical theory in directing public strategy couldn't be effectively tested. It was during the 1920s that Keynes offered an alternate worldview of public strategy which was entirely inverse to that of the classical vision of a decent open financial plan. The contention that Keynes progressed was that shortfall spending by the public authority would raise total interest and subsequently the work level in the economy. Private investment out of the current savings was not the effective means for the reason that it would slow down the multiplier effect of investment as the determinant of the multiplier is marginal propensity to consume (mpc + mps = 1). Government spending through made cash would keep the economy developing as per the multiplier esteem. Thus, Keynes was the first to give hypothetical authenticity to shortfall financial plans and public obligations. Indeed, even before the beginning of the downturn, Keynes was contending for shortfall-supported public attempts to raise work. "There is no reason why we should not feel ourselves free to be bold, to be open, to experiment, to take action, to try the possibilities of things."

The Keynesian model posits that prices and wages are rigid and do not adjust instantaneously in response to fluctuations in supply and demand. Monetary policy is susceptible to real variables such as output and employment, particularly in the short term. The model indicates that central banks ought to employ monetary policy to invigorate aggregate demand and rectify production gaps during recessions, while also averting overheating during economic booms. Nevertheless, it promotes a discretionary approach, which may result in policy delays, inaccuracies, ambiguity, andinconsistency.

During the Great Depression, the neoclassical paradigm was contested due to the market's failure to address demand shortage. Keynes emerged as the champion of capitalism, augmenting public expenditure in market economies such as the New Deal. The Keynesian paradigm necessitates governmental responsibilities to mitigate instability and was supplanted by the neo-classical approach in the 1970s. The latest global financial crises and recessions have reinvigorated Keynesian principles, employing substantial fiscal expenditures to salvage major financial institutions in capitalist nations.

3.4. The Monetarist Model

Milton Friedman's monetarist school posits that the Classical theory holds true insofar as money influences real variables in the short run, but only nominal magnitudes in the long run. Friedman's modern quantity theory contends that alterations in the money supply will influence the price level, provided that the demand for money remains constant. This theory asserts that when the economy functions

below full employment, an increase in the money supply will result in a temporary rise in output and employment. Friedman critiques fine-tuning and activist policies, advocating instead for an outcome-blind monetary rule that maintains a steady, non-inflationary growth rate of the money supply. He terms fiscal policy as lacking macroeconomic significance. The monetarist model advocates for a rule-based monetary policy that aims to maintain a consistent growth rate of the money supply while minimizing erratic fluctuations in both money supply and inflation.

3.5. The New Classical Model

New Classical macroeconomics is a revival of Keynes' classical orthodoxy, focusing on rational expectations and market efficiency. Pioneered by Robert Lucas, Neil Wallace, and Thomas Sargent, this model assumes that monetary policy doesn't affect real variables like output and employment. The economy is composed of actors pursuing a defined objective function, trading in well-organized markets at market clearing prices. The New Classical world is characterized by recurrent shocks and noise signals, making it "perfect" for full information and costless adjustment. The model assumes a credible monetary policy that anchors inflation expectations and avoids surprises, but doesn't account for financial intermediation and innovation.

3.6. The New Keynesian Model

The new Keynesian approach is a school of macroeconomics that emerged in the 1980s and 1990s as a reaction to the new classical approach and the rational assumption revolution. It expects to give microeconomic establishments to Keynesian economics and to make sense of the sources and consequences of price and wage rigidities in the economy. The new Keynesian approach likewise upholds the utilization of monetary and fiscal policies to stabilize the economy in the face of various shocks and frictions.

The history of the new Keynesian approach can be traced back to the works of John B. Taylor, Gregory Mankiw, Olivier Blanchard, David Romer, and others, who developed various models and extensions of the new Keynesian framework. The contribution of this model was immense and not limited to:

- The improvement of the model of the amazed agreement, which expects that various specialists change their prices and wages at different times, creating nominal rigidities and real effects of monetary policy.
- The advancement of the menu cost model, which expects that there are expenses of changing prices and wages, creating nominal rigidities and real effects of monetary policy.
- The advancement of the effectiveness wage model, which accepts that higher wages increase the efficiency and exertion of laborers, making genuine rigidities and compulsory joblessness.
- The development of the imperfect competition model, which assumes that

there are market power and markups in the goods and labor markets, creates real rigidities and inefficiencies.

- The advancement of the new Keynesian Phillips curve, which relates inflation to expected inflation and the output gap, integrates the impacts of nominal and real rigidities.
- The improvement of the new Keynesian IS curve, which relates results to expected yield and the real interest rate, consolidates the impacts of consumption smoothing, investment adjustment costs, and credit market imperfections.
- The development of the new Keynesian optimal monetary policy, which derives the optimal interest rate rule or the optimal inflation target for the central bank, takes into account the trade-off between inflation and output stabilization.

The analysis of the new Keynesian methodology comes according to different viewpoints, like the new classical, the post-Keynesian, and the heterodox economics. These analyses purport criticism of the Keynesian model. It misjudges the job of reasonable assumptions and micro-foundations in macroeconomics, neglecting the role of vulnerability, limited objectivity, and institutional variables.

3.7. Endogenous Growth Perspective

In recent years, economists have developed new models of endogenous economic growth that consider policy influences on growth and divergent outcomes among countries. These models deal with such issues as growth, the operation of financial markets, trade policy, government expenditures, and taxation (Renelt, 1991). Endogenous growth theory maintains that economic growth is primarily the result of internal forces, rather than external ones (Liberto, 2023). It studies how internal factors, such as human capital, innovation, and investment, can affect the long-term growth of an economy. This theory asserts that monetary policy can have real effects on economic growth by influencing the incentives and constraints faced by economic agents. For example, inflation can reduce the real return on savings and investment, while credit expansion can stimulate the demand for capital goods and infrastructure. However, the effects of monetary policy on economic growth are not clear-cut and depend on the assumptions and specifications of the models.

Economic growth theory serves as an alternative to the neoclassical theory. This theory questions the wealth gap persistence between developed and developing countries if investment in physical capital is contingent on diminishing returns. Technological change is believed to be not just an exogenous byproduct of independent scientific developments. Government policies, including investment in R&D and intellectual property laws, helped foster endogenous innovation and fuel persistent economic growth.

3.8. Monetary Policy Transmission Mechanisms

The transmission mechanism of monetary policy explains how monetary policy

works—which variables respond to interest rate changes, when, why, how, how much, and how predictably. This broadens the issue of what monetary policy can do and what it should do to offset the effects of disturbances on inflation (Von Peter, 2009). Understanding the monetary policy transmission mechanisms is essential for planning and executing effective and credible monetary policy.

The historical backdrop of monetary policy transmission mechanisms can be followed back to those crafted by John Maynard Keynes, Milton Friedman, and others, who proposed various hypotheses and models of how monetary policy influences the economy. Traditionally, the monetary policy literature has distinguished between four different transmission channels (Mishkin, 1995)—the interest rate channel, the exchange rate channel, the asset price channel, and the credit channel.

The interest rate channel symbolizes the direct mechanism by which central bank actions influence macroeconomic indicators. It posits that monetary policy influences the economy through alterations in the nominal interest rate, which subsequently impacts the real interest rate, borrowing costs, and the opportunity cost of holding money. A decrease in real interest rates encourages consumption and investment, resulting in increased aggregate demand and output. The exchange rate channel influences the relative prices of domestic and foreign goods. Monetary contractions generally lead to an appreciation of the home currency, which in turn decreases net exports and aggregate demand.

Monetary contraction reduces firms' net worth (Gertler et al., 2007). This enables borrowers to use collateral to obtain loans. As a result, firms are motivated to be involved in investment strategies not in the interest of lenders. However, lenders will now raise the cost of lending to offset this risk. The credit channel assumes that monetary policy affects the economy by changing the availability and cost of credit, especially for borrowers who are constrained by collateral or information problems. A lower (higher) interest rate increases (decreases) the supply of credit and reduces (increases) the external finance premium, leading to higher (lower) consumption and investment.

Critics of monetary policy transmission mechanisms contend that they are characterized by instability and unpredictability, influenced by factors such as the structure of the financial system, the openness of the economy, the magnitude of shocks, and the behaviour of economic agents, which ultimately impact their stability and predictability.

4. Empirical Literature Review

Numerous emerging nations lack robust institutions and fundamental financial structures, resulting in a correlation between monetary policy and economic growth. Shirai (2018) examined Japan's quantitative and qualitative monetary easing, pinpointing elements that attenuate its impact on the economy. Aizenman, Chinn, and Ito (2017) observed that economies exhibiting enhanced exchange rate stability and financial transparency are more inclined to cultivate outstanding

links with prominent financial centers. Nonetheless, empirical data regarding the correlation between monetary policy and economic growth is inconsistent and contextually sensitive, with certain research indicating positive impacts and others revealing negative effects.

A thorough review of the empirical literature confirms that some studies found little or no impact of monetary policy on economic growth. The Granger causality test was utilized in Starr's (2005) investigation of the connections between variables related to monetary policy and the dynamics of both production and price levels during the period following stabilization in the fundamental CIS nations (Russia, Ukraine, Kazakhstan, and Belarus). The data for this investigation was collected on a quarterly basis from 1995 to 2003. With the exception of the important observation that interest rates exert a significant influence on production in Russia, the findings of the inquiry revealed very little evidence on the tangible impacts of monetary policy in the four essential countries that make up the Commonwealth of Independent States (CIS). Uhlig's research, which revealed that restrictive monetary policy shocks do not have a discernible impact on the real GDP in the United States, was incorporated into the findings, which incorporated aspects from that research. In their 2023 study, Omar and Yousri looked at how symmetric and asymmetric monetary policies affected inflation and output in Egypt. They obtained quarterly data covering the period from 2007Q3 to 2019Q3, and they used the interest rate as the monetary policy instrument. Automatic Regressive Distributed Lag (ARDL) models, both linear and non-linear, are utilized. There is evidence of asymmetric impacts on inflation, but not on output, even if both macroeconomic variables are significantly affected in the long run. In a similar vein, Onwuasoeze et al. (2023) analyze the expansion of Nigeria's informal economy and the impact of monetary policy tools on GDP growth from 1991 to 2020. To investigate the link between the CBN's monetary policies and the informal sector, the study used the results of an ADF unit root test, an OLS-based Auto Regressive distributed Lag, and a Granger causality test. A negative and statistically significant effect of the interest rate on short-term economic growth in Nigeria was demonstrated by the empirical results. Over the long term, there was a negative correlation between GDP and money supply. With time-series data spanning 1997-2010, Mutuku (2015) aimed to use the recursive vector autoregressive (VAR) method to illustrate how fiscal and monetary policy shocks affected Kenya's economic growth. They came to the conclusion that monetary policy tools like short-term interest rates and money supply have little to no effect on actual output. Also, another VAR analysis by Kamaan and Nyamongo (2014) confirmed that monetary policy has no bearing on economic growth in Kenya. Lashkary and Kashani (2011) revealed the same thing when they looked at Iranian time series data from 1959 to 2008; they also didn't find any evidence of a connection between the money supply, economic growth, salaries, or real economic indicators.

Monetary policy significantly influences economic growth, as demonstrated by

several research. Duskobilov's (2017) analysis indicated that monetary policy instruments have a beneficial effect on Uzbekistan's economy, however Rafiq and Mallick's 2008 research demonstrated that the effects of monetary policy innovations are most significant in Germany. The 2013 study by Fasanya et al. identified a significant correlation among variables, highlighting the critical roles of inflation rate, exchange rate, and external reserves as essential monetary policy instruments influencing economic growth in Nigeria. Bello et al.'s 2024 study analyzed the impact of monetary policy on the economic development of African nations utilizing data from the World Bank. The results demonstrated that economic growth relies on variables including interest rates, money supply, exchange rates, and monetary policy rates. Dauda and Abdul Kareem's 2023 research revealed that monetary policy significantly influences GDP growth in Nigeria. Ogboghro's 2023 study analyzed the relationship between domestic debt and economic growth in Nigeria and Ghana, revealing that different government debt forms positively impact GDP. Aliu (2022) examined the effectiveness of monetary policy in fostering economic growth in Nigeria, concluding that interest rates and reserve requirements substantially influence long-term economic growth. Malaysia's monetary policy exhibited a positive association with economic growth, demonstrating a clear relationship between inflation and economic growth. Nouri and Samimi (2011) identified a favorable and statistically significant correlation between Iran's monetary policy and economic development. Rahman et al. (2019) discovered that Bangladesh's monetary policy has a substantial impact on the nation's economic growth. The expansion of the UK economy is impacted by monetary policy, which is determined by the money supply. Monetary policy exhibits an adverse correlation with economic growth. Research indicates that interest rates substantially influence economic growth over time, thereby hindering economic advancement and exacerbating inflationary pressures. Currency exchange rates exert a minor adverse effect on economic growth. Dele (2007) determined that monetary policy restricted economic growth in the countries in the West African Monetary Zone, resulting in stagnation. Berument and Dincer (2008) discovered that a company's monetary policy exerted a short-term adverse effect on output, resulting in a substantial decline over a three-month period. Nweke (2023) discovered no significant adverse effect on economic growth from the monetary policy rate, reserve requirement, Treasury bill rate, and fiscal deficit. Ivrendi and Yildirim (2013) discovered that tight monetary policy adversely impacted inflation and growth dependent on interest rates. Ayodeji and Oluwole's extensive model evaluated the effect of monetary policy on Nigeria's economic growth, revealing that money supply and exchange rate exerted a positive but comparatively negligible influence. Precious and Makheta-Kosi (2014) determined that money supply, repo rate, and exchange rate do not fundamentally drive economic growth, whereas inflation rate exerts a strong positive influence.

The study examines the influence of monetary policy on economic growth in Nigeria, utilizing interest rate factors. Abubakar and Lawal (2022) determined that

interest rates and domestic credit substantially affect economic growth, although the exchange rate does not. Miftahu Idris (2020) identified a negative link between economic growth and interest and currency rates. Michael et al. (2020) discovered that the expansion of broad money had a positive impact on inflation, while adversely influencing economic growth. Aliyev et al. (2020) discovered that the monetary base and exchange rate positively influence economic growth in Azerbaijan, however the discount rate exerts little impact. Islam et al. (2021) identified a sustained relationship between monetary policy and GDP growth in the UK and Bangladesh, indicating that an increase in the money supply enhances economic growth. Mugableh (2019) determined that the money supply and real interest rate facilitate economic growth in both the short and long term, with the exception of inflation. Ufoeze et al. (2018) discovered that the money supply promotes economic growth, whereas interest rates, the monetary policy rate, and investment exert no significant influence.

Since most studies have focused on monetary policy in developed nations, there are a lot of unknowns when it comes to using it to stabilize the economy in sub-Saharan Africa. Research on inflation in sub-Saharan Africa has been extensive (e.g., Barnichon & Peiris, 2007), but the pros and cons of different monetary policy frameworks for low-income nations in this region have received far less attention. Few insights into the conduct of monetary policy in low-income countries are provided by the extensive literature on the science of monetary policy, which primarily focuses on industrial countries and advanced emerging markets (Clarida, Galí, & Gertler, 1999). This is due to the fact that low-income countries have entirely different economies and monetary policy settings.

No research has yet attempted to implement a unified framework in Mozambique to examine the implications of the various monetary approaches utilized in the investigations. This chapter employ real GDP as a metric of economic growth to analyze data from Mozambique through an autoregressive distributed lag (ARDL) model, whilst assessing the trade-offs of monetary policy within this context. This constitutes the first endeavor to estimate an ARDL model for Mozambique, along with a causality analysis aimed at evaluating the overall causation between the dependent and independent variables. The research attempts to establish a fundamental ARDL model for the examination of macroeconomic policies, including the characteristics of low-income nations and sub-Saharan Africa.

5. Methodology

5.1. Data Sources

The study leverages secondary quantitative data, concentrating on four independent variables: real exchange rate, real interest rate, inflation rate, and broad money supply. Annual time series data for these variables have been gathered for the period from 1981 to 2021. The dependent variable in this research is the real gross domestic product (GDP). The selection of these particular factors is influenced by the literature, particularly the research of Hameed and Amen (2011), furthermore

the accessibility of trustworthy data. The data for these variables have been gathered from two prominent databases: the World Development Indicators and the World Economic Outlook. The extensive and longitudinal characteristics of the data promise a thorough study of the interactions between the independent and dependent variables, yielding significant insights into the economic processes being studied.

5.2. Data Analysis

For a comprehensive data analysis, the study uses both descriptive and inferential statistical approaches. Descriptive statistics are utilized to encapsulate and delineate the primary characteristics and trends of the dataset, offering metrics of central tendency (mean, median) and metrics of variability (standard deviation, variance). These statistical tools enhance the comprehension of data distribution and dispersion, providing a concise overview of the essential aspects of each variable examined.

The study incorporates inferential statistical techniques alongside descriptive statistics to derive conclusions and generalizations about the population from the sample data. A principal inferential method employed is the computation of the correlation coefficient, which quantifies the strength and direction of the linear relationship between the independent variables (real exchange rate, real interest rate, inflation rate, and broad money supply) and the dependent variable (real GDP). The study leverages statistical approaches to reveal significant linkages and patterns, enhancing the understanding of economic dynamics throughout the defined period.

5.3. Model Specification

In this study, the dependent variable is real GDP whilst the independent variables are real interest rate, broad money supply, exchange rate, and inflation rate. The result of the unit root test confirms the use of the Auto Regressive Distributed Lag (ARDL) model to determine if there is a long-run relationship that exists in the model. For this study, the variables were stationary at levels and first difference which satisfies the criterion for ARDL model use. Hashem and Yongcheol (1998) developed this model. This model is advantageous because it simultaneously estimates both the short and long-run effect by forming an Error Correction Model (ECM) from the existing ARDL model without the fear of a loss of any long-term information. The order of integration problem doesn't affect the ARDL approach as it does for the Johansen likelihood approach. The co-integration approach by Johansen (1991) and Johansen & Juselius (1990) requires that variables be of the same order of integration {i.e., $I(1)$ or $I(0)$}. Hence, the ARDL approach enjoys the advantage of flexibility in that it can be applied irrespective of the order of integration of the variables i.e., mixed at $I(1)$ and $I(0)$. Furthermore, Banerjee et al. (1993) show that the ARDL approach to co-integration is efficient when carrying out co-integration in small samples and that it is more effective than other

VAR methods. The models' linear specification is depicted to be:

$$\ln \mathrm{RGDP}_t = \beta_0 + \beta_1 \mathrm{RIR}_t + \beta_2 \mathrm{M3}_t + \beta_3 \mathrm{REXC}_t + \beta_4 \mathrm{INF}_t + \mu_t$$

where:

$\ln \mathrm{RGDP}_t$ = log of real GDP;

β_0 = intercept term;

RIR_t = real interest rate;

$\mathrm{M3}_t$ = money supply;

REXC_t = real exchange rate;

INF_t = inflation rate;

μ_t = error term;

t = time;

β_i = estimated parameters ($i = 1, 2, 3, 4$).

When testing for the existence of long-run relationship, an ARDL model is employed for this study. The null hypothesis of no co-integration will also be tested by restricting the lagged level variables equal to zero (i.e., $\beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = \beta_6 = \beta_7 = \beta_8 = 0$) against the alternative hypothesis that $\beta_1 \neq \beta_2 \neq \beta_3 \neq \beta_4 \neq \beta_5 \neq \beta_6 \neq \beta_7 \neq \beta_8 \neq 0$. The bounds test that affirms the existence of a long-run relationship among variables will provide two asymptotic critical value bounds (Shahbaz et al., 2018). The lower bound assumes variables are $I(0)$ whilst the upper bound assumes $I(1)$ variables. The null hypothesis of no co-integration is rejected if the computed F-statistic is greater than the upper and lower critical value bound at a 1% significance level; otherwise, the null hypothesis is not rejected. If the value of the F-statistic falls between the upper and lower critical value bound at a significance level of 1%, then it seems inconclusive (Kapaya, 2020). The framework of the model shows:

$$\begin{aligned}\ln \mathrm{RGDP}_t = {} & \alpha_0 + \sum_{i=1}^{p} \alpha_1 \Delta \mathrm{RIR}_{t-i} + \sum_{i=1}^{q} \alpha_2 \Delta \mathrm{M3}_{t-i} + \sum_{i=1}^{r} \alpha_3 \Delta \mathrm{REXC}_{t-i} \\ & + \sum_{i=1}^{s} \alpha_4 \Delta \mathrm{INF}_{t-i} + \beta_1 Y_{t-j} + \beta_2 \mathrm{RIR}_{t-j} + \beta_3 \mathrm{M3}_{t-j} + \beta_4 \mathrm{REXC}_{t-j} \\ & + \beta_5 \mathrm{INF}_{t-j} + \mu_t\end{aligned}$$

where:

Δ = difference operator;

i's and j's = lags;

β and α = estimated coefficients.

Once the criteria for the cointegration relationship exist, the error correction estimate of the ARDL model is represented as:

$$\begin{aligned}\ln \mathrm{RGDP}_t = {} & \alpha_0 + \sum_{i=1}^{p} \alpha_1 \Delta \mathrm{RIR}_{t-i} + \sum_{i=1}^{q} \alpha_2 \Delta \mathrm{M3}_{t-i} + \sum_{i=1}^{r} \alpha_3 \Delta \mathrm{REXC}_{t-i} \\ & + \sum_{i=1}^{s} \alpha_4 \Delta \mathrm{INF}_{t-i} + \delta \mathrm{ECT}_{t-1} \mu_t\end{aligned}$$

where:

α_i's = the short run coefficients;

δ_i's = the coefficient of the error correction term.

Estimation Methods

The study utilizes the EViews12 software package. This study uses the unit root test to provide information about the stationary level of the variables through the Augmented Dickey-Fuller (ADF) (Dickey & Fuller, 1979) and Philips-Perron (PP) (Perron, 1988) tests. Variables are stationary at either level $I(0)$, the first difference $I(1)$, or the second difference $I(2)$. For a proper estimation of the model, it is required that we obtain the optimal lag length criteria of the model. From a list of given criteria, the Akaike Information Criterion (AIC) and the Schwarz Information Criterion (SIC) are the standards for the selection of lag length (Ozcicek & McMillin, 1999).

The time series analysis of the impact of monetary policies on economic growth in Mozambique follows the technique of co-integration, which is employed to estimate the long-run impact of monetary policies on economic growth; accompanied by an error correction model representation which provides estimates for the short-run and the adjustment term once co-integration is found to exist. To determine the existence of a long-run relationship or not between the dependent and independent variables, we perform a co-integration test using the ARDL F-bounds test introduced by Pesaran et al. (2001). The Granger causality test is employed to determine the causality direction among the variables that we used in this study.

It is important to diagnose the residuals of this time series model. We conduct a diagnostic test to ensure that the model does not suffer from serial correlation, heteroskedasticity, and normality problems. These standards render the model valid. For normality problems, the study employs, Jarque-Bera Test. The Breusch-Godfrey serial correlation LM test for autocorrelation, and Breusch-Pagan-Godfrey (BPG) test for heteroscedasticity. For the residuals of a model to be considered normally distributed, the P-value of the Jarque-Bera Test should be above 0.05. The cumulative sum (CUSUM) test and the CUSUM of squares test will ensure the structural stability of the regression coefficients. When the cumulative sum for each test is found between the 5% critical lines, the parameter of the model is structurally stable. For the robustness checks, a co-integration regression model is used with the following methods: fully-modified OLS (FMOLS), dynamic OLS (DOLS), and canonical cointegrating regression (CCR).

6. Results and Discussions

6.1. Descriptive Statistics

To give a fair description of the link between the exogenous variables and economic growth, it is salient to present the summary statistics for the period 1981 to 2021. The summary statistics for the total sample are presented in **Table 1**. Based on these statistics, it is clear that real GDP growth (RGDP) averaged 5.98%, and money supply (LNM2) growth averaged 36.06%. However, the real interest rate (RIR) averaged 12.73%. Inflation (LNCPI) grew by an average of 6.14% and the real exchange rate, measured as LNREXR, increased by an average of 37.97%. The kurtosis of the variables is leptokurtic, meaning that they are positive and have

higher values than the sample mean. All the variables mirror a normal skewness which means that their distributions are symmetric around their mean, except for negative GDP.

Table 1. Descriptive statistics.

	GDP	RIR	MS	REER	INF
Mean	5.979084	12.73297	36.06799	37.96649	6.137716
Median	6.679729	13.02345	34.42449	29.0676	5.794265
Maximum	12.85168	20.31052	59.02527	69.465	14.78207
Minimum	−1.219523	6.651057	17.59868	15.22725	1.085871
Std. Dev.	3.196068	3.747042	13.90326	18.3221	3.537452
Skewness	−0.281108	0.075917	0.108192	0.668882	0.711956
Kurtosis	3.036089	2.439341	1.538112	1.730963	2.954388
Jarque-Bera	0.304165	0.323334	2.092941	3.258399	1.945038
Probability	0.858918	0.850725	0.351175	0.196086	0.378129
Sum	137.5189	292.8583	829.5639	873.2294	141.1675
Sum. Sq. Dev.	224.7267	308.887	4252.615	7385.388	275.2984
Obs	40	40	40	40	40

Source: author's computation (EViews 12).

6.2. Trends in Macroeconomic Variables

To date, Mozambique has experienced a combination of different development trajectories, particularly in the macroeconomic sector. This has led to the implementation of various monetary policies whose impacts have proven to be unpredictable. The fluctuating outcome of these variables is discussed further.

6.3. Gross Domestic Product

The inability to achieve steady economic growth is one of the most significant constraints that the economy struggles with. The country's economic growth rates have been irregular ever since. There have been times of great growth in the region throughout the 1960s and 1970s, and periods of poor growth during the 1980s and 1990s. Immediately following its attainment of independence, the nation demonstrated encouraging possibilities for economic growth. An average of four percent growth was seen in the economy during the first ten years after the country gained its independence. During this period, productive mining and agricultural production, low levels of inflation, and a reasonably stable exchange rate were its defining characteristics. Between the years 1970 and 1979, the nation was confronted with its first oil crisis. Despite this, the economy was able to keep its average growth rate at 3.7 percent during the year. During this period, however, inflation began to become more noticeable. It is important to highlight that the nation has managed to keep both its foreign reserve position and its exchange rate constant. A

decrease in growth rates, with an average of 0.20 percent, was observed in the later part of the decade.

The expansion of the monetary supply slowed down in the first quarter of 2008 as a result of a decrease in net foreign assets, whilst the growth in output in 2008 was estimated to be approximately six percent. Following the worldwide financial meltdown that occurred in 2007, the consequences of this event had a significant impact on the overall performance of the macroeconomic system in the years that followed. When compared to the growth rate of 6.8 percent in 2008, the real GDP growth rate in 2009 was only 5.93 percent. Despite this, the foundations of the macroeconomic system underwent a considerable improvement between the years 2011 and 2014, with the country reaching its highest growth rate and the lowest inflation rate during this period. Notably, the real GDP was determined to be 15.2 percent. Figure 1 reveals that the country achieved a GDP growth rate of 7.7 percent in the first half of 2014, which then dropped to 7.39 percent in 2015. This declines continuous until 2019, and even became worse in 2020 as the GDP records a negative position. The situation was encouraging in 2021 and 2022 as the GDP recovered from a negative to a positive position.

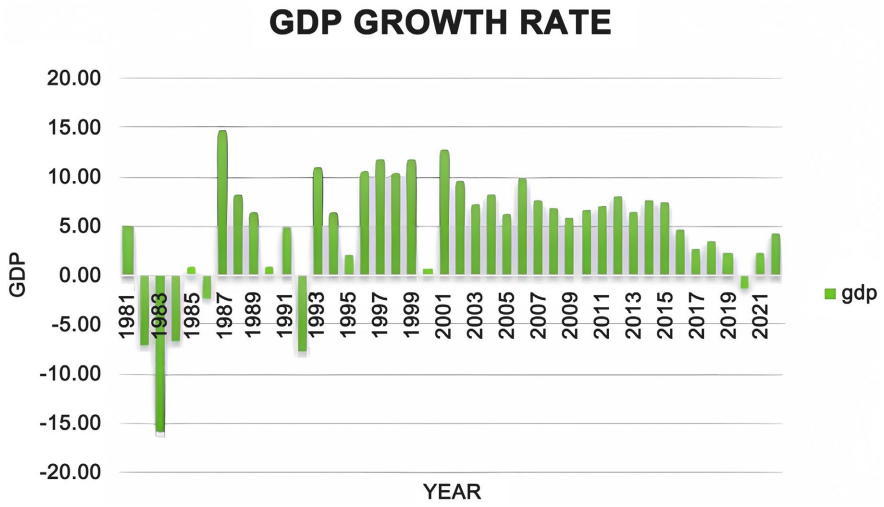

Figure 1. Real GDP growth rates. Source: author's visualization.

6.4. Money Supply

The increase in narrow money reached its highest point of 88.40 percent in 1987, having risen from 11.7 percent during the 1970-1975 fiscal year to 20.66 percent during the 1976-1979 fiscal year. Beginning with a growth rate of 12.7 percent in 1970-1975, the growth rate of broad money increased to 23.79 percent in 1976-1979, and it reached 28.34 percent in 1980-1985. The expansion of narrow money was 30.45 percent between the years 1986 and 1990, 24.98 percent between 1991 and 1995, 25.02 percent between 1996 and 2000, and 22.1 percent between 1996 and 2009. The rates of increase for broad money were 70.91 percent in the years 1986-1990, 56.05 percent in the years 1991-1995, and 26.19 percent in the years 1996-2000, respectively. The expansion of broad money reached 21.12 percent

by the year 2007. In 2008, it decreased by 1.18 percent, reaching a total of 20.30 percent. Thereafter, it increased to 29.35 percent in 2012, having previously reached 7.79 percent in 2011. According to the International Monetary Fund (IMF), the monetary policy was supportive from 2016 through 2018, with broad money expanding to 8.22 percent in 2018, which is an increase from 5.09 percent in 2017. Figure 2 shows the graphical trend in broad money as a percentage of RGDP.

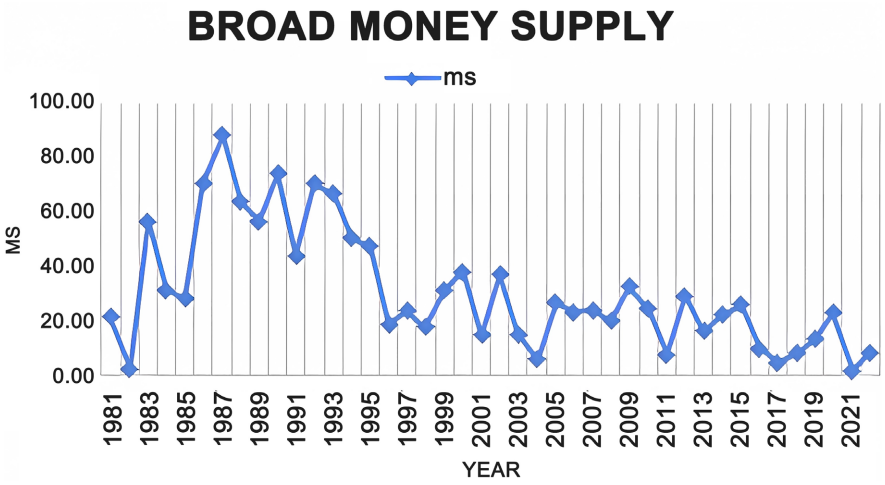

Figure 2. Broad money supply as a percentage of RGDP. Source: author's visualization.

6.5. Inflation Rate

The rate of inflation went from being relatively modest to being in the double digits by the middle of the 1970s. This occurred during the early 1970s when it underwent a major increase. The average inflation rate for the years 1970 to 1975 was 8.44 percent, which was higher than the mark of 5 percent. This was because the inflation numbers for 1974 and 1975 were significantly higher than others. Following that, inflation skyrocketed from an average of 8.44 percent during the years 1970-1975 to 14.4 percent during the years 1976-1979, and then it continued to rise until it reached a mean of 39.66 percent during the years 1980-1985. Inflation dropped from 110.90 percent in 1991 to 102.70 percent in 1992 as a result of the implementation of the structural adjustment program. However, it continued to fluctuate between 22 percent and 24 percent from 1994 to 1995, indicating a fall in comparison to the preceding decade. The rate of inflation went from 26.76 percent during the period from 1996 to 2000 to 4.10 percent during the period from 2001 to 2005, and then it went up to 10.01 percent during the period from 2006 to 2009.

The nation's inflation rates reached their lowest levels ever recorded from 2011 to 2014, which coincided with a significant improvement in the fundamentals of the American economy. Compared to 11.17 percent in 2011, inflation reached single digits at 2.56 percent in 2014. In 2012, inflation declined to 2.60 percent, a significant decrease from 2011. Over the course of the hard years of 2014 and 2015,

the Bank of Mozambique was able to effectively control inflation levels by keeping it below 7 percent. At the end of December 2017, inflation had reduced from 17.42 percent in 2016 to 15.11 percent, and it had drastically reduced to 3.91 percent in the first half of 2018. This was mostly because changes in food prices and exchange rate influences on inflation were the primary contributors to this decline. Figure 3 illustrates the trends in headline inflation from 2014 for the period from 2014 to 2018.

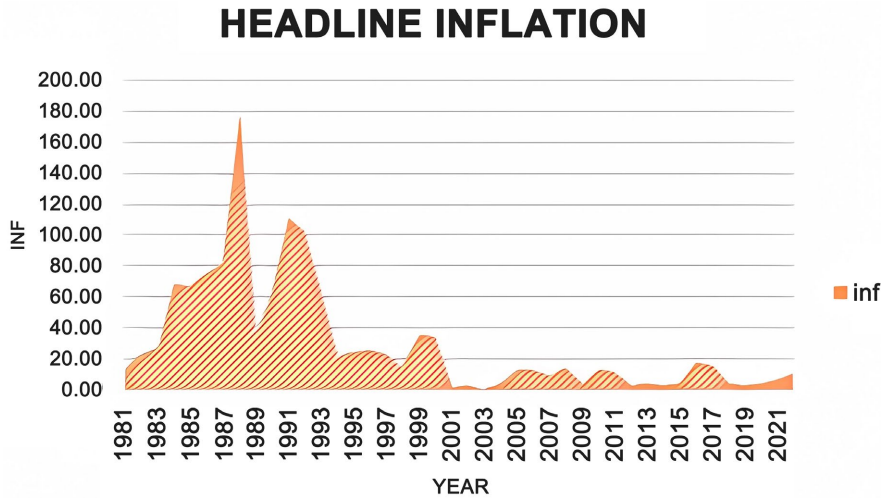

Figure 3. Trends in headline inflation. Source: author's visualization.

6.6. Unit Root Test

To establish the time series properties of the variables, unit-root tests such as Augmented Dickey-Fuller (ADF) and Philips-Peron (PP), are used to determine the order of integration of series. This test is conducted to ensure that the variables are not stationary at 2nd difference.

Based on the Unit Root Test result in Table 2, it is clear that all the variables are integrated of order one (1) that is no unit root, except GDP and LRIR are I (0), which is stationary at levels. The decision rule states that we accept the null hypothesis if the absolute t-statistic value is lower than the absolute critical value at a 5% level of significance.

Table 2. Unit root test.

Variable	Augmented Dickey-Fuller test		Phillips-Perron test		Order of Integration
	Levels	First Difference	Levels	First Difference	
GDP	−6.815869	−8.682528	−6.373068	−9.953578	*I*(0)
LRIR	−3.862428	−4.910993	−4.704762	−6.323237	*I*(0)
LMS	−2.087836	−5.009932	−2.087836	−5.165667	*I*(1)
LREER	−2.809934	−4.096138	−2.100573	−4.118704	*I*(1)
LINF	−3.490430	−6.322015	−3.431675	−8.256729	*I*(1)
Critical value at 5% level = −3.632896					

Source: author's computation (EViews 12).

From Table 2, the t-statistic value, at a level for each of LMS, LREER, and LINF, is less than its corresponding critical values, thus, we will accept the null hypothesis at the level and conclude that the variables are non-stationary. But at first differencing, the t-statistic values of these variables are greater than its corresponding critical value at 5%, and thus we reject the null hypothesis and accept the alternative hypothesis, and conclude that the variables are stationary at first differencing for both the Augmented Dickey-Fuller tests and Philips-Peron tests, which indicates that these variables are integrated of order one, that is $I(1)$ series.

Similarly, the t-statistic value at a level for GDP and LRIR is greater than its corresponding critical values. Thus, we reject the null hypothesis and conclude that these variables are stationary at levels, that is, they are integrated of order zero, $I(0)$. The results of unit root test results support the decision to use the ARDL Bounds test approach to test the existence of co-integration among the variables.

6.7. Short-Run ARDL Estimates

The short-run error correction model is given in Table 3. The estimation results reveal that a positive relationship exists between money supply and economic growth, with a statistically insignificant coefficient at the 5% level. A one percentage increase in money supply will increase economic growth by 0.93 percentage points. The coefficient of real interest rate shows that a negative relationship exists between real interest rate and economic growth in the short run, with an insignificant coefficient at the conventional level. Hence, a one-unit increase in real interest rate will lead to a 0.29 percent decrease in economic growth. The study also shows that a real effective exchange rate exhibits a positive relationship with economic growth and the coefficient is statistically insignificant at the 5% level. An implication of this is, that a one percentage point increase in a real effective exchange rate will lead to a 0.62 percentage point increase in economic growth. Thus, an appreciation will enhance the trade balance of the country because the country's demand for imports and the external demand for exports is inelastic. The error correction term has the expected negative sign which depicts a long-run reversion to equilibrium, and the coefficient is statistically significant at the conventional level. Thus, the result shows that 117 percent of any previous disequilibrium in real GDP is corrected in the current year, which confirms a high speed of adjustment to long-run equilibrium.

Table 3. Error correction model ARDL (4, 2, 3, 4, 4).

ECM Regression				
Case 1: Constant and No Constant Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(GDP(−1))	0.019274	0.158104	0.121907	0.9044
D(GDP(−2))	0.019991	0.147509	0.135522	0.8938
D(GDP(−3))	0.278703	0.129005	2.160405	0.0453***

Continued

D(LNRIR)	−0.287852	0.940940	−0.305920	0.634
D(LNRIR(−1))	3.884021	0.974561	3.985407	0.0010***
D(LNMS)	0.929911	0.985236	0.943846	0.3585
D(LNMS(−1))	−4.721351	1.243948	−3.795456	0.0014
D(LNMS(−2))	−3.564904	1.199756	−2.971357	0.0086**
D(LNREER)	0.627854	1.125690	0.557751	0.5843
D(LNREER(−1))	−1.552790	1.019077	−1.523722	0.1460
D(LNREER(−2))	−2.880657	0.884787	−3.255764	0.0047***
D(LNREER(−3))	1.643541	0.703249	2.337069	0.0319**
D(LNINF)	−1.991145	0.577662	−3.446906	0.0031***
D(LNINF(−1))	2.008162	0.630191	3.186594	0.0054***
D(LNINF(−2))	1.765028	0.549391	3.212701	0.0051
D(LNINF(−3))	1.517438	0.518422	2.927032	0.0094**
CointEq(−1)*	−1.170205	0.180486	−6.483631	0.0000***
R-Squared	0.846758	Mean dependent var		0.285785
Adjusted R-Squared	0.730003	S.D dependent var		6.188824
S.E of Regression	3.215791	Akaike info criterion		5.475697
Sum Squared resid	217.1676	Schwarz criterion		6.208302
Log Likelihood	−87.03825	Hannan-Quinn criter		5.736352
Durbin-Watson stat 2.072004				

Note: *p-value incompatible with t-Bonds distribution, *** statistically significant at 1%, ** statistically significant at 5%, Source: author's computation (EViews 12).

Conclusively, the value of the R-squared is 0.846758, implying that approximately 84% of the variation in the economic growth model is explained by the independent variables, which is an indication of a very good fit.

6.8. Lag Selection Criteria

For efficient estimates, the study must check for the maximum number of lags that must be included in the model. As such, Lag-length selection criteria such as sequential modified LR test statistic (LR), Final Prediction Error (FPE), Akaike Information Criterion (AIC), Schwarz Information Criterion (SC), and Hanna-Quinn information criterion (HQ) were employed to determine the appropriate lag length. The independent variables in the model were transformed into a natural logarithmic form. The dependent variable was not transformed as a result of the presence of a negative value in the data. With this transformation, the independent variables seem to become more linear in nature. The test results of the different lag selection methods are reported in **Table 4**. The result shows that the optimal lag length based on the lag length selection criteria is zero. Thus, this study uses no lag for each of the variables.

Table 4. Var lag order selection criteria.

Endogenous variables: GDP						
Exogenous variables: C LRIR LMS LREER LINF						
Lag	LogL	LR	FPE	AIC	SC	HQ
0	−32.91319	NA*	2.186322*	3.610780*	3.859476*	3.664754*
2	−32.82987	0.1119034	2.402630	3.698083	3.996518	3.762851
3	−32.70417	0.167595	2.637821	3.781350	4.129524	3.856913

*indicates lag order selected by the criterion; LR: sequential modified LR test statistic (each test at 5% level); FPE: Final prediction error; AIC: Akaike information criterion; SC: Schwarz information creation; HQ: Hannan-Quinn information criterion. Source: author's computation (EViews 12).

6.9. Co-Integration (F-Bounds) Test

Based on the stationarity tests presented in Table 4 above, the Auto Regressive Distributed Lag (ARDL) model was used to check if a long-run relationship exists between the endogenous and exogenous variables. The decision rule states that the null hypothesis, of no co-integration, must be accepted if the f-statistic is less than the lower bound. However, if the f-statistic is greater than the upper bound, the null hypothesis must be rejected. The rule further states that the result will be inconclusive if the f-statistic is greater than the lower bound but less than the upper bound. Hence, the test results are specified in Table 5 below.

Table 5. ARDL F-Bounds test results.

F-Bunds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	$I(0)$	$I(1)$
F-Statistic	6.806066	10%	1.9	3.01
k	4	5%	2.26	3.48
		2.5%	2.62	3.9
		1%	3.07	4.44

Source: author's computation (EViews 12).

Given that the f-statistic (6.806066) is greater than the 5% and 10% upper bounds of 2.26 and 3.48 respectively, the study concludes by rejecting the null hypothesis of no co-integration and confirming the existence of co-integration. Upon establishing the unique long-run equilibrium, the study proceeded to estimate both the long-run and short-run models within the ARDL framework.

6.10. Long-Run ARDL Estimates

The results of the long run are presented in Table 6 below. The result shows that real interest rate, money supply, and inflation are the most significant variables that affect real GDP in the long run. Specifically, the result establishes a positive relationship between money supply and economic growth, and the variable is statistically significant at the 5% level. Thus, a percentage point increase in money

supply will increase growth by 6.97 percentage points at the conventional level of significance. This finding is consistent with the a priori expectation. A similar result was established by Goher Fatima et al. (2011) for Pakistan.

The result further reveals a positive relationship between the real effective exchange rate and economic growth in the long run, with a statistically insignificant coefficient at the 5% level. The result shows that an appreciation of the real exchange rate will increase real GDP growth. This finding is typical for a country like Mozambique whose economy is characterized by inelastic demand for both import and export. Specifically, a one percentage point appreciation of the real exchange rate will increase real GDP growth by 0.11 percentage points.

Although the coefficient of real interest rate and inflation are negative, the variables are however significant at the conventional level in the long run.

Table 6. ARDL long run form (4, 2, 3, 4, 4).

Level Equation				
Case 1: No Constant and No Trend				
Variables	Coefficient	Std. Error	t-Statistics	Prob.
LNRIR	−3.193997**	1.194211	−2.674567	0.0160
LNMS	6.968348***	1.760672	3.957778	0.0010
LNREER	0.108344	0.418383	0.258959	0.7988
LNINF	−3.230431**	1.240316	−2.604523	0.0185
EC = GPT − (−3194*LNRIR + 6.9683*LNMS + 0.1083*LNREER − 3.2304*LNINF)				

Note: All variables in log form, Std. Error denote Standard Error, Prob denote Probability *** statistically significant at 1%, ** statistically significant at 5%. Source: author's computation (EViews 12).

6.11. Correlation Matrix

In an attempt to check for multicollinearity in the model, this study employed a correlation matrix to determine the extent of correlation among the dependent variables. Correlation simply explains the extent to which a change in one variable affects the other. For multicollinearity to exist, the correlation between the variables must be at least 90%. However, based on the result presented in **Table 7**, we conclude that this study does not suffer from multicollinearity because the highest value of correlation is 87.1% between money supply and real effective exchange rate.

Table 7. Correlation matrix.

	GDP	RIR	MS	REER	INF
GDP	1	−0.1433916	−0.6006428	−0.6736514	0.21274112
RIR	−0.1433916	1	0.07830243	0.19500274	−0.5890603
MS	−0.6006428	0.07830243	1	0.87133680	−0.3651249
REER	−0.6736514	0.19500274	0.87133680	1	−0.1226593
INF	0.21274112	−0.5890603	−0.3651249	−0.1226593	1

Source: author's computation (EViews 12).

The pairwise correlation matrix as shown in Table 7 also indicated a negative relationship between three of the independent variables (RIR, MS, REER) and economic growth. In the same vein, a positive relationship is found to exist between inflation (INF) and economic growth.

6.12. Serial Correlation

To test for autocorrelation in the research model, the study makes use of the Breusch-Godfrey serial correlation LM test for autocorrelation. Results presented for serial correlation in Table 8 reveal that there is no evidence of autocorrelation in the disturbances as the F-statistical probability value is greater than 0.05%.

Table 8. Result of serial correlation.

Breusch-Godfrey Serial Correlation LM Test:			
Null Hypothesis: No Serial correlation at up to 2 lags			
F-statistic			
Obs*R-squared	0.998898	Prob. F(2, 15)	0.3915
	4.466239	Prob. Chi-Square (2)	0.1072

Source: author's computation (EViews 12).

Breusch-Pagan-Godfrey (BPG) test is used to test for heteroscedasticity in a linear regression model. It tests whether the estimated variance of the residuals from a regression is dependent on the values of the independent variables. In that case, we have heteroscedasticity in our model. The null hypothesis states that there is no heteroscedasticity in the model while the alternative hypothesis states that there is heteroscedasticity in our model. The result of the BPG test is given in Table 9.

Table 9. Result of heteroskedasticity.

Heteroskedasticity Test: Breusch-Pagan-Godfrey			
Null hypothesis: Homoskedasticity			
F-statistic	1.007867	Prob. F(21, 16)	0.5019
Obs*R-squared	21.64062	Prob. Chi-Square (21)	0.4205
Scaled explained SS	4.699822	Prob. Chi-Square (21)	0.9999

Source: author's computation (EViews 12).

The result for heteroskedasticity in Table 9 shows that the null hypothesis of no heteroscedasticity (homoskedasticity) must be accepted because the chi-square (21) probability is greater than 0.05%.

6.13. Normality Test

This test is carried out to check whether the error term follows a normal distribution. As shown in Figure 4, the normality test adopted the Jarque-Bera (JB) Test of Normality. The *p*-value of the Jarque-Bera (JB) Test of Normality is greater than 0.05%. The result shows the residuals are also normally distributed as the

Jarque-Bera test of normality fails to reject the null of normally distributed residuals. The same conclusion can be derived using the Histogram-Normality test.

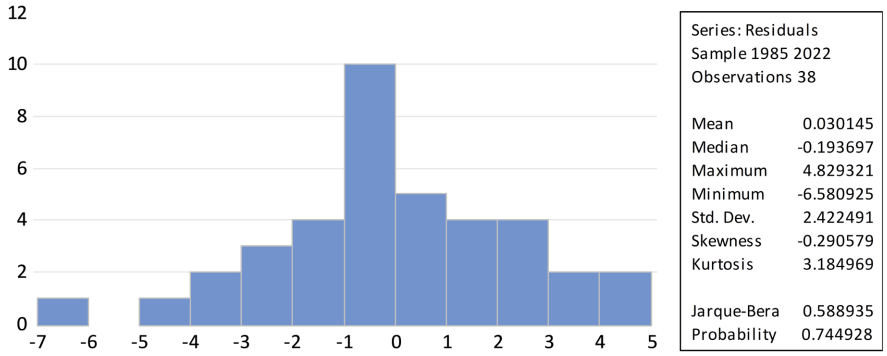

Figure 4. Result of Normality test. Source: author's computation (EViews 12).

6.14. Stability Test

The stability of the regression coefficients is evaluated using the cumulative sum (CUSUM) and the cumulative sum of squares (CUSUMSQ) test for structural stability. The test results on both the CUSUM and CUSUMSQ tests revealed that the regression equation appears to be stable, as the test statistic lies within the 5% critical bound as shown in **Figure 5** and **Figure 6** below.

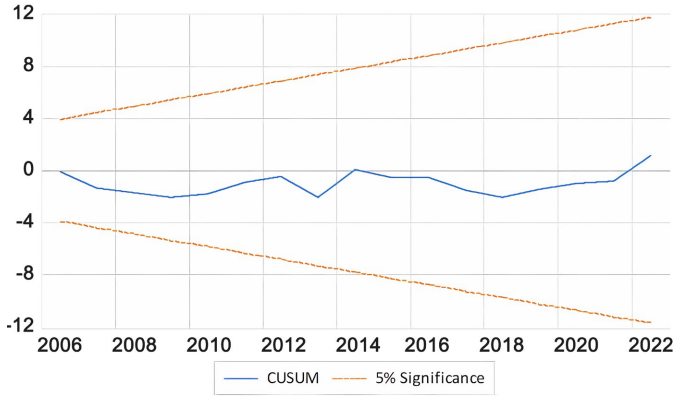

Figure 5. Plot of CUSUM test. Source: author's computation (EViews 12).

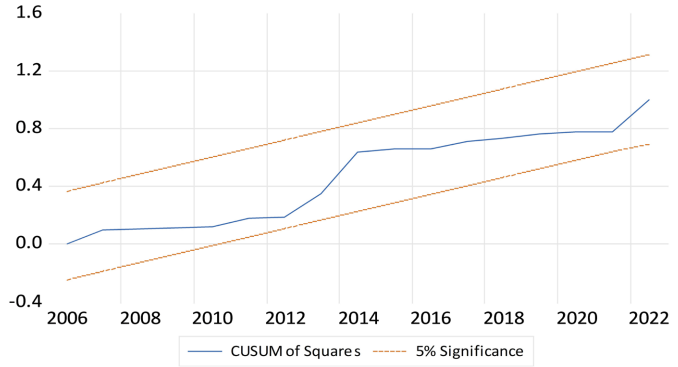

Figure 6. Plot of CUSUMSQ test. Source: author's computation (EViews 12).

6.15. Granger Casualty Test

The pairwise Granger casualty test is used to determine whether the variables in the study Granger casualize. The null hypothesis supports the existence of no Granger casualty. The null hypothesis is accepted if the probability value of the F-statistics is greater than 0.05%. Otherwise, the alternative hypothesis of the existence of Granger casualty is accepted (Table 10).

Table 10. Result of Granger casualty test.

Pairwise Granger causality Test			
Date: 06/06/24 Time: 09:00			
SAMPLE: 1981 2021			
Logs: 2			
Null Hypothesis:	Obs	F-Statistic	Prob.
LNRIR does not Granger Cause GDP	40	1.10410	0.3428
GDP does not Granger Cause LNRIR		5.52984	0.0082
LMNS does not Granger Cause GDP	40	1.61291	0.2138
GDP does not Granger Cause LNMS		0.57764	0.5665
LNREER does not Granger Cause GDP	40	0.20097	0.8189
GDP does not Granger Cause LNREER		0.02653	0.9738
LNINF does not Granger Cause GDP	40	0.14596	0.8647
GDP does not Granger Cause LNINF		1.66727	0.2034
LMNS does not Granger Cause LNRIR	40	0.56486	0.5735
LNRER does not Granger Cause LNMS		0.52242	0.5976
LNREER does not Granger Cause LNRIR	40	1.22645	0.3056
LNRIR does not Granger Cause LNREER		0.93980	0.4003
LNINF does not Granger Cause LNRIR	40	0.16616	0.8476
LNRIR does not Granger Cause LNINF		0.18236	0.8341
LNREER does not Granger Cause LMNS	40	10.0224	0.0004
LMNS does not Granger Cause LNREER		3.80696	0.0319
LNINF does not Granger Cause LNMS	40	6.42890	0.0042
LNMS does not Granger Cause LNINF		0.24344	0.7852
LNINF does not Granger Cause LNREER	40	0.06281	0.9392
LNREER does not Granger Cause LNINF		4.51232	0.0181

Source: author's computation (EViews 12).

LNRIR does not Granger cause GDP, but GDP Granger causes LNRIR. LNMS and GDP do not Granger cause each other. LNREER and GDP do not Granger cause each other. LNINF and GDP do not Granger cause each other. LNMS and LNRIR do not Granger cause each other.

LNREER and LNRIR do not Granger cause each other. LNINF and LNRIR do not Granger cause each other. LNREER Granger causes LNMS and vice versa. LNINF Granger causes LNMS but not the other way around. LNINF does not Granger cause LNREER, but LNREER Granger causes LNINF.

6.16. Robustness Check

A robustness check is carried out to examine the pattern of behavior of certain regression coefficient estimates especially when the specified regression is modified. The presence of a robust coefficient is identified as a structural stability situation. It serves as a way of verifying the reliability of an empirical model's results by simply altering the model's specification i.e., by adding or removing non-core variables.

6.17. Fully Modified OLS (FMOLS)

Fully modified least squares (FM-OLS) regression is used to provide optimal estimates of cointegrating regressions. The method modifies least squares to account for serial correlation effects and the results from the existence of a cointegrating relationship (Table 11).

Table 11. Result of fully modified OLS.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNRIR	−0.121690	1.374026	−0.088564	0.9299
LNMS	2.093086**	1.164259	1.797367	0.0804
LNREER	0.591015	0.486916	1.213792	0.2325
LNIF	−0.819171	0.991992	−0.825783	0.4142
R-squared	0.128860	Mean dependent var		4.855325
Adjusted R-squared	0.058226	S.D dependent var		6.119930
S.E of regression	5.939087	Sum squared resid		1305.092
Long-run variance	50.9602			

Note: ** statistically significant at 10%. Source: author's computation (EViews 12).

According to this check, all the independent variables are statistically insignificant. The coefficient of both LNRIR and LNINF are negative whilst LNMS and LNREER maintain positive coefficients. A one-point increase in both LNMS and LNREER causes a 2.09% and 0.59% increase in GDP respectively. Also, a one-point increase in both LNRIR and LNINF causes a 0.12% and 0.82% decrease in GDP respectively.

6.18. Dynamic OLS (DMOLS)

This is an alternative approach in which lags and leads are introduced to cope with the problem irrespective of the order integration and the existence or absence of cointegration (Table 12).

Table 12. Result of dynamic OLS.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNRIR	−0.957982	1.594099	−0.600955	0.5515
LNMS	2.733670*	1.542288	1.772477	0.0845
LNREER	0.668793	0.532952	1.254885	0.2174
LNIF	−0.796016	1.266281	−0.628625	0.5335
R-squared	0.074899	Mean dependent var		4.855325
Adjusted R-squared	0.000109	S.D dependent var		6.119930
S.E of regression	6.120264	Sum squared resid		1385.932
Long-run variance	50.96025			

Note: ** statistically significant at 5%. Source: author's computation (EViews 12).

According to this check, all the independent variables are statistically insignificant except LNMS. The coefficient of both LNRIR and LNINF are negative whilst LNMS and LNREER maintain positive coefficients. A one-point increase in both LNMS and LNREER causes a 5.59% and 0.18% increase in GDP respectively. Also, a one-point increase in both LNRIR and LNINF causes a 2.13% and 2.74% decrease in GDP respectively.

6.19. Canonical Cointegrating Regression (CCR)

This approach is usually preferred to the OLS estimator because it takes care of small sample bias and endogeneity bias by taking the leads and lags of the first-differenced regressors (Table 13).

Table 13. Result of canonical cointegrating regression.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNRIR	−0.957982	1.594099	−0.600955	0.5515
LNMS	2.733670*	1.542288	1.772477	0.0845
LNREER	0.668793	0.532952	1.254885	0.2174
LNIF	−0.796016	1.266281	−0.628625	0.5335
R-squared	0.074899	Mean dependent var		4.855325
Adjusted R-squared	0.000109	S.D dependent var		6.119930
S.E of regression	6.120264	Sum squared resid		1385.932
Long-run variance	50.96025			

Note: * statistically significant at 10%. Source: author's computation (EViews 12).

According to this check, all the independent variables are statistically insignificant. The coefficient of both LNRIR and LNINF are negative whilst LNMS and LNREER maintain positive coefficients. A one-point increase in both LNMS and LNREER causes a 2.73% and 0.67% increase in GDP respectively. Also, a one-point increase in both LNRIR and LNINF causes a 0.96% and 0.80% decrease in

GDP respectively.

The core coefficients of both the ARDL and COINTEGRATING REGRESSION methods depict a similar direction. In both models, LNMS and LNREER have positive coefficients whilst LNRIR and LNINF have negative coefficients. The stability of the coefficients across different specifications strengthens the argument that the ARDL model used has structural validity.

7. Empirical Findings of the Results and Discussions

7.1. Descriptive Statistics

The descriptive statistics for the period 1981 to 2021 provide a comprehensive overview of the variables analyzed in the study. Real GDP growth (RGDP) averaged 5.98%, while money supply (LNM2) growth averaged 36.06%. The real interest rate (RIR) averaged 12.73%, inflation (LNCPI) grew by an average of 6.14%, and the real exchange rate (LNREXR) increased by an average of 37.97%. The kurtosis values indicate that the variables exhibit leptokurtic distributions, suggesting higher peaks compared to a normal distribution, while the skewness values suggest symmetric distributions around the mean except for GDP.

7.2. Short-Run ARDL Estimates

The short-run error correction model results indicate a positive but statistically insignificant relationship between money supply and economic growth. Specifically, a one percentage point increase in money supply is associated with a 0.93 percentage point increase in economic growth. Conversely, real interest rates show a negative relationship with economic growth, where a one-unit increase in real interest rates results in a 0.29 percent decrease in economic growth. Additionally, the real effective exchange rate is positively related to economic growth, with a one percentage point increase leading to a 0.62 percentage point increase in economic growth. The error correction term is significant and negative, indicating that deviations from long-run equilibrium are corrected by 117% per year, demonstrating a high speed of adjustment.

7.3. Lag Selection Criteria and Co-Integration Test

The optimal lag length, determined by various criteria including the sequential modified LR test, Final Prediction Error (FPE), Akaike Information Criterion (AIC), Schwarz Information Criterion (SC), and Hanna-Quinn information criterion (HQ), was found to be zero. The ARDL model was used to test for the existence of a long-run relationship between the variables. The ARDL F-bounds test results rejected the null hypothesis of no co-integration, indicating a long-run equilibrium relationship between the endogenous and exogenous variables.

7.4. Diagnostic Tests and Model Stability

The model underwent rigorous diagnostic tests to ensure its validity. The Jarque-Bera Test confirmed the normality of residuals, while the Breusch-Godfrey serial

correlation LM test and Breusch-Pagan-Godfrey (BPG) test confirmed the absence of serial correlation and heteroskedasticity, respectively. The CUSUM and CUSUM of squares tests confirmed the structural stability of the regression coefficients, as the cumulative sum for each test remained within the 5% critical lines. These robustness checks validate the model's accuracy in depicting the relationship between monetary policy variables and economic growth.

7.5. Conclusion and Policy Recommendations

This study investigated the impact of monetary policies on economic growth in Mozambique using a time series analysis. Employing the ARDL co-integration approach, it was determined that there is a long-run relationship between monetary policies and economic growth. The error correction model further illustrated that deviations from the long-term equilibrium are corrected at a significant rate, confirming the robustness of the findings. Key findings indicate that the money supply has a positive, albeit statistically insignificant, impact on economic growth in the short run, while real interest rates have a negative impact. The real effective exchange rate was also positively related to economic growth, suggesting that an appreciation of the currency could enhance the trade balance by influencing both import and export demands. Robustness checks, including the CUSUM and CUSUM of squares tests, confirmed the structural stability of the model, while diagnostic tests ensured the absence of serial correlation, heteroskedasticity, and normality issues. These validations underscore the reliability of the model in depicting the relationship between monetary policy variables and economic growth.

This study contributes to the limited literature on monetary policy in low-income countries, particularly within the context of Mozambique. It provides a baseline ARDL model that can be used for future macroeconomic policy analysis, considering the unique economic environment of sub-Saharan Africa. Future research could expand on this work by incorporating additional variables or by applying similar methodologies to other low-income countries to validate the generalizability of these findings. Overall, the study underscores the importance of carefully calibrated monetary policies in fostering economic growth in Mozambique.

To enhance the effectiveness of monetary policy in promoting economic growth in Mozambique, several recommendations are proposed. The Bank of Mozambique should enhance its monetary policy framework to ensure a more robust and responsive mechanism that can address economic fluctuations effectively. This includes adopting more sophisticated models and tools to predict economic conditions and respond accordingly. Accurate and timely data is crucial for effective monetary policy, so the government should invest in improving the quality and frequency of economic data collection to provide a solid basis for policy decisions and help in the accurate assessment of economic conditions. Additionally, the Bank of Mozambique should improve its transparency and communication strategies. Clear and consistent communication about monetary policy

decisions and their expected impact can help manage market expectations and reduce economic volatility. Efforts should be made to develop and deepen financial markets in Mozambique. This includes improving the regulatory framework, increasing financial literacy, and encouraging financial innovation. Effective coordination between monetary and fiscal policies is essential for macroeconomic stability. The government and the central bank should work closely to ensure that fiscal policy supports monetary policy objectives and vice versa.

Structural reforms are essential to enhance productivity, upgrade infrastructure, and stimulate investment, so facilitating sustainable economic growth. Enhancing capacity and experience within the central bank and institutions, along with enacting policies to foster economic resilience, is essential for Mozambique's stability.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

References

Abubakar, A., & Lawal, S. (2022). Impact of Monetary Policy on Economic Growth in Nigeria (1986-2019). *Gusau Journal of Business Administration, 1,* 14.

African Development Bank Group (2023). *2023 Annual Report.*

Aizenman, J., Chinn, M. D., & Ito, H. (2017). Balance Sheet Effects on Monetary and Financial Spillovers: The East Asian Crisis Plus 20. *Journal of International Money and Finance, 74,* 258-282. https://doi.org/10.1016/j.jimonfin.2017.02.020

Aliu, T. I. (2022). Effectiveness of Monetary Policy in Stimulating Economic Growth in Nigeria. *International Journal of Research in Social Science and Humanities (IJRSS), 3,* 34-42.

Aliyev, J., Mukhtarov, S., Haydarov, K., & Isgandarov, M. (2020). Does Monetary Policy Boost Economic Growth? The Case of Small Open Economy. *Research in World Economy, 11,* 216-223. https://doi.org/10.5430/rwe.v11n3p216

Banerjee, A., Dolado, J. J., Galbraith, J. W., & Hendry, D. F. (1993). *Co-Integration, Error Correction, and the Econometric Analysis of Non-Stationary Data.* Oxford University Press.

Barnichon, R., & Peiris, S. (2007). Sources of Inflation in Sub-Saharan Africa. *SSRN Electronic Journal, 17,* 729-746. https://doi.org/10.2139/ssrn.981639

Berument, H., & Dincer, N. N. (2008). Measuring the Effects of Monetary Policy for Turkey. *Journal of Economic Cooperation, 29,* 83-110.

Clarida, R., Galí, J., & Gertler, M. (1999). The Science of Monetary Policy: A New Keynesian Perspective. *Journal of Economic Literature, 37,* 1661-1707. https://doi.org/10.1257/jel.37.4.1661

Cornwall, J. (1990). *The Theory of Economic Breakdown: An Institutional-Analytical Approach.* Blackwell.

Dele, B. E. (2007). *Monetary Policy and Economic Performance of West African Monetary Zone Countries.* MPRA Paper. http://mpra.ub.uni-muenchen.de/4308/

Demir, İ., Eroğlu, B. A., & Yildirim-Karaman, S. (2022). Heterogeneous Effects of Unconventional Monetary Policy on the Bond Yields across the Euro Area. *Journal of Money,*

Credit and Banking, 54, 1425-1457. https://doi.org/10.1111/jmcb.12886

Dickey, D. A., & Fuller, W. A. (1979). Distribution of the Estimators for Autoregressive Time Series with a Unit Root. *Journal of the American Statistical Association, 74,* 427-431. https://doi.org/10.1080/01621459.1979.10482531

Duskobilov, U. (2017). Impact of Economic Regulation through Monetary Policy: Impact Analysis of Monetary Policy Tools on Economic Stability in Uzbekistan. *International Journal of Innovation and Economic Development, 3,* 65-69. https://doi.org/10.18775/ijied.1849-7551-7020.2015.35.2005

Dyvik, E. H. (2021). *Global GDP—Statistics & Facts.* Statista.

Egri, T., & Orhan, Z. H. (2021). Islamic Monetary Economics Finance and Banking in Contemporary Muslim Economies Preface. https://hdl.handle.net/20.500.12436/3092

Fatima, G., Ahmed, A. M., & Rehman, W. U. (2011). Fiscal Deficit and Economic Growth: An Analysis of Pakistan's Economy. *International Journal of Trade, Economics and Finance, 2,* 501-504. https://doi.org/10.7763/ijtef.2011.v2.156

Gertler, M., Gilchrist, S., & Natalucci, F. M. (2007). External Constraints on Monetary Policy and the Financial Accelerator. *Journal of Money, Credit and Banking, 39,* 295-330. https://doi.org/10.1111/j.0022-2879.2007.00027.x

Hameed, I., & Amen, U. (2011). *Impact of Monetary Policy on Gross Domestic Product (GDP)* (pp. 1348-1361). Institute of Interdisciplinary Business Research.

Hashem, P. H., & Yongcheol, S. (1998). Generalized Impulse Response Analysis in Linear Multivariate Models. *Economics Letters, 58,* 17-29. https://doi.org/10.1016/s0165-1765(97)00214-0

Idris, M. (2020). Analysis of Capital Market Development and Economic Growth in Nigeria. *Global Journal of Applied, Management and Social Sciences, 20,* 156-172.

Islam, M. S., Hossain, M. E., Chakrobortty, S., & Ema, N. S. (2021). Does the Monetary Policy Have Any Short-Run and Long-Run Effect on Economic Growth? A Developing and a Developed Country Perspective. *Asian Journal of Economics and Banking, 6,* 26-49. https://doi.org/10.1108/ajeb-02-2021-0014

Ivrendi, M., & Yildirim, Z. (2013). *Monetary Policy Shocks and Macroeconomic Variables: Evidence from Fast Growing Emerging Economies (No. 2013-61).* Economics Discussion Papers.

Johansen, S. (1991). Estimation and Hypothesis Testing of Cointegration Vectors in Gaussian Vector Autoregressive Models. *Econometrica, 59,* 1551-1580. https://doi.org/10.2307/2938278

Johansen, S., & Juselius, K. (1990). Maximum Likelihood Estimation and Inference on Cointegration—With Applications to the Demand for Money. *Oxford Bulletin of Economics and Statistics, 52,* 169-210. https://doi.org/10.1111/j.1468-0084.1990.mp52002003.x

Kamaan, C. K., & Nyamongo, E. M. (2014). The Effect of Monetary Policy on Economic Growth in Kenya. *International Journal of Business and Commerce, 3,* 11-24.

Kapaya, S. M. (2020). Financial Development and Economic Growth in Tanzania: An ARDL and Bound Testing Approach. *Asian Journal of Economics and Banking, 5,* 46-65. https://doi.org/10.1108/ajeb-09-2020-0063

Lashkary, M., & Kashani, B. H. (2011). The Impact of Monetary Variables on Economic Growth in Iran: A Monetarists' Approach. *World Applied Sciences Journal, 15,* 449-456.

Liberto, D. (2023). *Consumer Theory: Definition, Meaning, Objective, and Example.* Investopedia.

Michael, A., Oppong, E.O., & Gulnabat, O. (2020). Effects of Monetary Policy on Economic Growth; Evidence from Five (5) African Countries (Mauritius, Nigeria, South Africa, Namibia and Kenya) from 1980 to 2019. *Journal of Economics, Business and Management, 7,* 293-298.

Mishkin, F. S. (1995). Symposium on the Monetary Transmission Mechanism. *Journal of Economic Perspectives, 9,* 3-10. https://doi.org/10.1257/jep.9.4.3

Mugableh, M. I. (2019). Does Monetary Policy Affect Economic Growth in Jordan? Evidence from Ordinary Least Square Models. *International Business Research, 12,* 27-34. https://doi.org/10.5539/ibr.v12n1p27

Mutuku, C. (2015) Assessing Fiscal Policy Cyclicality and Sustainability: A Fiscal Reaction Function for Kenya. *Journal of Economics Library, 2,* 173-191.

Nouri, M., & Samimi, A. J. (2011). The Impact of Monetary Policy on Economic Growth in Iran. *Middle-East Journal of Scientific Research, 9,* 740-743.

Nweke, O. (2023). Economic Policies and the Growth of the Nigerian Economy: The Role of Monetary and Fiscal Policies. *British International Journal of Applied Economics, Finance and Accounting, 7,* 58-70.

Omodero, C. O. (2019). Effect of Money Supply on Economic Growth: A Comparative Study of Nigeria and Ghana. *International Journal of Social Science Studies, 7,* 16-23. https://doi.org/10.11114/ijsss.v7i3.4137

Onwuasoeze, C. N., Adediran, O., & Ubah, I. J. (2023). Monetary Policy, Informal Sector, and Economic Growth in Nigeria. *Journal of Southwest Jiaotong University, 58*.

Ozcicek, O., & Douglas McMillin, W. (1999). Lag Length Selection in Vector Autoregressive Models: Symmetric and Asymmetric Lags. *Applied Economics, 31,* 517-524. https://doi.org/10.1080/000368499324237

Perron, P. (1988). Trends and Random Walks in Macroeconomic Time Series: Further Evidence from a New Approach. *Journal of Economic Dynamics and Control, 12,* 297-332. https://doi.org/10.1016/0165-1889(88)90043-7

Pesaran, M. H., Shin, Y., & Smith, R. J. (2001). Bounds Testing Approaches to the Analysis of Level Relationships. *Journal of Applied Econometrics, 16,* 289-326. https://doi.org/10.1002/jae.616

Precious, C., & Makhetha-Kosi, P. (2014). Impact of Monetary Policy on Economic Growth: A Case Study of South Africa. *Mediterranean Journal of Social Sciences, 5,* 76-84. https://doi.org/10.5901/mjss.2014.v5n15p76

Rahman, M. N., Nower, N., Tushar, R. H., Abbas, S. M., & Musa, M. N. (2019). Impact of Monetary Policy on the Economic Growth of a Developing Country: An Empirical Study on Bangladesh Economy. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.3391280

Rastogi, A. K. (2023). Critical Analysis on Marketing Strategies for the Development of Indian Tourism Industry. *European Economic Letters (EEL), 13,* 434-456.

Renelt, D. (1991). Economic Growth: A Review of the Theoretical and Empirical Literature. World Bank Publications.

Shahbaz, M., Naeem, M., Ahad, M., & Tahir, I. (2018). Is Natural Resource Abundance a Stimulus for Financial Development in the USA? *Resources Policy, 55,* 223-232. https://doi.org/10.1016/j.resourpol.2017.12.006

Shirai, S. (2018). *The Bank of Japan's Super-Easy Monetary Policy from 2013-2018 (No. 896).* ADBI Working Paper.

Squires, D., Jiménez-Toribio, R., Guillotreau, P., & Anastacio-Solis, J. (2023). The Ex-

Vessel Market for Tropical Tuna in Manta, Ecuador. A New Key Player on the Global Tuna Market. *Fisheries Research, 262,* Article ID: 106646. https://doi.org/10.1016/j.fishres.2023.106646

Starr, M. A. (2005). Does Money Matter in the CIS? Effects of Monetary Policy on Output and Prices. *Journal of Comparative Economics, 33,* 441-461. https://doi.org/10.1016/j.jce.2005.05.006

Stobierski, T. (2021). *What Is GDP & Why Is It Important?* Harvard Business School Online.

Tarawalie, A. B., & Kargbo, J. M. (2018). The Impact of Monetary Policy on Economic Growth in Sierra Leone: An ARDL Bounds Testing Approach. *International Journal of Economics and Financial Issues, 8,* 175-182.

Taylor, J. B. (1993). Discretion versus Policy Rules in Practice. *Carnegie-Rochester Conference Series on Public Policy, 39,* 195-214. https://doi.org/10.1016/0167-2231(93)90009-l

Uchendu, O. (1993). Interest Rate Policy Savings and Investment in Nigeria. *Central Bank of Nigeria Quarterly Review, 31,* 34-52.

Ufoeze, L. O., Odimgbe, J. C., Ezeabalisi, V. N., & Alajekwu, U. B. (2018). Effect of Monetary Policy on Economic Growth in Nigeria: An Empirical Investigation. *Annals of Spiru Haret University. Economic Series, 18,* 123-140. https://doi.org/10.26458/1815

von Peter, G. (2009). Asset Prices and Banking Distress: A Macroeconomic Approach. *Journal of Financial Stability, 5,* 298-319. https://doi.org/10.1016/j.jfs.2009.01.001

World Bank Group (2023). *Mozambique Economic Update.* http://documents.worldbank.org/curated/en/931171614625070870/Mozambique-Economic-Update-Setting-the-Stage-for-Recovery