International Journal of Economics and Finance; Vol. 17, No. 5; 2025
ISSN 1916-971X E-ISSN 1916-9728
Published by Canadian Center of Science and Education

The Nexus Between Fiscal Deficit and Inflation in Mozambique: ARDL Model Approach

Khalilahmad Mussa Bahadur[1]

[1] Faculty of Economics and Management, Chatholic University of Mozambique, Sofala, Mozambique

Correspondence: Khalilahmad M. Bahadur, Beira city, Sofala, 2200, Mozambique. Tel: 258-844-550-130. E-mail: kbahadur.kb@hotmail.com

Received: March 5, 2025 Accepted: March 26, 2025 Online Published: April 8, 2025

doi:10.5539/ijef.v17n5p13 URL: https://doi.org/10.5539/ijef.v17n5p13

Abstract

This study investigates the relationship between fiscal deficits and inflation in Mozambique from January 2017 to December 2023 using an Autoregressive Distributed Lag (ARDL) model. Monthly data on inflation, money supply, and interest rates were collected from official sources, while annual fiscal deficit and public debt figures were converted into monthly values. The Phillips-Perron (PP) test was applied to assess stationarity, the ARDL bounds test examined long-run relationships, and the Error Correction Model (ECM) captured short-run dynamics. The results confirm a significant long-run relationship between fiscal deficits and inflation, with a 1% increase in the fiscal deficit leading to a 0.0089% rise in inflation. Money supply strongly influences inflation, while public debt exhibits a negative long-run relationship. These findings highlight the importance of coordinated fiscal and monetary policies to ensure macroeconomic stability in Mozambique.

Keywords: fiscal deficit, inflation, monetary policy, public debt

1. Introduction

Fiscal deficits and inflation are a critical topic generating extensive debate among economist and policymakers. A fiscal deficit occurs when government expenditure surpasses its revenue, necessitating borrowing to cover the gap (Mankiw, 2009). This financial strategy can have significant repercussions on a nation's economy, particularly concerning inflation, a sustained increase in the general price level of goods and services.

Economists have divergent views on the impact of fiscal deficits on inflation. Some argue that large and persistent deficits can lead to higher inflation rates, especially if financed through money creation. This perspective aligns with the classical quantity theory of money, which posits a direct relationship between the money supply and price levels (Mishkin, 2004). Conversely, others contend that under certain conditions, fiscal deficits may not necessarily result in inflationary pressures or would have no result in economic activity which is the view of David Ricardo which was further developed in 70s by Robert Barro (Blanchard & Johnson, 2013).

According to CGE (2017-2023) accumulated fiscal deficit is 301,949.04 million meticais, the amplitude is 390.757.24 million meticais, the mean is 55,822.46 million meticais on the other hand according National Institute of statistics, inflation have been increasing throughout these years, in January 2017 IPC were 113.04 and in December 2023 it was 163.76 which corresponded to an increase of 44,87%.

This study aims to explore the long-term relationship between fiscal deficit and inflation, using monthly data from 2017 to 2023. By employing Autoregressive Distributed Lag (ARDL) model, we seek to uncover both the short-run and long-run dynamics. Additionally, we will examine other external factors that may influence the interplay between fiscal deficits and inflation during the specified period.

Understanding the nexus between fiscal deficit and inflation is crucial for several reasons. Firstly, it informs fiscal policy decisions that aim to stabilize the economy, promote sustainable growth, and maintain price stability. Secondly, it provides insights into the long-term implications of fiscal deficits on economic health, helping to guide prudent management of public finances. Lastly, it contributes to the broader discourse on the effectiveness of fiscal and monetary policies in achieving macroeconomic objectives.

Most research has emphasized the importance of understanding how fiscal deficit affects inflation. However, research focusing specifically on Mozambique's economy has been limited. Therefore, this study seeks to address this gap by implication of fiscal for inflation this study also aspires not only to contribute to the

academic discourse but also empower policymakers, businesses, and investors, by providing insights into potential vulnerabilities or opportunities linked it.

The paper's structure is outlined as follows. In Section 2, we provide a comprehensive review of the previous research. In Section 3, we introduce our proposed model using an Auto Regressive Distributed Lag (ARDL) approach. Moving to section 4, we expand upon established ARDL model to analyze the nexus between fiscal deficit and inflation in Mozambique, assessing our findings. And finally in section 5 there is conclusion.

2. Literature Review

The relationship between fiscal deficits and inflation has been extensively studied across numerous economies, uncovering nuanced insights into their intricate dynamic. Here, we summarize key empirical findings from selected studies:

Catão and Terrones (2001) examines the relationship between fiscal deficits and inflation from 1970 to 2000, employing the ARDL model and pooled mean group estimator (PMGE) and the result showed that a 1-percentage point reduction in the ratio of fiscal deficit to GDP typically lowers long-run inflation by 1.5 to 6 percentage points, depending on the size of the inflation tax base. The fiscal deficit-inflation relationship appeared to be positive, relatively strong, and statistically significant in emerging markets.

Catão and Terrones (2003) examined the relationship between fiscal deficits and inflation across economies from 1960 to 2001, using the ARDL model and pooled mean group estimator (PMGE). Their study reinforced fiscal-based theories of inflation, showing deficits significantly impact inflation during high and hyperinflation periods and to a lesser extent during moderate inflation. They found a robust deficit-inflation link across many developing countries but noted weaker evidence in advanced economies and low-inflation countries. Alternative variables, except oil prices, did not undermine this relationship. Trade openness mattered for developed countries, but fixed exchange rates did not consistently lower inflation. For low-inflation countries, fiscal dominance assumptions faltered, especially in small, open economies or those without national currencies. Advanced economies showed mixed results, suggesting fiscal deficits' impact varies with inflation levels and institutional factors. The study's findings underscored the robust statistical significance of deficit-inflation links across different specifications, with dynamic panel estimators showing stronger elasticities than static models. Overall, their research supports fiscal theories of inflation, indicating their relevance across diverse economic contexts.

Solomon and De Wet (2004) examined the relationship between deficit and inflation in Tanzania from 1967 to 2001 using a VAR model and cointegration analysis. They found a stable long-run relationship among budget deficits, exchange rates, GDP, and inflation. Their study affirmed a significant impact of budget deficits on inflation under the assumption of long-run monetary neutrality. Simulations revealed that inflation in Tanzania is highly responsive to shocks in budget deficits and GDP, highlighting the country's vulnerability due to its dependence on agriculture. Weather-related shocks in the agricultural sector significantly affect consumer prices by impacting GDP. This underscores the importance of fiscal policy sensitivity in developing countries with underdeveloped financial systems. The study's findings suggest that managing budget deficits is crucial for price stability in Tanzania, especially given the economy's reliance on agriculture and susceptibility to external shocks.

Makochekanwa (2008) investigated the deficit-inflation nexus in Zimbabwe's economy from 1980 to 2005 using Johansen cointegration test and ECM. The study found that the cointegrating vector supported a significant positive impact of the budget deficit on inflation in Zimbabwe. This implies that increases in the budget deficit were associated with higher inflation rates over the studied period. The use of cointegration analysis and ECM allowed for a robust examination of the long-run relationship between budget deficits and inflation, highlighting the persistent nature of fiscal impacts on price levels in Zimbabwe.

Ekanayake (2012) examined the link between fiscal deficits and inflation in Sri Lanka, specifically investigating the impact in the absence of public sector wage expenditure. Employing the ARDL model, the study found that in the long run, a one percentage point increase in the fiscal deficit to narrow money ratio corresponded to approximately an 11 percentage point increase in inflation. Importantly, the study highlighted that this relationship weakened significantly when public sector wage expenditure was not considered. This suggests that inflation dynamics in Sri Lanka are not solely driven by monetary factors but are also influenced by fiscal policy decisions, particularly regarding public sector wages. The findings underscore the nuanced role of public sector expenditure in shaping inflationary pressures in the Sri Lankan economy.

Ezeabasili and Mojekwu (2012) investigated the relationship between fiscal deficits and inflation in Nigeria using a Vector Error Correction (VEC) model. Their findings revealed a positive but statistically insignificant link between fiscal deficits and inflation, indicating that past deficit levels did not significantly impact inflation

rates. Conversely, the study found a strong positive long-term association between money supply growth and inflation, with a 1% increase in money supply leading to a 2.4% rise in inflation. The research highlighted that monetary financing of fiscal deficits exacerbated inflationary pressures, underscoring the importance of fiscal discipline and adherence to fiscal responsibility laws. It emphasized the critical role of government policy in managing inflation and liquidity in Nigeria, advocating for sustainable limits on government spending to maintain macroeconomic stability.

Afrin (2013) examines the relationship between fiscal deficits and CPI inflation in Bangladesh from 1974 to 2010, employing the ARDL model. The study reveals that fiscal deficits exert inflationary pressures over the long term. It identifies real GDP, inflation expectations, and the current floating exchange rate regime as additional factors influencing inflation dynamics in Bangladesh. The findings underscore the critical importance of implementing both demand-side and supply-side management policies to sustain price stability in the country.

Nguyen (2015) examines the impact of fiscal deficits and broad money M2 supply on inflation across Asian countries from 1985 to 2012. Using the Pooled Mean Group (PMG) estimation and panel differenced GMM Arellano-Bond estimator, the study finds that broad money M2 supply significantly influences inflation in the PMG estimation method, while fiscal deficit, government expenditure, and interest rates affect inflation consistently across both methods. The findings underscore the importance of prudent management of money supply, fiscal deficits, government spending, and interest rates in mitigating inflationary pressures when implementing economic policies in Asian countries.

Muhammad, Zafar, Noman, and Arfeen (2016) investigate the relationship between inflation and fiscal imbalances in Pakistan from 1973 to 2014, employing the ARDL bound testing approach. Their findings indicate that money supply and exchange rates significantly affect inflation in both the short and long run, whereas foreign and domestic debt do not show statistical significance. The study highlights that increasing money supply to finance deficits tends to escalate inflationary pressures. It recommends that Pakistan's government manage its borrowing carefully, suggesting that promoting economic growth through effective expenditure could mitigate inflationary impacts of fiscal deficits. Additionally, the study advises caution against excessive external borrowing due to associated inflationary and debt burden risks.

Dissanayake (2016) analyzes Sri Lanka's budget deficits and macroeconomic variables from 1980 to 2014, using ARDL tests for long-run relationships and Granger-Causality for short-run dynamics. It reveals a persistent link between deficits, inflation, interest rates, exchange rates, debt, and GDP growth. The study identifies a one-way causal relationship where deficits lead to increased debt and inflation but finds no causation between deficits and interest rates, exchange rates, or GDP growth. Highlighting the fiscal policy's impact on inflation and debt, the study urges Sri Lanka's government to manage deficits to stabilize prices and mitigate escalating debt levels from long-standing deficit budgets since 1957.

Sanya (2017) investigated the relationship between budget deficits and inflation in South Africa and Nigeria using Johansen Cointegration, Vector Error Correction Model (VECM), and Granger Causality tests. Results from Impulse Response functions and Variance Decomposition indicated that budget deficit shocks significantly and positively affect inflation in both countries. Budget deficits, alongside money supply, were identified as major inflationary factors. The Granger Causality test revealed a unidirectional relationship between budget deficit and inflation in South Africa, whereas in Nigeria, the causality was found to be bidirectional.

Myovella and Kisava (2018) aimed to analyze the long-run relationship between government budget deficits and inflation in Tanzania using the ARDL bounds test approach. The results indicated a positive long-run relationship between budget deficits and inflation. The coefficient of the speed of adjustment was significant at 5 percent, suggesting that the system can adjust back to equilibrium at a speed of 72% towards the long run.

ŞAHİN (2019) analyzed the impact of budget deficits on inflation in the Turkish economy from 1980 to 2017 using the ARDL bounds testing approach. The study found that while the money supply variable (M2) was not statistically significant, the coefficient of the budget deficit (DEF) variable was both positive and significant in both the short and long term. This suggests that increases in budget deficits in Turkey have a significant impact on inflation, highlighting the importance of fiscal policy management in controlling inflationary pressures.

Ssebulime and Edward (2019) investigated the relationship between budget deficits and inflation in Uganda from 1980 to 2016, employing cointegration analysis, error correction model (ECM), and pairwise Granger causality tests. The study confirmed a long-run relationship among inflation, budget deficit, and money supply, indicating Granger causality in at least one direction. Exogenous factors such as trade balance and exchange rates were also considered. The findings underscored that inflation in Uganda is influenced by both fiscal and monetary factors, necessitating a comprehensive policy approach that integrates budgetary, monetary, and exchange rate policies to

effectively manage inflationary pressures.

Bordo and Levy (2020) surveyed over two centuries of historical data to examine the relationship between expansionary fiscal policy and inflation. They found that fiscal deficits tend to correlate with inflation during wartime, when governments resort to inflation taxes due to fiscal stress. Peacetime episodes, such as in France during the 1920s and the U.S. recovery from the Great Recession in the 1930s, showed that bond-financed deficits without future tax backing significantly contributed to inflation. Examining the post-World War II era, they highlighted the Great Inflation in the 1960s and 1970s, where fiscal influences on monetary policy were crucial. They contrasted this with the Great Financial Crisis of 2007-2008 and the recent pandemic, noting that despite expansionary fiscal and monetary policies, inflation remained subdued, though concerns about fiscal dominance and future inflation risks persist.

Eita, Manuel, Nakusera, and Florette (2021) investigated the impact of fiscal deficits on inflation in Namibia from 2002 to 2017 using the Autoregressive Distributed Lag Model (ARDL) and Granger causality approach. The empirical findings revealed a long-run positive effect of fiscal deficits on inflation, indicating a direct relationship between the two variables in Namibia. The study also identified a unidirectional causality running from fiscal deficits to inflation. Additionally, it highlighted that South Africa's price levels influence inflation in Namibia positively. The study underscores the policy implication that high negative fiscal balances could undermine the monetary policy objective of price stability. It recommends coordinated fiscal and monetary policies to maintain fiscal deficits at acceptable levels. Monitoring budget deficits and price developments in South Africa is crucial for informed policy-making aimed at achieving and sustaining price stability in Namibia.

Abdu (2022) reexamines the relationship between fiscal deficits and inflation from 1981 to 2020, employing the Vector Error Correction Model (VECM) and Granger causality test. It finds that fiscal deficits exert a significant long-run effect on inflation, suggesting that increasing fiscal deficits lead to higher inflation rates. The Granger causality test reveals a bidirectional causal relationship between fiscal deficits and inflation in the short run, mediated through the impact of money supply and interest rates. Interestingly, while interest rates influence fiscal deficits, they do not directly affect inflation in the short term. These findings imply that addressing Egypt's inflation and fiscal deficit requires breaking the cycle of fiscal deficits, money supply growth, and interest rates through coordinated policy measures.

Obeng and Abotsi (2024) investigates the impact of fiscal deficits on inflation in Ghana from 1976 to 2019, utilizing the Autoregressive Distributed Lag (ARDL) cointegration test and vector error correction models. Their findings indicate a significant and positive relationship between fiscal deficits and inflation in both the short and long run. Importantly, the study identifies a unidirectional causality where inflation influences fiscal deficits. This suggests that in Ghana, inflationary pressures are exacerbated by fiscal deficits, highlighting the importance of fiscal discipline and policy coordination to achieve price stability

The empirical studies collectively reveal a consistent pattern: fiscal deficits generally exert inflationary pressures, albeit with nuances in magnitude and causal mechanisms. Studies such as those by Catão and Terrones (2001, 2003) consistently find a positive and statistically significant link between fiscal deficits and inflation, emphasizing the impact across emerging markets and diverse economic conditions. This relationship is further affirmed in specific country studies like those on Tanzania (Solomon & De Wet, 2004), Zimbabwe (Makochekanwa, 2008), and Sri Lanka (Ekanayake, 2012), where long-term empirical analyses using cointegration methods demonstrate persistent inflationary effects of fiscal deficits.

Contrastingly, studies like Ezeabasili and Mojekwu (2012) in Nigeria highlight nuances, where fiscal deficits alone may not significantly impact inflation compared to factors like money supply growth. Similarly, variations in causal directions are observed in studies across different countries like South Africa and Nigeria (Sanya, 2017), where the relationship between deficits and inflation may exhibit bidirectional causality.

Overall, while the studies underscore the inflationary risks associated with fiscal deficits, they also emphasize the role of monetary policy responses, institutional frameworks, and external economic factors in shaping inflation dynamics. The findings collectively advocate for balanced fiscal policies, prudent monetary management, and coordinated policy frameworks to mitigate inflationary pressures and achieve sustainable economic stability across diverse global contexts.

3. Methodology

The main objective of the research is to investigate the nexus between fiscal deficit and inflation within the Mozambican economy by analysing how inflation, respond to changes in the fiscal deficit 2017.1 and 2023.12. To achieve this goal, various econometric tests were employed. Firstly, the stationarity of the variables was

examined using the Phillips – Perron (PP) tests. Following this, bound test was employed to assess the long run relation between variable, error correction model (ECM) to analyise the short run relation, and subsequently, validation test was employed, Jarque – Bera for normality, Breusch-Godfrey LM for Serial Correlation and Breusch-Pagan – Godfrey for Heteroskedacity.

3.1 Data

The data for the variables under study spans from January 2017 to December 2023. The selection of the sample was driven by the need to maintain consistency across variables and address stationarity issues. Data were sourced from the National Statistics Institute (INE), the general state account report from the Ministry of Finance, and the Central Bank of Mozambique. Monthly data were collected for inflation, money supply, and interest rates, while annual data on public debt and the fiscal deficit were transformed into monthly frequency using interpolation techniques in Eviews. Specifically, Quadratic Match Sum was applied to monetary variables, while Quadratic Match Average was used for percentage-based variables. Additionally, variables not initially expressed in percentage form were transformed into natural logarithms to ensure consistency and facilitate analytical interpretation.

Table 1. Variable descriptions

Variable	Description
DF	Fiscal Deficit
IPC	Consumer Price Index (Inflation)
D	Total Public Debt
M	M3
FPC	Interest (Permanent Facility Lending Rate)

The econometric model required the inclusion of the following variables: consumer price index, fiscal deficit as percentage of GDP, public debt, money supply and interest rate as evident from table 1.

3.2 ARDL Model

To analyze the nexus between inflation and fiscal deficit in Mozambique, this study employs an Autoregressive Distributed Lag (ARDL) model, developed by Pesaran and Shin (1999). The ARDL model is particularly suitable for examining both short-run and long-run relationships between variables, as highlighted by Ekanayake (2012) and Catão and Terrones (2001). This model is robust to variables that are integrated of different orders (I(0) and I(1)) but not I(2), making it ideal for the data under consideration.

The empirical studies reviewed underscore the importance of both long-run and short-run dynamics, particularly in the context of developing economies. For instance, Solomon and De Wet (2004) found that fiscal deficits had long-term inflationary effects, while Ezeabasili and Mojekwu (2012) and Sanya (2017) noted that the inflationary impact can vary depending on monetary policy and institutional factors. The ARDL model will allow this study to capture the dual nature of fiscal deficit impacts, examining both long-run equilibrium relationships and short-run dynamics.

The baseline model is specified as:

$$LnIPC_t = \beta_1 + \beta_2 DF_t + \beta_3 LnD_t + \beta_4 LnM_t + \beta_5 FPC_t \quad (1)$$

To test for the long-run relationship between fiscal deficits and inflation, the ARDL bounds testing procedure developed by (Pesaran, Shin, & Smith, 2001) will be employed. This procedure is consistent with the empirical findings of studies like those by Bordo and Levy (2020), who found long-run relationships between fiscal deficits and inflation during periods of fiscal stress.

The following hypotheses are tested:

H_o: No Long – Run relationship exists.

H_1: A long – run Relationship Exists.

The F-statistic is computed and compared to critical values from (Pesaran, Shin, & Smith, 2001). If the F-statistic exceeds the upper bound, cointegration is confirmed; if it falls below the lower bound, no cointegration exists; and if it lies between the bounds, the result is inconclusive.

Following the bounds test, the Error Correction Model (ECM) derived from the ARDL framework will be employed to analyze the short-run dynamics between fiscal deficits and inflation. The ECM helps estimate the speed of adjustment towards long-run equilibrium following a shock, with a statistically significant negative

coefficient of the lagged error correction term indicating cointegration.

The short-run dynamics will provide valuable insights into how quickly inflation adjusts in response to fiscal deficits, in line with the findings of studies like Ekanayake (2012) and Sanya (2017), which emphasized the short-term impact of fiscal deficits on inflation.

The study selected ARDL bounds testing approach for its suitability with small sample sizes, ease of interpretation, and ability to capture both short- and long-run dynamics. Unlike Johansen, ARDL operates within a single-equation framework, incorporates an Error Correction Model, and is robust to endogeneity, making it more efficient.

To validate the reliability of the model, several diagnostic tests were conducted such as Serial Correlation: Breusch-Godfrey LM test, Heteroskedasticity: Breusch-Pagan-Godfrey test and Normality: Jarque-Bera test.

4. Result

In this section, we rigorously assess the nexus between fiscal deficit and inflation in Mozambique from 2017.1 to 2023.12. Initial scrutiny involves the Phillips – Perron test (PP) to establish variable stationarity, ARDL Bound Test to analysis the long run relation additionally the paper also makes a short run assessment to the relation between the variables. Then is proceeded by the validation test of the model, autocorrelation, heteroskedasticity and normality.

4.1 Unit Root Test

The following table (Table 2) provides the Phillips-Perron (PP) test statistics for various variables at levels (I(0)) and at first differences (I(1)). The PP test is a widely used statistical tool to evaluate the stationarity of time series data, helping determine whether a series contains unit roots that must be adjusted to make the data suitable for analysis. The results indicate that all variables are stationarity at the first difference, which suggests that they are integrated of order one, denoted as I(1).

Table 1. PP test

Variable	Order	PP statistics	Critical value 5%	Stationarity
df	I(0)	-1.883543	-2.896779	Not stationary
	I(1)	-7.059407	-2.897223	Stationary
d	**I(0)**	**-1.097776**	**-2.896779**	**Not stationary**
	I(1)	**-7.092592**	**-2.897223**	**Stationary**
IPC	I(0)	0.794151	-2.896779	Not stationary
	I(1)	-4.143364	-2.897223	Stationary
M	**I(0)**	**-0.642281**	**-2.896779**	**Not stationary**
	I(1)	**-9.861651**	**-2.897223**	**Stationary**
FPC	I(0)	-1.789499	-2.896779	Not stationary
	I(1)	-9.033343	-2.897223	Stationary

This outcome confirms that first differencing is required to render each series stationary, a critical step in econometric analysis to avoid spurious results. Such stationarity is especially important for models like the Autoregressive Distributed Lag (ARDL) model, which typically assumes the variables are stationary to produce valid and consistent estimates. The confirmation of stationarity at the first difference ensures the variables are suitable for further analysis within this modeling framework.

4.3 Bound Test

The Bound Test was conducted to assess the presence of a long-run relationship among the variables under investigation. The test involves comparing the calculated F-statistic with the critical values corresponding to different significance levels for both I(0) and I(1) bounds. In this analysis, the calculated F-statistic is 6.567980, which surpasses all critical values at the 10%, 5%, 2.5%, and 1% significance levels, as shown in Table 3.

Table 2. Bound test

	Value	Significance	I(0)	I(1)
F Statistics	6.567980	10%	2.2	3.09
k	4	5%	2.56	3.49
		2.5%	2.88	3.87
		1%	3.29	4.37

Since the F-statistic exceeds these critical values at all standard significance levels, we reject the null hypothesis of "no levels relationship" between the variables. This finding provides strong evidence of a long-run relationship, supporting the model's appropriateness for capturing long-term dynamics among the included variables.

4.3 Long Run Relation

To conduct a robust analysis of the relationship between fiscal deficit and inflation, it is crucial to validate key statistical assumptions, including normality, autocorrelation, and heteroskedasticity. The diagnostic tests performed are summarized in Table 4, with detailed results available in the appendix.

Table 3. Diagnosis test

Normality - Jarque – Bera	0.601057 (0.740427)
Serial Correlation - Breusch-Godfrey LM	0.897981 (0.4121)
Heteroskedacity - Breusch-Pagan - Godfrey	3.520098 (0.0008)

The Jarque-Bera test yielded a p-value above the 5% significance threshold ($p > 0.05$), confirming that the residuals follow a normal distribution. Similarly, the Breusch-Pagan LM test for autocorrelation indicated no evidence of serial correlation, as the probability associated with the F-statistic also exceeded 5% ($p > 0.05$). These results support the null hypothesis that the residuals are free from autocorrelation.

However, the heteroskedasticity test rejected the null hypothesis of homoscedasticity, indicating the presence of heteroskedasticity in the model. To address this issue, the model was re-estimated using Newey-West standard errors, which correct for both heteroskedasticity and autocorrelation. This adjustment enhances the accuracy of the standard error estimates, ensuring robust statistical inferences and improving the reliability of the model's results.

Table 4. Long run relation

Variables	Coefficient	t Statistics	p – value
DF	0.008946	2.961491	0.0042
FPC	0.004819	2.021135	0.0470
LND	-0.501634	-3.577742	0.0006
LNM	0.770682	12.14501	0.0000
C	0.226062	0.215593	0.8299

Long Run Equation:

$$LnIPC_t = 0.2261 + 0.0089DF_t + 0.0048FPC_t - 0.5016LnD_t + 0.77LnM_t + u_t$$

The positive and statistically significant relationship between fiscal deficits and inflation suggests that, on average, a 1% increase in the fiscal deficit as a percentage of GDP results in a 0.0089% rise in inflation. This finding aligns with the Fiscal Theory of the Price Level (FTPL), which posits that monetized fiscal deficits expand the money supply, fueling inflation (Cochrane, 2023). Similarly, Keynesian economics argues that fiscal deficits can raise aggregate demand, exerting upward pressure on prices, especially when the economy approaches full capacity (Mankiw, 2009). This result corroborates prior studies by Catão and Terrones (2001, 2003), Solomon and De Wet (2004), Makochekanwa (2008), and Obeng and Abotsi (2024).

Similarly to the findings of Nguyen (2015) and Abdu (2022), the results indicate a positive relationship between interest rates and inflation, where a 1% increase in interest rates is associated with an average rise of 0.0048% in inflation. This finding is consistent with the Cost-Push Inflation Theory and the Fisher Effect. According to the cost-push mechanism, higher interest rates increase borrowing costs for businesses, driving up production expenses, which are often transferred to consumers as higher prices (Mankiw, 2009). The Fisher Effect, on the other hand, posits that nominal interest rates embed expectations of future inflation, suggesting that higher rates may reflect anticipated inflationary pressures (Blanchard & Johnson, 2013). Additionally, elevated interest rates can contribute to currency depreciation, further fueling inflation by increasing the cost of imports (Mankiw, 2009). These mechanisms collectively highlight the complex interplay between monetary policy and inflation dynamics.

Differing from the findings of Ezeabasili and Mojekwu (2012) and Muhammad et al. (2016), which identified no

significant relationship between inflation and public debt, the results of the study reveal a negative coefficient (-0.501634) with a significant p-value (0.0006), indicating that a 1% increase in public debt reduces inflation by 0.50% in the long run. While seemingly counterintuitive, this outcome aligns with the Ricardian Equivalence Hypothesis.

Under the Ricardian Equivalence Hypothesis, investors may anticipate that higher public debt will necessitate future tax increases. This expectation could lead to a reduction in current consumption, thereby decreasing aggregate demand and, subsequently, inflation (Greenlaw & Shapiro, 2018). Another contributing factor is tightening of monetary policy by Mozambique's central bank. According to the data can deduct that another contributing factor is the tightening of monetary policies by Mozambique's central bank Interest rates were raised from 15.75% in 2020 to 20.25% in 2023, a 28.57% increase, which played a role in curbing inflation. Higher interest rates tend to attract buyers of government bonds, while simultaneously reducing consumption and investment, thereby helping to alleviate inflationary pressures.

While this may appear contradictory to the positive relationship found between inflation and interest rates, the distinction lies in the time horizon. In the short to medium run, higher interest rates can increase inflation via cost-push mechanisms or currency depreciation. However, in the long run, the deflationary impact of reduced demand due to Ricardian behaviour and tighter monetary conditions takes precedence. This nuanced interpretation underscores the complexity of macroeconomic interactions between fiscal and monetary policies.

Consistent with numerous empirical studies, such as those by Makochekanwa (2008), Ekanayake (2012), Nguyen (2015), and Ezeabasili and Mojekwu (2012), the results indicate a positive relationship between money supply and inflation, revealing a robust and statistically significant long-term association. Specifically, a 1% increase in money supply leads to a 0.77% rise in inflation. This finding underscores the pivotal role of money supply in shaping inflationary dynamics and aligns with the Quantity Theory of Money (QTM), which posits that an increase in the money supply (M), assuming constant velocity (V) and output (Y), results in a proportional rise in the price level (Mishkin, 2004)).

This relationship is strongly supported by monetarist theory, particularly the work of Milton Friedman, who famously asserted, ”Inflation is always and everywhere a monetary phenomenon” (Blanchard & Johnson, 2013). Monetarists argue that excessive monetary expansion is the principal driver of inflation over the long term. From a Keynesian perspective, while short-term factors such as price stickiness and aggregate demand fluctuations dominate, Keynesians acknowledge that sustained growth in money supply can lead to demand-pull inflation in the long run, particularly in economies operating at or near full employment. These findings highlight the importance of prudent monetary policy in maintaining price stability and managing inflation expectations.

4.3 Short Run Relation

The Error Correction Model (ECM) regression results and Bound Test statistics provide valuable insights into the short-run dynamics and long-run relationships among the variables under study. The analysis confirms both the significance of short-term adjustments and the existence of a long-term equilibrium.

Table 5. Error correction model

Variables	Coefficient	t – statistics	p - value
D(LnIPC(-1))	0.628821	10.19188	0.0000
D(DF)	-0.000584	-0.434404	0.6653
D(DF(-1))	-0.005781	-4.089366	0.0001
D(LnD)	0.057469	0.805971	0.4230
D(LnD(-1))	0.272021	3.663607	0.0005
CointEq(-1)	-0.122898	-6.494850	0.000

The coefficient of the error correction term (CointEq(-1)) is -0.1229 (p = 0.0000), indicating a statistically significant negative relationship. This confirms the presence of a long-run equilibrium among the variables, with deviations from this equilibrium being corrected at a rate of 12.3% per period.

The lagged inflation term (ΔLNIPC(-1)) has a coefficient of 0.6288 (p = 0.0000), indicating a highly significant and positive relationship. This result suggests strong inflation persistence in the short run, implying that past inflation significantly influences current inflation dynamics. This finding aligns with the theory of adaptive expectations, which posits that economic agents base their expectations of future inflation on past trends, leading to inertia in price-setting behaviors (Mankiw, 2009). Such persistence is particularly evident in economies

experiencing sustained inflationary pressures, where businesses and consumers adjust their expectations and actions based on observed inflation rates. This highlights the challenge of breaking inflationary cycles without structural or policy interventions aimed at anchoring expectations.

The current fiscal deficit (ΔDF) exhibits an insignificant short-run impact on inflation (coefficient: -0.000584, p = 0.6653), indicating that immediate changes in fiscal deficits do not directly influence inflationary trends. This aligns with findings from studies such as Ezeabasili and Mojekwu (2012), which also reported no significant short-term relationship. However, the lagged fiscal deficit term (ΔDF(-1)) demonstrates a significant negative effect on inflation (coefficient: -0.005781, p = 0.0001), reinforces the need for fiscal sustainability. In the long run, unsustainable fiscal practices may exacerbate inflationary pressures, underscoring the importance of disciplined fiscal policies.

Current changes in public debt (ΔLND) show an insignificant impact on inflation (coefficient: 0.0575, p = 0.4230), indicating that immediate shifts in public debt levels have limited short-term effects. This result is consistent with the findings of Muhammad et al. (2016), which suggest that the inflationary effects of debt are not immediate but rather evolve over time. Conversely, the lagged public debt term (ΔLND(-1)) reveals a significant positive relationship with inflation (coefficient: 0.2720, p = 0.0005), implying that the inflationary consequences of public debt take time to manifest.

The short-run results corroborate long-term theoretical and empirical insights. Result showed that in the short run there is a positive relationship between interest rates and inflation, consistent with the Cost-Push Inflation Theory and the Fisher Effect. Higher interest rates increase borrowing costs for businesses, leading to higher production costs passed on as increased consumer prices. Simultaneously, higher nominal rates may reflect inflation expectations, contributing to immediate inflationary pressures. While in Long-Run, however, tighter monetary policy (higher interest rates) reduces aggregate demand, discouraging consumption and investment. Over time, these contractionary effects dominate, leading to deflationary impacts. Thus, the positive short-run relationship is a transient effect that dissipates as the economy adjusts.

As for public dect result indicates that it is insignificant in the short run, reflecting the delay in the transmission of debt-related inflationary pressures. The lagged debt variable shows a positive effect, indicating that debt-financed expenditures can eventually push up demand, contributing to inflationary trends. The long-run results show a negative relationship between public debt and inflation. This finding aligns with the Ricardian Equivalence Hypothesis and the Debt Sustainability Framework, where expectations of future taxation and fiscal tightening reduce current aggregate demand. Furthermore, high debt levels often prompt monetary tightening (e.g., interest rate hikes), which reduces inflation over time.

The current fiscal deficit has an insignificant effect on inflation in the short run, as immediate changes in deficits may not directly influence aggregate demand or prices. However, the lagged fiscal deficit shows a significant negative impact, indicating that unsustainable fiscal practices may prompt anticipatory adjustments in behavior, such as reduced spending, mitigating inflationary pressures. The long-run results exhibit a positive relationship between fiscal deficits and inflation. Monetized deficits expand the money supply, driving inflation, as suggested by the Fiscal Theory of the Price Level (FTPL). Over extended periods, persistent deficits erode fiscal discipline, amplifying inflationary pressures.

Across both the short and long run, the relationship between money supply and inflation is positive and statistically significant, emphasizing its pivotal role in shaping inflationary dynamics. The Quantity Theory of Money (QTM) and monetarist perspectives consistently predict that excessive monetary growth leads to proportional increases in price levels. While short-run factors like price stickiness or velocity adjustments may moderate this effect, the long-run outcome remains robust and significant.

The policymakers can balance fiscal expansion with inflation control by maintaining fiscal sustainability, implementing effective monetary policies, and managing money supply growth to ensure that economic growth does not come at the expense of price stability. Coordinating fiscal discipline with careful monetary interventions will be key to maintaining macroeconomic stability.

5. Conclusion

This study investigates the relationship between fiscal deficits and inflation in Mozambique from 2017 to 2023 using the Autoregressive Distributed Lag (ARDL) model. The findings indicate a long-run link between fiscal deficits and inflation, supporting both the Fiscal Theory of the Price Level (FTPL) and Keynesian perspectives. Notably, fiscal deficits and an increased money supply contribute to inflationary pressures, reinforcing monetarist views. While interest rates have short-term inflationary effects due to cost-push factors, their

long-term impact is deflationary as they reduce aggregate demand.

The study also reveals a negative long-run relationship between public debt and inflation, consistent with the Ricardian Equivalence Hypothesis, where higher public debt leads to expectations of future taxation, thus reducing present consumption and inflationary pressures. These findings highlight the importance of balancing fiscal expansion with inflation control.

Policymakers in Mozambique should prioritize fiscal discipline, as fiscal deficits may spur short-term economic activity but can lead to inflationary pressures in the long run. Effective monetary policy, particularly controlling the money supply and managing interest rates, is essential for maintaining price stability. Coordinated fiscal and monetary interventions are necessary to ensure macroeconomic stability.

Future research should explore the role of external factors, such as exchange rate fluctuations and global economic conditions, and assess how structural reforms could impact inflation dynamics. These areas would provide deeper insights into policy effectiveness in Mozambique's economic context.

References

Abdu, M. I. (2022). Analyzing the relationship between Fiscal Deficit and Inflation: The Case of Egypt. *Scientific Journal for Economic& Commerce, 52*(4), 235-271. https://doi.org/10.21608/jsec.2022.263945

Afrin, S. (2013). Fiscal Deficits and Inflation: the case of Bangladesh. *Working Paper Series: WP 1303*.

Blanchard , O., & Johnson , D. R. (2013). *Macroeconomics* (6th ed.). USA: Pearson Education.

Bordo, M. D., & Levy, M. D. (2020). Do Enlarged Fiscal Deficits Cause Iflation: The Historical Records. *NBER WORKING PAPER SERIES, Working Paper 28195*. https://doi.org/10.3386/w28195

Catão, L., & Terrones, M. (2001). Fiscal Deficits and Inflation: A New Look at the Emerging Market Evidence. *IMF Working Papers, WP/O1/74*. https://doi.org/10.5089/9781451849592.001

Catão, L., & Terrones, M. (2003). Fiscal Deficits and Inflation. *IMF Working Paper, WP/03/65*. https://doi.org/10.5089/9781451848700.001

CGE. (2018). *Conta Geral de Estado Ano 2017.* Maputo: Volume 1.

CGE. (2019). *Conta Geral de Estado Ano 2018.* Maputo: Volume I.

CGE. (2020). *Conta Geral de Estado Ano 2019.* Maputo: Volume I.

CGE. (2021). *Conta Geral de Estado ano 2020.* Maputo: Volume I.

CGE. (2022). *Conta Geral de Estado 2021.* Maputo: Volume I.

CGE. (2023). *Conta Geral de Estado Ano 2022.* Maputo: Volume 1.

CGE. (2024). *Conta Geral de Estado Ano 2023.* Maputo: Volume I.

Cochrane, J. H. (2023). *The Fiscal Theory of the Price Level.* New Jersey: Princeton Univeristy Press. https://doi.org/10.1353/book.109854

Dissanayake, D. (2016, December 16). *Identifying the Relationships between Budget Deficit and Selected Macroeconomic Variables: A Study of Sri Lanka During the Postliberalization Era.* https://doi.org/10.2139/ssrn.2910354

Eita, J. H., Manuel, V., Nakusera, E. N., & Florette, N. (2021). The Impact of Fiscal Deficit on Inflation in Namibia. *Journal of Central Banking Theory and Practice, 10*(1), 141-164. https://doi.org/10.2478/jcbtp-2021-0007

Ekanayake, H. K. (2012). The Link Between Fiscal Deficit and Inflation: Do public sector wages matter? *ASARC Working Papers*.

Ezeabasili, V. N., & Mojekwu, J. N. (2012). An Empirical Analysis of Fiscal Deficits and Inflation in Nigeria. *International Business and Management,* 105-120. https://doi.org/10.3968/j.ibm.1923842820120401.0185

Greenlaw, S. A., & Shapiro, D. (2018). *Principles of Macroeconomics.* Texas: OpenStax.

Makochekanwa, A. (2008). *The Impact of a Budget Deficit on Inflation in Zimbabwe*. Retrieved from https://mpra.ub.uni-muenchen.de/24227/

Mankiw, N. G. (2009). *Macroeconomics* (7th ed.). New York, USA: Worth Publishers.

Mankiw, N. G. (2009). *Macroeconomics.* New York: Worth Publishers.

Mishkin, F. S. (2004). *The Economics of Money, Banking and Financial Markets* (7th ed.). USA: The Addison-Wesley series in economics.

Mishkin, F. S. (2004). *The Economics of Money, Banking and Financial MArkets.* USA: Addison-Wesley.

Muhammad, S. D., Zafar, S., Noman, M., & Arfeen, N. (2016). The nexuses between budget deficit and price inflation in Pakistan: An ARDL bound testing approach. *Pakistan Journal of Commerce and Social Sciences (PJCSS), 10*(3), 606-614. https://doi.org/10.18488/journal.62/2016.3.9/62.9.113.121

Myovella., G. A., & Kisava, Z. S. (2018). Budget Deficit and Inflation in Tanzania: ARDL Bound Test Approach. *Journal of Business, Economics and Finance, 7*(1), 83-88. https://doi.org/10.17261/Pressacademia.2018.797

Nguyen, V. B. (2015). Effects of fiscal deficit and money M2 supply on inflation: Evidence from selected economies of Asia. *Journal of Economics, Finance and Administrative Science, 20*(38), 49-53. https://doi.org/10.1016/j.jefas.2015.01.002

Obeng, S. H., & Abotsi, A. K. (2024). Fiscal Deficits and Inflation in Ghana. *International Journal of Economics and Financial Issues, 14*(1), 154-163. https://doi.org/10.32479/ijefi.15116

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

ŞAHİN, B. E. (2019). Analysis of the Relationship Between Inflation, Budget Deficit and Money Supply in Turkey by ARDL Approach 1980-2017. *Journal of Life Economics, 6*(3), 297-306. https://doi.org/10.15637/jlecon.6.018

Sanya, O. (2017, August). Nexus Between Inflation and Budget Deficit: A Comparative Study Between Nigeria and South Africa. *International Journal of Economics, Commerce and Management, 5*(8), 98-112.

Solomon, M., & De Wet, W. (2004). The Effect of a Budget Deficit on Inflation: The Case of Tanzania. *SAJEMS NS, 7*(1), 100-116. https://doi.org/10.4102/sajems.v7i1.1431

Ssebulime, K., & Edward, B. (2019). Budget deficit and inflation nexus in Uganda 1980-2016: A cointegration and error correction modeling approach. *Journal of Economic Structures, 8*(3). https://doi.org/10.1186/s40008-019-0136-4

Appendix A. Eviews Output

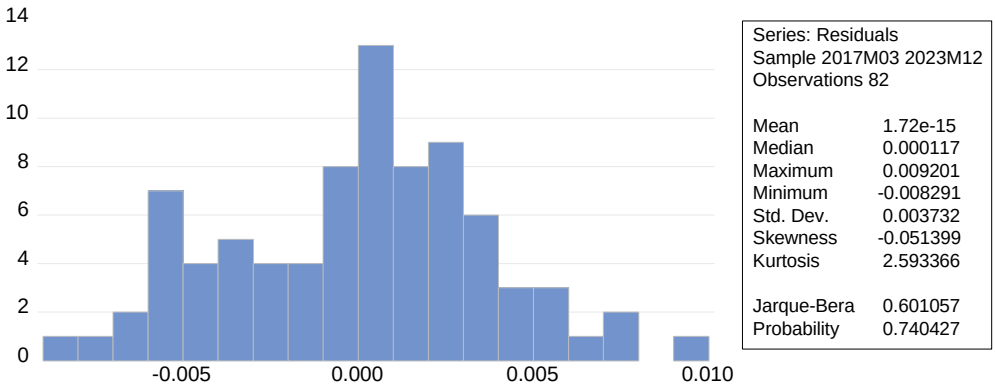

Figure A1. Normality test

Table A1. ARDL Long Run Form and Bound Test

ARDL Long Run Form and Bounds Test
Dependent Variable: D(LNIPC)
Selected Model: ARDL(2, 2, 0, 2, 0)
Case 2: Restricted Constant and No Trend
Date: 10/02/24 Time: 15:29
Sample: 2017M01 2023M12
Included observations: 82

Conditional Error Correction Regression

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.027783	0.099422	0.279442	0.7807
LNIPC(-1)*	-0.122898	0.023909	-5.140196	0.0000
DF(-1)	0.001099	0.000329	3.346602	0.0013
FPC**	0.000592	0.000350	1.694694	0.0945
LND(-1)	-0.061650	0.018062	-3.413234	0.0011
LNM**	0.094715	0.017071	5.548151	0.0000
D(LNIPC(-1))	0.628821	0.076196	8.252721	0.0000
D(DF)	-0.000584	0.001502	-0.389211	0.6983
D(DF(-1))	-0.005781	0.001615	-3.579747	0.0006
D(LND)	0.057469	0.080272	0.715928	0.4764
D(LND(-1))	0.272011	0.085227	3.191584	0.0021

* p-value incompatible with t-Bounds distribution.
** Variable interpreted as Z = Z(-1) + D(Z).

Levels Equation
Case 2: Restricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DF	0.008946	0.003021	2.961491	0.0042
FPC	0.004819	0.002385	2.021135	0.0470
LND	-0.501634	0.140210	-3.577742	0.0006
LNM	0.770682	0.063457	12.14501	0.0000
C	0.226062	1.048563	0.215593	0.8299

EC = LNIPC - (0.0089*DF + 0.0048*FPC -0.5016*LND + 0.7707*LNM + 0.2261)

F-Bounds Test — Null Hypothesis: No levels relationship

Test Statistic	Value	Signif.	I(0)	I(1)
		Asymptotic: n=1000		
F-statistic	6.567980	10%	2.2	3.09
k	4	5%	2.56	3.49
		2.5%	2.88	3.87
		1%	3.29	4.37
Actual Sample Size	82	Finite Sample: n=80		
		10%	2.303	3.22
		5%	2.688	3.698
		1%	3.602	4.787

Table A1. Short Run: Error Correction Model

ARDL Error Correction Regression
Dependent Variable: D(LNIPC)
Selected Model: ARDL(2, 2, 0, 2, 0)
Case 2: Restricted Constant and No Trend
Date: 10/02/24 Time: 15:32
Sample: 2017M01 2023M12
Included observations: 82

ECM Regression
Case 2: Restricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNIPC(-1))	0.628821	0.061698	10.19188	0.0000
D(DF)	-0.000584	0.001345	-0.434404	0.6653
D(DF(-1))	-0.005781	0.001414	-4.089366	0.0001
D(LND)	0.057469	0.071304	0.805971	0.4230
D(LND(-1))	0.272011	0.074247	3.663607	0.0005
CointEq(-1)*	-0.122898	0.018922	-6.494850	0.0000

R-squared	0.658638	Mean dependent var	0.004369
Adjusted R-squared	0.636180	S.D. dependent var	0.006388
S.E. of regression	0.003853	Akaike info criterion	-8.209562
Sum squared resid	0.001128	Schwarz criterion	-8.033460
Log likelihood	342.5920	Hannan-Quinn criter.	-8.138860
Durbin-Watson stat	1.724608		

* p-value incompatible with t-Bounds distribution.

F-Bounds Test — Null Hypothesis: No levels relationship

Test Statistic	Value	Signif.	I(0)	I(1)
F-statistic	6.567980	10%	2.2	3.09
k	4	5%	2.56	3.49
		2.5%	2.88	3.87
		1%	3.29	4.37

Table A3. Correlation Test

Breusch-Godfrey Serial Correlation LM Test:
Null hypothesis: No serial correlation at up to 2 lags

F-statistic	0.897981	Prob. F(2,69)	0.4121
Obs*R-squared	2.080188	Prob. Chi-Square(2)	0.3534

Test Equation:
Dependent Variable: RESID
Method: ARDL
Date: 10/02/24 Time: 15:30
Sample: 2017M03 2023M12
Included observations: 82
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNIPC(-1)	-0.081346	0.115904	-0.701843	0.4851
LNIPC(-2)	0.077312	0.109159	0.708244	0.4812
DF	0.000118	0.001507	0.078232	0.9379
DF(-1)	-0.000103	0.002560	-0.040131	0.9681
DF(-2)	2.86E-05	0.001619	0.017638	0.9860
FPC	2.40E-05	0.000353	0.067919	0.9460
LND	-0.009542	0.080752	-0.118163	0.9063
LND(-1)	0.011595	0.135253	0.085727	0.9319
LND(-2)	-0.005340	0.085479	-0.062477	0.9504
LNM	0.004281	0.017795	0.240594	0.8106
C	-0.000142	0.100246	-0.001417	0.9989
RESID(-1)	0.206445	0.161847	1.275554	0.2064
RESID(-2)	-0.008650	0.146560	-0.059018	0.9531

R-squared	0.025368	Mean dependent var	1.72E-15
Adjusted R-squared	-0.144133	S.D. dependent var	0.003732
S.E. of regression	0.003992	Akaike info criterion	-8.064525
Sum squared resid	0.001100	Schwarz criterion	-7.682972
Log likelihood	343.6455	Hannan-Quinn criter.	-7.911338
F-statistic	0.149664	Durbin-Watson stat	1.992816
Prob(F-statistic)	0.999546		

Table A4. Heteroskedasticity Test

Heteroskedasticity Test: Breusch-Pagan-Godfrey
Null hypothesis: Homoskedasticity

F-statistic	3.520098	Prob. F(10,71)	0.0008
Obs*R-squared	27.17942	Prob. Chi-Square(10)	0.0024
Scaled explained SS	16.23359	Prob. Chi-Square(10)	0.0931

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 10/02/24 Time: 15:30
Sample: 2017M03 2023M12
Included observations: 82
HAC standard errors & covariance (Bartlett kernel, Newey-West fixed bandwidth = 4.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.000867	0.000402	-2.159293	0.0342
LNIPC(-1)	0.000628	0.000312	2.010955	0.0481
LNIPC(-2)	-0.000434	0.000302	-1.435488	0.1555
DF	2.38E-05	3.20E-06	7.411197	0.0000
DF(-1)	-3.61E-05	4.33E-06	-8.355084	0.0000
DF(-2)	8.12E-06	3.59E-06	2.259743	0.0269
FPC	1.93E-06	1.38E-06	1.392439	0.1681
LND	-0.001201	0.000134	-8.957772	0.0000
LND(-1)	0.001837	0.000181	10.12423	0.0000
LND(-2)	-0.000462	0.000184	-2.518808	0.0140
LNM	-0.000153	5.06E-05	-3.026569	0.0034

R-squared	0.331456	Mean dependent var	1.38E-05
Adjusted R-squared	0.237295	S.D. dependent var	1.75E-05
S.E. of regression	1.53E-05	Akaike info criterion	-19.21820
Sum squared resid	1.65E-08	Schwarz criterion	-18.89534
Log likelihood	798.9460	Hannan-Quinn criter.	-19.08858
F-statistic	3.520098	Durbin-Watson stat	2.071718
Prob(F-statistic)	0.000818		

Copyrights

Copyright for this article is retained by the author(s), with first publication rights granted to the journal.

This is an open-access article distributed under the terms and conditions of the Creative Commons Attribution license (http://creativecommons.org/licenses/by/4.0/).