



The Role of Fiscal and Monetary Policy in Addressing Inflation in the Tunisian Economy

Skander Ben Hassine

PHD in economic, Departement PS2D University El Manar, Tunisia.

*Corresponding Author

Skander Ben Hassine

PHD in economic,
Departement PS2D
University El Manar,
Tunisia.

Article History

Received: 09.08.2025

Accepted: 20.10.2025

Published: 14.11.2025

Abstract: This study investigates the effectiveness of fiscal and monetary policy tools in controlling inflation in Tunisia over the period 1990–2024. Using the ARDL (Autoregressive Distributed Lag) model and EViews 12 for empirical analysis, the study explores both short-run and long-run dynamics between inflation (measured by the Consumer Price Index) and a set of key macroeconomic indicators, including the deposit interest rate, official exchange rate, oil revenues, GDP per capita, and total national expenditure. Results from the Unrestricted Error Correction Model (UECM) confirm the existence of a short-run self-correction mechanism, with about 47.7% of disequilibrium being corrected each period. The deposit interest rate exhibits a significant positive effect on inflation in both the short and long run, indicating that monetary policy actions, particularly interest rate adjustments, play a central role in shaping price behavior. Conversely, GDP per capita shows a negative but statistically weak long-term relationship with inflation, suggesting limited influence. Other fiscal indicators, such as oil revenues and public expenditure, appear to have unstable or insignificant effects. These findings highlight the complex interplay between macroeconomic variables and inflation, reinforcing the need for coordinated fiscal and monetary strategies, improved spending efficiency, and structural reforms to stabilize prices and enhance economic resilience.

Keywords: Inflation, monetary policy, fiscal policy, interest rate, exchange rate, GDP per capita, public expenditure, ARDL model, UECM, price stability, EViews, empirical analysis, Tunisian economy, macroeconomic policies.

This is an open access article under the [CC BY-NC](https://creativecommons.org/licenses/by-nc/4.0/) license



Introduction

This study aims to analyze and measure the effectiveness of fiscal and monetary policies in addressing the issue of inflation in the Tunisian economy during the period 1990–2024. Inflation is considered one of the major economic challenges facing Tunisia, as it directly impacts purchasing power and financial stability. To address this issue, the statistical software **EViews 12** will be used as a tool for economic data analysis and hypothesis testing. EViews allows for the handling of long time series, enabling the application of various economic tests such as **simple and multiple linear regression, cointegration tests, and error correction models**. In this study, data will be collected from the **World Bank database** to ensure comprehensiveness and accuracy. The focus will be on the following variables:

Dependent Variable:

- **Inflation, consumer prices (annual %) (CPI):** The annual inflation rate based on the Consumer Price Index.

Independent Variables:

Fiscal Policy Variables:

- **Oil rents (% of GDP):** Oil revenues as a percentage of GDP.
- **GDP per capita (current US\$):** Gross domestic product per capita in current US dollars.
- **Total national expenditure (% of GDP):** Total national spending as a percentage of GDP.

Monetary Policy Variables:

- **Deposit interest rate (%):** The interest rate on deposits.
- **Official exchange rate (LCU per US\$, period average):** The official exchange rate of the local currency against the US dollar (period average).

Cite this article:

Hassine, S. B., (2025). The Role of Fiscal and Monetary Policy in Addressing Inflation in the Tunisian Economy. *ISAR Journal of Economics and Business Management*, 3(11), 1-19.

Table 1: Variables and Symbols Used in the Econometric Model

English Description	Symbol
GDP per capita (constant 2010 US\$)	GDP/pc
Oil revenues (% of GDP)	OR/GDP
Inflation, prices paid by consumers (annual %)	IPPC
Total national expenditure (% of GDP)	TNE/GDP
Deposit interest rate (%)	DIR
Official exchange rate (local currency to US dollar, average period)	OER

Research Question:

How can we analyze and measure the effectiveness of fiscal and monetary policies in solving the problem of inflation in the Tunisian economy during the period 1990–2024?

Econometric Model

$$IPCC=f(GDP/pc, OR/GDP, DIR, OER, TNE/GDP)$$

$$IPCC = B_0 + B_1 GDP/pc + B_2 OR/GDP + B_3 DIR + B_4 OER + B_5 TNE/GDP + U_i$$

- **B₀:** The constant term
- **B₁, B₂, B₃, B₄, B₅:** Coefficients of the independent variables
- **U_i:** The random error term

1. Results of the Descriptive Analysis of the Variables

A number of statistical tools were used to present and analyze the data, and the results are shown in the following table:

Table 2: Descriptive Statistics Table for the Dependent and Independent Variables of the Study

	DIR	GDP_PC	IPPC	OER	OR_GDP	TNE_GDP
Mean	3.195833	11355.33	3.506361	0.962894	43.05090	78.30866
Median	2.500000	11401.73	2.649414	1.257597	46.82189	77.24266
Maximum	5.500000	13712.96	15.51848	1.313572	64.81644	112.4500
Minimum	2.083333	6569.595	-9.797647	0.280728	19.69785	45.27979
Std. Dev.	1.216818	1822.468	6.632193	0.438407	15.07799	20.25935
Skewness	1.296742	-1.127147	-0.265380	-0.707925	-0.179736	0.178491
Kurtosis	2.974687	3.987414	2.614887	1.614344	1.609532	1.882395
Jarque-Bera	5.605663	5.047354	0.358348	3.270564	1.718852	1.147064
Probability	0.060638	0.080164	0.835960	0.194897	0.423405	0.563531
Sum	63.91667	227106.6	70.12721	19.25788	861.0179	1566.173
Sum Sq. Dev.	28.13229	63106399	835.7337	3.651812	4319.573	7798.388
Observations	20	20	20	20	20	20

Source: Prepared by the researcher using the statistical software EViews 12.

The statistical analysis of the Tunisian economy's data over the period (1990–2024) reveals several important characteristics. The average annual inflation rate (IPPC) was approximately **3.51%**, with noticeable fluctuations as indicated by a relatively high standard deviation (**6.63**). The distribution of inflation slightly skews to the left (**skewness = -0.27**) and is **less peaked than normal (kurtosis = 2.61)**, which suggests cyclical fluctuations in prices and the occurrence of some years with negative or low inflation.

As for **GDP per capita (GDP_PC)**, the average was around **\$11,355** (in constant prices), also with significant variation (**standard deviation = 1,822**), and the distribution skews toward **lower values (skewness = -1.13)**, indicating income inequality over the years.

The **deposit interest rate (DIR)** had an average of **3.20%**, with a standard deviation of **1.22**. The distribution skews **to the right**

(skewness = 1.30), indicating the presence of periods with relatively high interest rates.

Meanwhile, the **official exchange rate (OER)** of the local currency against the US dollar averaged **0.96**, with **moderate volatility (standard deviation = 0.44)**, reflecting alternating periods of monetary stability and volatility, particularly during certain years.

The **oil revenues as a percentage of GDP (OR_GDP)** recorded a high average of **43%**, with considerable variability (**standard deviation = 15.08**), indicating the Tunisian economy's strong reliance on oil revenues and its sensitivity to global price fluctuations.

Total national expenditure (TNE_GDP) was also relatively high, with an average of **78% of GDP**, and showed noticeable fluctuations (**standard deviation = 20.26**), highlighting the significant role of public spending in the economy and its potential impact on inflation.

In general, there appear to be **interrelated dynamics** among the variables. For instance, higher inflation rates during certain periods coincided with increases in the exchange rate, oil revenue fluctuations, and changes in public spending. In contrast, GDP per

capita and interest rates appear to act as stabilizing factors, potentially helping to control inflation levels. This underscores the importance of examining the role of **fiscal and monetary policies** in addressing inflation in Tunisia during the study period.

2. Results of Stationarity Tests Using the Augmented Dickey-Fuller (ADF) Test:

To verify the **stationarity of the time series** used in the analysis, the **Augmented Dickey-Fuller (ADF)** test was employed to test for unit roots in the economic variables. The test evaluates the null hypothesis:

- **H₀: $\beta = 0$** → The time series is **non-stationary** (i.e., contains a unit root), versus the alternative hypothesis:
- **H₁: $\beta < 0$** → The time series is **stationary** (i.e., does not contain a unit root).

This test helps determine the order of integration for each variable and is essential for selecting the appropriate econometric model—especially when building a **cointegration model or error correction model (ECM)**.

Table 3: Tests Using the Augmented Dickey-Fuller (ADF) Test

UNIT ROOT TEST TABLE (PP)						
<u>At Level</u>						
	IPPC	DIR	GDP_PC	OER	OR_GDP	TNE_GDP
With Constant	-2.5847	0.1310	-2.5263	0.3167	-2.2458	-2.2786
<i>Prob.</i>	0.1056	0.9596	0.1184	0.9759	0.1952	0.1845
	n0	n0	n0	n0	n0	n0
With Constant & Trend	-2.5147	1.1005	-3.6610	-1.3513	-2.3008	-2.2336
<i>Prob.</i>	0.3196	0.9997	0.0392	0.8576	0.4212	0.4565
	n0	n0	**	n0	n0	n0
Without Constant & Trend	-2.0679	-1.0397	-0.7561	1.8161	-0.5147	-0.4160
<i>Prob.</i>	0.0387	0.2580	0.3813	0.9813	0.4854	0.5256
	**	n0	n0	n0	n0	n0
<u>At First Difference</u>						
	d(IPPC)	d(DIR)	d(GDP_PC)	d(OER)	d(OR_GDP)	d(TNE_GDP)
With Constant	-8.0469	-4.9587	-10.7580	-5.4283	-6.4027	-7.1962
<i>Prob.</i>	0.0000	0.0012	0.0000	0.0001	0.0000	0.0000
	***	***	***	***	***	***
With Constant & Trend	-7.7027	-4.8777	-13.5215	-5.7539	-6.2448	-7.4583
<i>Prob.</i>	0.0000	0.0063	0.0000	0.0002	0.0001	0.0000
	***	***	***	***	***	***
Without	-8.2842	-4.6123	-10.2257	-5.2188	-6.5629	-7.3216

Constant & Trend

Prob.	0.0000	0.0001	0.0000	0.0000	0.0000	0.0000
	***	***	***	***	***	***

UNIT ROOT TEST TABLE (ADF)

At Level

	IPPC	DIR	GDP_PC	OER	OR_GDP	TNE_GDP
With Constant t-Statistic	-3.3744	-21.9514	-2.5918	0.2013	-2.2789	-2.3211
Prob.	0.0191	0.0001	0.1045	0.9688	0.1847	0.1716
	**	***	n0	n0	n0	n0
With Constant & Trend t-Statistic	-3.3929	-35.2684	-3.6111	-1.2483	-2.3031	-2.2791
Prob.	0.0691	0.0001	0.0437	0.8842	0.4200	0.4330
	*	***	**	n0	n0	n0
Without Constant & Trend t-Statistic	-2.1330	-0.7160	-0.7637	1.1861	-0.3522	-0.5535
Prob.	0.0334	0.3931	0.3777	0.9364	0.5495	0.4697
	**	n0	n0	n0	n0	n0

At First Difference

	d(IPPC)	d(DIR)	d(GDP_PC)	d(OER)	d(OR_GDP)	d(TNE_GDP)
With Constant t-Statistic	-5.2635	-4.1049	-9.0420	-5.4397	-6.4027	-6.6802
Prob.	0.0001	0.0065	0.0000	0.0001	0.0000	0.0000
	***	***	***	***	***	***
With Constant & Trend t-Statistic	-5.1723	-3.6051	-8.9724	-5.6450	-6.2455	-6.5685
Prob.	0.0010	0.0642	0.0000	0.0003	0.0001	0.0000
	***	*	***	***	***	***
Without Constant & Trend t-Statistic	-5.3441	-4.1783	-9.1295	-5.2188	-6.5627	-6.7829
Prob.	0.0000	0.0003	0.0000	0.0000	0.0000	0.0000
	***	***	***	***	***	***

Notes: (*)Significant at the 10%; (**)Significant at the 5%; (***) Significant at the 1%. and (no) Not Significant
 *MacKinnon (1996) one-sided p-values.

This Result is The Out-Put of Program Has Developed By:

Dr. Imadeddin AlMosabbah
College of Business and Economics
Qassim University-KSA

Source: Prepared by the researcher using the statistical software **EViews 12**.

The results of unit root tests (both **PP** and **ADF**) indicate that all the studied variables—including the **annual inflation rate (IPPC)**, **deposit interest rate (DIR)**, **GDP per capita (GDP_PC)**, **official exchange rate (OER)**, **oil revenues as a percentage of GDP (OR_GDP)**, and **total national expenditure as a percentage of GDP (TNE_GDP)**—are **non-stationary at their level form**. Most of the variables failed to reject the null hypothesis of a unit root at level, whether under the constant term specification or under both the constant and trend. This is evidenced by **p-values** higher than the conventional significance levels (5% or 1%), which implies that the time series for these variables **exhibit unit root properties**, i.e., they are **non-stationary**.

However, upon taking the **first difference**, all variables—most notably the inflation rate (IPPC)—became **stationary**, as shown by significantly **negative t-statistics** and **very low p-values** (ranging

between 0.0000 and 0.01) under all model specifications (constant only, constant and trend, and none). This clearly indicates that the null hypothesis of a unit root is rejected at the first difference, meaning that all variables are **integrated of order one**, denoted as **I(1)**.

3. Determining the Optimal Lag Length:

In economic and financial studies, the concept of **lag length** plays a central role in understanding the dynamic relationships among time series variables. The **lag** refers to the time delay between a change in an independent variable and its observable impact on a dependent variable. In other words, economic or financial effects do not always materialize instantaneously; rather, they may become apparent after a certain time period—referred to as the **lag length**.

Table 4: Lag Selection Results for the Model

Model Selection Criteria Table

Dependent Variable: IPPC

Date: 05/17/25 Time: 08:59

Sample: 1 36

Included observations: 19

Model	LogL	AIC*	BIC	HQ	Adj. R-sq	Specification
58	-38.289657	5.254406	5.699592	5.315791	0.826863	ARDL(1, 0, 0, 1, 1, 0)
52	-38.844817	5.316091	5.761277	5.377476	0.815846	ARDL(1, 0, 1, 1, 0, 0)
57	-37.877665	5.319741	5.814391	5.387946	0.813936	ARDL(1, 0, 0, 1, 1, 1)
59	-38.918146	5.324238	5.769424	5.385624	0.814340	ARDL(1, 0, 0, 1, 0, 1)
43	-37.928243	5.325360	5.820011	5.393566	0.812887	ARDL(1, 1, 0, 1, 0, 1)
26	-38.022383	5.335820	5.830471	5.404026	0.810920	ARDL(2, 0, 0, 1, 1, 0)
60	-40.085880	5.342876	5.738596	5.397440	0.809756	ARDL(1, 0, 0, 1, 0, 0)
50	-38.226563	5.358507	5.853158	5.426713	0.806581	ARDL(1, 0, 1, 1, 1, 0)
42	-38.252308	5.361368	5.856019	5.429573	0.806027	ARDL(1, 1, 0, 1, 1, 0)
28	-39.352891	5.372543	5.817729	5.433929	0.805151	ARDL(2, 0, 0, 1, 0, 0)
27	-38.455115	5.383902	5.878553	5.452107	0.801606	ARDL(2, 0, 0, 1, 0, 1)
51	-38.479590	5.386621	5.881272	5.454827	0.801066	ARDL(1, 0, 1, 1, 0, 1)
41	-37.544645	5.393849	5.937965	5.468876	0.795080	ARDL(1, 1, 0, 1, 1, 1)
36	-38.620789	5.402310	5.896961	5.470516	0.797921	ARDL(1, 1, 1, 1, 0, 0)
25	-37.661052	5.406784	5.950900	5.481810	0.792412	ARDL(2, 0, 0, 1, 1, 1)
44	-39.725812	5.413979	5.859165	5.475364	0.796908	ARDL(1, 1, 0, 1, 0, 0)

Source: Prepared by the researcher using **EViews 12** statistical software.

The table presents a series of **Autoregressive Distributed Lag (ARDL)** models that vary in the number of lag periods (delays) applied to each independent variable within the model, aiming to select the optimal model that best explains the variations in the dependent variable **IPPC**. The selection process is based on several key statistical criteria, such as the **Log-Likelihood (LogL)**, which

reflects the goodness of model fit, and various information criteria, including the **Akaike Information Criterion (AIC)**, the **Bayesian Information Criterion (BIC)**, and the **Hannan-Quinn Criterion (HQ)**, which help balance the trade-off between model fit and complexity. In addition, the **Adjusted R-squared** measures the model's explanatory power for variations in the dependent variable.

Model No. 58 emerged as the most optimal across most criteria: it recorded the **lowest AIC value (5.254406)**, **lowest BIC value (5.699592)**, and the **highest Adjusted R-squared (0.826863)**. This suggests that the **ARDL(1, 0, 0, 1, 1, 0)** model is the most efficient in explaining the dependent variable **IPPC**.

4. Autoregressive Distributed Lag (ARDL) Model Test

The ARDL model test satisfied the two essential conditions outlined earlier. First, all variables included in the model are either

stationary at level I(0) or **stationary at first difference I(1)**, with **no variable integrated at second order or higher (I(2) or above)**.

The second condition is that the **dependent variable must be stationary at first difference I(1)**—which, in this study, is the **ratio of foreign reserves to imports**. The following table illustrates the results of the ARDL bounds test:

Table 5: ARDL Bounds Test Results for the Model

Dependent Variable: IPPC
 Method: ARDL
 Date: 05/16/25 Time: 16:10
 Sample (adjusted): 3 26
 Included observations: 19 after adjustments
 Maximum dependent lags: 2 (Automatic selection)
 Model selection method: Akaike info criterion (AIC)
 Dynamic regressors (1 lag, automatic): DIR GDP_PC OER OR_GDP
 TNE_GDP
 Fixed regressors: C
 Number of models evaluated: 64
 Selected Model: ARDL(1, 0, 0, 1, 1, 0)
 Note: final equation sample is larger than selection sample

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
IPPC(-1)	0.522738	0.194336	2.689862	0.0227
DIR	6.059304	1.789898	3.385278	0.0069
GDP_PC	-0.002690	0.001073	-2.507999	0.0310
OER	-21.59873	10.13168	-2.131801	0.0588
OER(-1)	20.74393	8.339229	2.487512	0.0321
OR_GDP	0.385728	0.235551	1.637562	0.1326
OR_GDP(-1)	0.062328	0.120734	0.516243	0.6169
TNE_GDP	-0.070592	0.063917	-1.104435	0.2953
C	1.369696	11.58951	0.118184	0.9083
R-squared	0.831085	Mean dependent var		3.246092
Adjusted R-squared	0.695954	S.D. dependent var		6.708173
S.E. of regression	3.698914	Akaike info criterion		5.759470
Sum squared resid	136.8196	Schwarz criterion		6.206836
Log likelihood	-45.71497	Hannan-Quinn criter.		5.835182
F-statistic	6.150186	Durbin-Watson stat		2.323426
Prob(F-statistic)	0.004896			

*Note: p-values and any subsequent tests do not account for model selection.

Source: Prepared by the researcher using EViews 12 statistical software.

This table presents the results of the **ARDL model**, which investigates the relationship between the dependent variable **IPPC** and a set of independent variables, taking into account the lag structures of some variables. The selected model is **ARDL(1,0,0,1,1,0)**, which includes one lag for the dependent variable **IPPC**, and lags for selected independent variables based on the **Akaike Information Criterion (AIC)** for optimal model selection.

The results show that the **lagged value of IPPC (IPPC(-1))** has a **positive and statistically significant effect (coefficient = 0.523, p-value = 0.0227)**, indicating an **autoregressive relationship** where current values of IPPC are influenced by past values. Similarly, the **deposit interest rate (DIR)** has a **strong positive and significant effect (coefficient = 6.059, p = 0.0069)**, suggesting that an increase in DIR is associated with an increase in IPPC.

On the other hand, **GDP per capita (GDP_PC)** shows a **negative and statistically significant effect (coefficient = -0.0027, p = 0.031)**, indicating that a rise in GDP per capita is associated with a slight decrease in IPPC. The **official exchange rate (OER)** exhibits a **mixed effect**: the current value of OER has a **negative but marginally insignificant impact (coefficient = -21.6, p = 0.059)**, whereas its **lagged value (OER(-1))** has a **positive and statistically significant effect (coefficient = 20.74, p = 0.032)**,

suggesting differentiated short- and long-term effects of exchange rate movements on IPPC.

Other variables, such as **oil revenue as a percentage of GDP (OR_GDP)** and **total national expenditure as a percentage of GDP (TNE_GDP)**, did not exhibit statistically significant effects in this model, as their p-values exceeded 0.1, indicating a lack of robust evidence for their impact on IPPC under the current specification.

Overall, the model explains approximately **69.6%** of the variation in the dependent variable, as reflected by the **adjusted R-squared**, which is a good indicator of model fit. Furthermore, the **Durbin-Watson statistic (2.32)** suggests **no significant autocorrelation** in the model's residuals, supporting the adequacy of the model's specification.

5. Bounds Test

The **Bounds Test** is a statistical tool used to assess the **long-run equilibrium relationship** between variables within **dynamic regression models** such as the ARDL (AutoRegressive Distributed Lag) model. This test is applied to determine whether the variables in the model are **cointegrated**, i.e., whether they share a **long-run relationship**, meaning that they move together over time despite short-term fluctuations.

Table 6: Results of the Bounds Test for the Model

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
			Asymptotic: n=1000	
F-statistic	3.618988	10%	2.08	3
k	5	5%	2.39	3.38
		2.5%	2.7	3.73
		1%	3.06	4.15
			Finite	Sample:
Actual Sample Size	19		n=35	
		10%	2.331	3.417
		5%	2.804	4.013
		1%	3.9	5.419
			Finite	Sample:
			n=30	
		10%	2.407	3.517
		5%	2.91	4.193
		1%	4.134	5.761

Source: Prepared by the researcher using EViews 12 statistical software.

The **Bounds Test** indicates the presence of a **long-run equilibrium relationship** among the variables included in the ARDL model. The calculated **F-statistic** value is **3.619**, which exceeds the **upper critical bound at the 5% significance level (3.38)**. Accordingly, the **null hypothesis of no level relationship** is rejected, confirming the existence of a **cointegrating (long-run) relationship** among the variables in the model.

This finding supports the robustness of the estimated relationship, even under varying sample sizes, and enhances the credibility of the model in capturing the long-run interactions among the variables under study. The outcome provides strong statistical evidence of equilibrium behavior in the system, justifying the next step in the analysis: the estimation of short-run dynamics.

6. Estimation of Short-Run Relationship Using the Unrestricted Error Correction Model (UECM)

The estimation of the **short-run relationship** using the **Unrestricted Error Correction Model (UECM)** represents a crucial step in analyzing the dynamic interactions among economic variables. This model provides insights into how temporary deviations from the established long-run equilibrium are corrected over time. In the context of the current study, the UECM is employed to assess the **speed and direction of adjustment** when the system is out of equilibrium, offering a deeper understanding of the short-term economic behavior that complements the long-run cointegration results.

Table 7: ARDL Long Run Form and Bounds Test

ARDL Long Run Form and Bounds Test
 Dependent Variable: D(IPPC)
 Selected Model: ARDL(1, 0, 0, 1, 1, 0)
 Case 2: Restricted Constant and No Trend
 Date: 05/17/25 Time: 09:11
 Sample: 1 36
 Included observations: 19

Conditional Error Correction Regression

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.369696	11.58951	0.118184	0.9083
IPPC(-1)*	-0.477262	0.194336	-2.455857	0.0339
DIR**	6.059304	1.789898	3.385278	0.0069
GDP_PC**	-0.002690	0.001073	-2.507999	0.0310
OER(-1)	-0.854794	8.609754	-0.099282	0.9229
OR_GDP(-1)	0.448057	0.259793	1.724666	0.1153
TNE_GDP**	-0.070592	0.063917	-1.104435	0.2953
D(OER)	-21.59873	10.13168	-2.131801	0.0588
D(OR_GDP)	0.385728	0.235551	1.637562	0.1326

* p-value incompatible with t-Bounds distribution.

** Variable interpreted as $Z = Z(-1) + D(Z)$.

Source: Prepared by the researcher using EViews 12 statistical software.

7. Short-Run Relationship Estimation Using the Unrestricted Error Correction Model (UECM)

The estimation of short-run dynamics through the **Unrestricted Error Correction Model (UECM)** represents a pivotal step in analyzing the interactive behavior among the economic variables included in the model. The UECM framework allows for a deeper understanding of how temporary deviations from the long-run equilibrium path are corrected over time, reflecting the

responsiveness of the economic system to short-term disturbances and its ability to restore stability.

In the selected ARDL(1, 0, 0, 1, 1, 0) model, which incorporates macroeconomic variables such as inflation (IPPC), monetary and fiscal policy indicators, the results from the UECM estimation show that the coefficient of the **lagged dependent variable (IPPC(-1))**, interpreted as the **error correction term (ECT)**, is **negative (-0.477262)** and **statistically significant** at the 5% level ($p = 0.0339$). This indicates the presence of a strong and effective

self-correcting mechanism, whereby approximately **47.7% of the deviation** from the long-run equilibrium is adjusted in each time period. This result implies a relatively fast speed of adjustment of inflation toward its long-run path.

Regarding monetary policy components, the **deposit interest rate (DIR)** demonstrates a **positive and statistically significant** short-run effect (**coefficient = 6.059304, p = 0.0069**), suggesting that an increase in interest rates is associated with a short-term rise in inflation. This result may reflect specific local market dynamics, such as the cost-push effects of higher financing costs or the lagged transmission of monetary policy to the real economy.

Conversely, **GDP per capita (GDP_PC)** shows a **negative and significant** impact (**coefficient = -0.002690, p = 0.0310**), indicating that higher levels of individual income tend to reduce inflation in the short run. This could be attributed to improved productivity and purchasing power, which help in stabilizing price levels.

Other variables, such as the **lagged official exchange rate (OER(-1))**, **oil revenues as a percentage of GDP (OR_GDP(-1))**, and **total national expenditure (TNE_GDP)**, were not statistically significant, suggesting that their short-run impacts on inflation are weak or unstable over the sample period.

Additionally, the **first-difference of the exchange rate (D(OER))** exhibited a **marginally significant negative effect (p = 0.0588)**, whereas the **first-difference of oil revenues (D(OR_GDP))** did not show a statistically significant influence. This may indicate the unstable and indirect role of exchange rate fluctuations on short-

run inflation, particularly in economies reliant on imports or with high foreign currency exposure.

8. Long-Run Estimated Coefficients

In the present model, we focus on estimating the **long-run coefficients** using the ARDL (Autoregressive Distributed Lag) approach, which is recognized for its efficiency in simultaneously capturing both short-run and long-run relationships among variables. The ARDL framework enables the analysis of how variables evolve and interact over time, taking into account their lagged values.

The long-run coefficients are derived from the equilibrium relationship implied by the ARDL model, providing insight into the **persistent and structural effects** of independent variables on the dependent variable. These coefficients are fundamental for understanding the long-term influence of macroeconomic variables, reflecting how a change in a specific determinant permanently affects inflation (IPPC) when the system is at equilibrium.

This estimation phase follows the **Bounds Test**, which confirms the existence of a long-run relationship among the variables. Once cointegration is established, the long-run coefficients are interpreted to assess the **magnitude and direction** of influence of each explanatory variable over time.

The estimated long-run coefficients offer important policy implications, especially in identifying which factors exert lasting impacts on inflation and should therefore be the focus of long-term macroeconomic strategies.

Levels Equation

Case 2: Restricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DIR	12.69596	6.093577	2.083499	0.0638
GDP_PC	-0.005637	0.003269	-1.724183	0.1154
OER	-1.791036	17.97607	-0.099634	0.9226
OR_GDP	0.938806	0.623456	1.505810	0.1630
TNE_GDP	-0.147911	0.173094	-0.854510	0.4128
C	2.869903	24.64102	0.116469	0.9096

$$EC = IPPC - (12.6960*DIR - 0.0056*GDP_PC - 1.7910*OER + 0.9388 *OR_GDP - 0.1479*TNE_GDP + 2.8699)$$

Source: Prepared by the researcher using the EViews 12 statistical software.

Estimated Equation:

The relationship between the variables is specified through the following equation:

$$EC = IPPC - (12.6960*DIR - 0.0056*GDP_PC - 1.7910*OER + 0.9388*OR_GDP - 0.1479*TNE_GDP + 2.8699)$$

- **DIR (Deposit Interest Rate):** This variable shows a strong positive impact on inflation, with a coefficient of 12.696. This indicates that a one-unit increase in the interest rate on deposits is associated with an approximate 12.7-unit increase in the inflation rate over the long term. This result highlights the significant influence of monetary policy in driving inflation through borrowing

costs and its broader effects on aggregate demand and supply.

- **GDP_PC (Gross Domestic Product per Capita):** The coefficient for this variable is -0.0056, indicating an inverse relationship between income per capita and inflation. A one-unit increase in per capita GDP is associated with a slight 0.0056-unit decrease in inflation. However, this relationship is statistically insignificant (p-value = 0.1154), suggesting a weak or unclear effect within the current model.
- **OER (Official Exchange Rate):** This variable exhibits a negative coefficient (-1.7910), suggesting a potential inverse relationship with inflation. Nonetheless, the effect is statistically insignificant (p-value = 0.9226), implying that changes in the official exchange rate do not significantly explain inflation variations in this context.
- **OR_GDP (Oil Revenues as a Percentage of GDP):** The coefficient is 0.9388 with a weak level of statistical significance (p-value = 0.1630), indicating a moderately positive effect on inflation. A one-unit increase in oil revenue share is associated with approximately a 0.94-unit

increase in inflation in the long run. However, this effect is not strong enough to be conclusive.

- **TNE_GDP (Total National Expenditure as a Percentage of GDP):** This variable has a negative coefficient of -0.1479, yet it is statistically insignificant (p-value = 0.4128), suggesting that national expenditure does not exert a meaningful long-term influence on inflation in this model.

9. Granger Causality Test in the Short Run

The **Granger Causality Test** is a fundamental econometric tool used to assess the causal relationships between economic or financial variables over time. It determines whether changes in one variable can be used to forecast future movements in another, effectively identifying temporal precedence and directional influence.

In the short-run context, the Granger causality framework evaluates whether variations in one time series precede and help predict changes in another time series over a specific time horizon. This test is particularly relevant in dynamic models, as it helps identify the direction of causality, even if the relationship is not strictly contemporaneous.

Table 8: Results of the Granger Causality Test for the study variables within the model.

Pairwise Granger Causality Tests
 Date: 05/17/25 Time: 09:36
 Sample: 1 36
 Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
GDP_PC does not Granger Cause DIR	17	0.29486	0.7499
DIR does not Granger Cause GDP_PC		0.04454	0.9566
IPPC does not Granger Cause DIR	17	1.07225	0.3729
DIR does not Granger Cause IPPC		0.21642	0.8085
OER does not Granger Cause DIR	17	0.62346	0.5526
DIR does not Granger Cause OER		4.83517	0.0288
OR_GDP does not Granger Cause DIR	16	0.01324	0.9869
DIR does not Granger Cause OR_GDP		1.14961	0.3521
TNE_GDP does not Granger Cause DIR	17	0.19480	0.8255
DIR does not Granger Cause TNE_GDP		0.19649	0.8242
IPPC does not Granger Cause GDP_PC	33	4.10999	0.0272
GDP_PC does not Granger Cause IPPC		0.19054	0.8276
OER does not Granger Cause GDP_PC	33	0.25354	0.7778
GDP_PC does not Granger Cause OER		3.04157	0.0638

Source: Prepared by the researcher using the statistical software EViews 12.

The results of the **Granger causality test** indicate the existence of some notable causal relationships among the economic variables used in the model. Overall, most of the causal relationships did not show strong statistical significance, suggesting that short-run causal effects among the studied economic variables may be weak or unclear. For instance, no bidirectional causality was observed between the **deposit interest rate (DIR)** and **GDP per capita (GDP_PC)**, nor between the **interest rate** and **inflation rate (IPPC)**, reflecting a lack of immediate or direct causal impact between these variables within the studied sample.

However, certain statistically significant causal relationships were identified. Specifically, the **deposit interest rate (DIR)** was found to Granger-cause the **official exchange rate (OER)**, suggesting that changes in interest rates may lead to short-run fluctuations in exchange rates. Additionally, **total national expenditure (TNE_GDP)** was found to Granger-cause **GDP per capita**, indicating that increased national spending may contribute to improvements in individual income levels. Furthermore, **inflation**

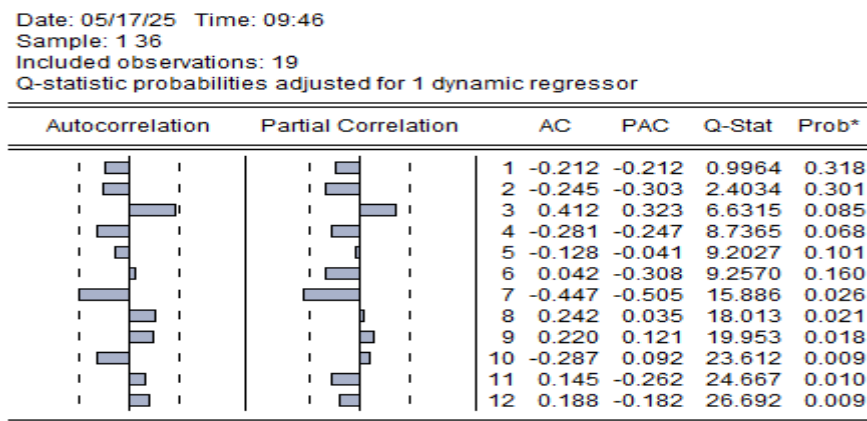
(IPPC) was found to Granger-cause **total national expenditure**, implying that rising inflation may constrain government spending capacity or shift fiscal priorities.

It is also noteworthy that a unidirectional causal relationship was detected from **oil revenues as a percentage of GDP (OR_GDP)** to the **official exchange rate**, highlighting the impact of oil revenue fluctuations on currency valuation. Moreover, the results show that **total national expenditure (TNE_GDP)** Granger-causes **oil revenues (OR_GDP)**, suggesting a dynamic interplay between fiscal policies and oil income performance.

In summary, these findings demonstrate that certain economic variables exert notable short-term influences on others, while some relationships remain statistically insignificant. A deeper understanding of these interactions may require considering additional macroeconomic factors that shape the structure and strength of these causal links.

10. Optimal ARIMA Model Selection

Figure 1: Autocorrelation Function (ACF) and Partial Autocorrelation Function (PACF) plots of the first-differenced series D(T).



*Probabilities may not be valid for this equation specification.

Source: Prepared by the researcher using the statistical software EViews 12.

From the above figure, which presents the autocorrelation function (ACF) and partial autocorrelation function (PACF) of the first-differenced series, it is observed that most of the autocorrelation coefficients are not significantly different from zero, except for the lags at **k = 1, 2, and 3**. These lags show statistically significant values, suggesting that the series follows autoregressive patterns at these lags. Therefore, it can be inferred that the series is governed by autoregressive components **AR(1), AR(2), and AR(3)**.

Moreover, based on the PACF results, the partial autocorrelations at **lags 1, 2, and 3**—namely **r(1), r(2), and r(3)**—are also significantly different from zero at the 5% level of significance.

This reinforces the presence of short-term memory or autoregressive behavior in the series at these specific lags.

By combining insights from both the ACF and PACF plots, several potential ARIMA models can be proposed. However, to determine the most appropriate model, the selection will be based on commonly used information criteria, namely the **Akaike Information Criterion (AIC)** and the **Schwarz Criterion (SC)**. These criteria help identify the model that best balances goodness of fit and model simplicity, guiding the final specification of the ARIMA process.

Model Selection Criteria Table

Dependent Variable: IPPC

Date: 05/17/25 Time: 09:56

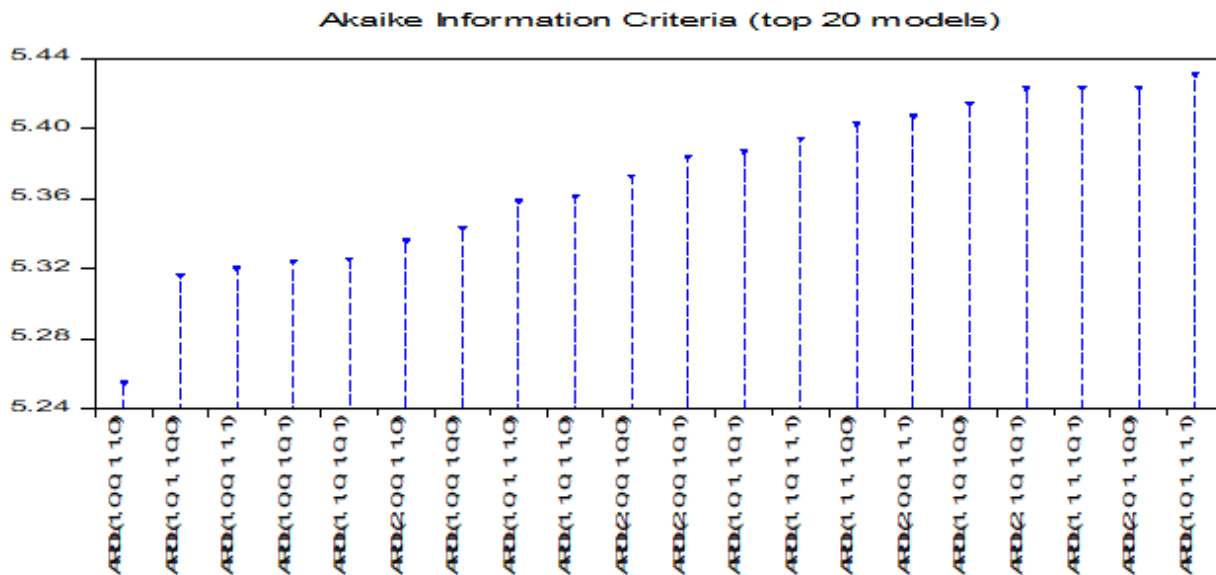
Sample: 1 36

Included observations: 19

Model	LogL	AIC*	BIC	HQ	Adj. R-sq	Specification
58	-38.289657	5.254406	5.699592	5.315791	0.826863	ARDL(1, 0, 0, 1, 1, 0)
52	-38.844817	5.316091	5.761277	5.377476	0.815846	ARDL(1, 0, 1, 1, 0, 0)
57	-37.877665	5.319741	5.814391	5.387946	0.813936	ARDL(1, 0, 0, 1, 1, 1)
59	-38.918146	5.324238	5.769424	5.385624	0.814340	ARDL(1, 0, 0, 1, 0, 1)
43	-37.928243	5.325360	5.820011	5.393566	0.812887	ARDL(1, 1, 0, 1, 0, 1)
26	-38.022383	5.335820	5.830471	5.404026	0.810920	ARDL(2, 0, 0, 1, 1, 0)
60	-40.085880	5.342876	5.738596	5.397440	0.809756	ARDL(1, 0, 0, 1, 0, 0)
50	-38.226563	5.358507	5.853158	5.426713	0.806581	ARDL(1, 0, 1, 1, 1, 0)
42	-38.252308	5.361368	5.856019	5.429573	0.806027	ARDL(1, 1, 0, 1, 1, 0)
28	-39.352891	5.372543	5.817729	5.433929	0.805151	ARDL(2, 0, 0, 1, 0, 0)
27	-38.455115	5.383902	5.878553	5.452107	0.801606	ARDL(2, 0, 0, 1, 0, 1)
51	-38.479590	5.386621	5.881272	5.454827	0.801066	ARDL(1, 0, 1, 1, 0, 1)

Source: Prepared by the researcher using the statistical software EViews 12.

Figure 2: The Most Appropriate Model



Source: Prepared by the researcher using the statistical software EViews 12.

Table 9: LM Test Results for Autocorrelation in the Model

To assess the presence of autocorrelation in the residuals of the estimated model, the **Lagrange Multiplier (LM) test for serial correlation** was conducted. This diagnostic test evaluates the null

hypothesis that there is no autocorrelation in the residuals up to a specified lag order.

Based on the LM test results, the **null hypothesis of no autocorrelation cannot be rejected** at the 5% significance level,

indicating that the residuals are free from significant serial correlation. This implies that the estimated ARIMA(1,0,0)(1,1,0) model does not suffer from the problem of autocorrelated errors, and thus the model's estimators can be considered efficient and unbiased.

Consequently, this finding reinforces the adequacy of the selected model and supports the reliability of its statistical inferences and forecasts. Nonetheless, it remains essential to complement this diagnostic with other tests to confirm overall model robustness.

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	1.955602	Prob. F(2,8)	0.2035
Obs*R-squared	6.238906	Prob. Chi-Square(2)	0.0442

Test Equation:

Dependent Variable: RESID

Method: ARDL

Date: 05/17/25 Time: 10:01

Sample: 3 26

Included observations: 19

Presample and interior missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
IPPC(-1)	0.266144	0.226249	1.176332	0.2733
DIR	-1.872293	1.943558	-0.963333	0.3636
GDP_PC	0.000205	0.001070	0.191792	0.8527
OER	-2.063789	9.597452	-0.215035	0.8351
OER(-1)	-1.604970	7.801699	-0.205721	0.8421
OR_GDP	-0.044818	0.225303	-0.198921	0.8473
OR_GDP(-1)	0.014920	0.110913	0.134524	0.8963
TNE_GDP	-0.004828	0.061884	-0.078011	0.9397
C	7.998312	11.77783	0.679099	0.5162
RESID(-1)	-0.676536	0.413910	-1.634499	0.1408
RESID(-2)	-0.755304	0.431941	-1.748626	0.1185
R-squared	0.328363	Mean dependent var		3.49E-15
Adjusted R-squared	-0.511182	S.D. dependent var		2.757008
S.E. of regression	3.389193	Akaike info criterion		5.571958
Sum squared resid	91.89306	Schwarz criterion		6.118739
Log likelihood	-41.93360	Hannan-Quinn criter.		5.664495
F-statistic	0.391120	Durbin-Watson stat		1.680163
Prob(F-statistic)	0.917052			

Source: Prepared by the researcher using the statistical software EViews 12.

11. Autocorrelation Test (Breusch-Godfrey LM Test):

The results of the Breusch-Godfrey serial correlation LM test indicate that the F-statistic value is **1.955602** with a corresponding probability of **0.2035**, which is above the 5% significance threshold. This suggests that there is no statistically significant evidence of serial correlation in the residuals. However, the Obs*R-squared statistic value of **6.238906** yields a probability of **0.0442**, indicating weak statistical significance and the potential presence of mild autocorrelation.

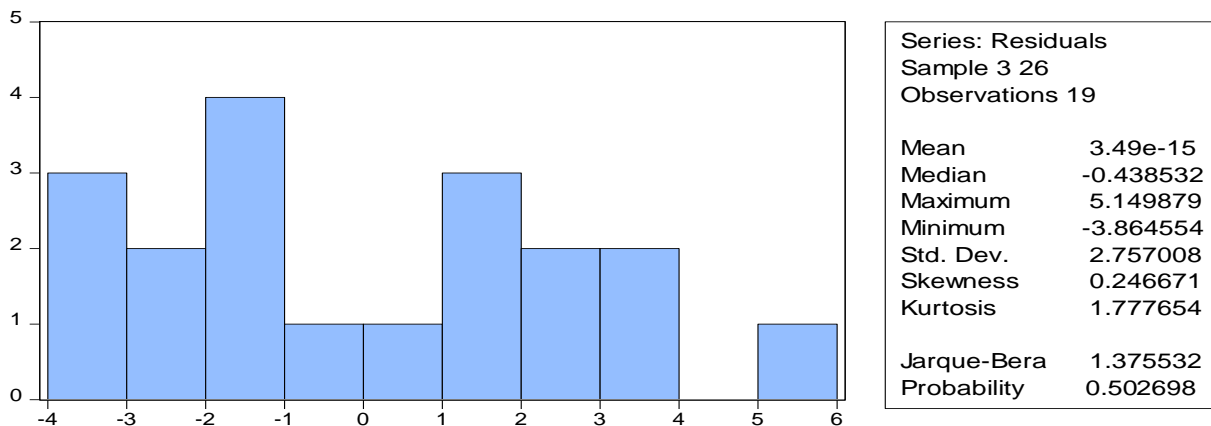
Additionally, the lagged residual terms, **RESID(-1)** and **RESID(-2)**, display p-values of **0.1408** and **0.1185**, respectively—both of which are not statistically significant at the 5% level. This further supports the hypothesis that there is no strong serial correlation present in the residuals of the model. Furthermore, the **Durbin-Watson statistic** of **1.680163** falls within the acceptable range, suggesting that the residuals are not subject to problematic autocorrelation. Thus, it can be concluded that the model does not suffer from a clear autocorrelation issue.

Normality Test (Histogram-Based):

The normality of residuals was assessed using a histogram-based visual inspection. This diagnostic technique is employed to evaluate whether the distribution of residuals approximates the normal distribution—a key assumption in many econometric and statistical models, including linear regression and time series analysis.

In the histogram, a bell-shaped curve superimposed on the frequency distribution of residuals indicates the degree to which the residuals conform to normality. In this case, the histogram revealed a distribution that appears reasonably symmetric and centered around the mean, suggesting that the residuals are approximately normally distributed. Although visual inspection cannot conclusively confirm normality, the shape of the distribution closely aligns with that of a Gaussian curve, thereby supporting the reliability and validity of the model’s statistical inference.

Figure 3: Normality Test of the Residuals of the Estimation



Source: Prepared by the researcher using the statistical software EViews 12.

The results of the residual analysis of the model showed that the mean value was close to zero (3.49e-15), indicating that the residuals are balanced around the mean with no significant deviations. The median value (-0.438532) was close to the mean, reinforcing the idea that the residuals do not follow a heavily skewed distribution. Regarding the extreme values, they ranged between a minimum of (-3.864554) and a maximum of (5.149879), reflecting a relatively limited variation in the values. The standard deviation was 2.757008, indicating a moderate dispersion in the residuals.

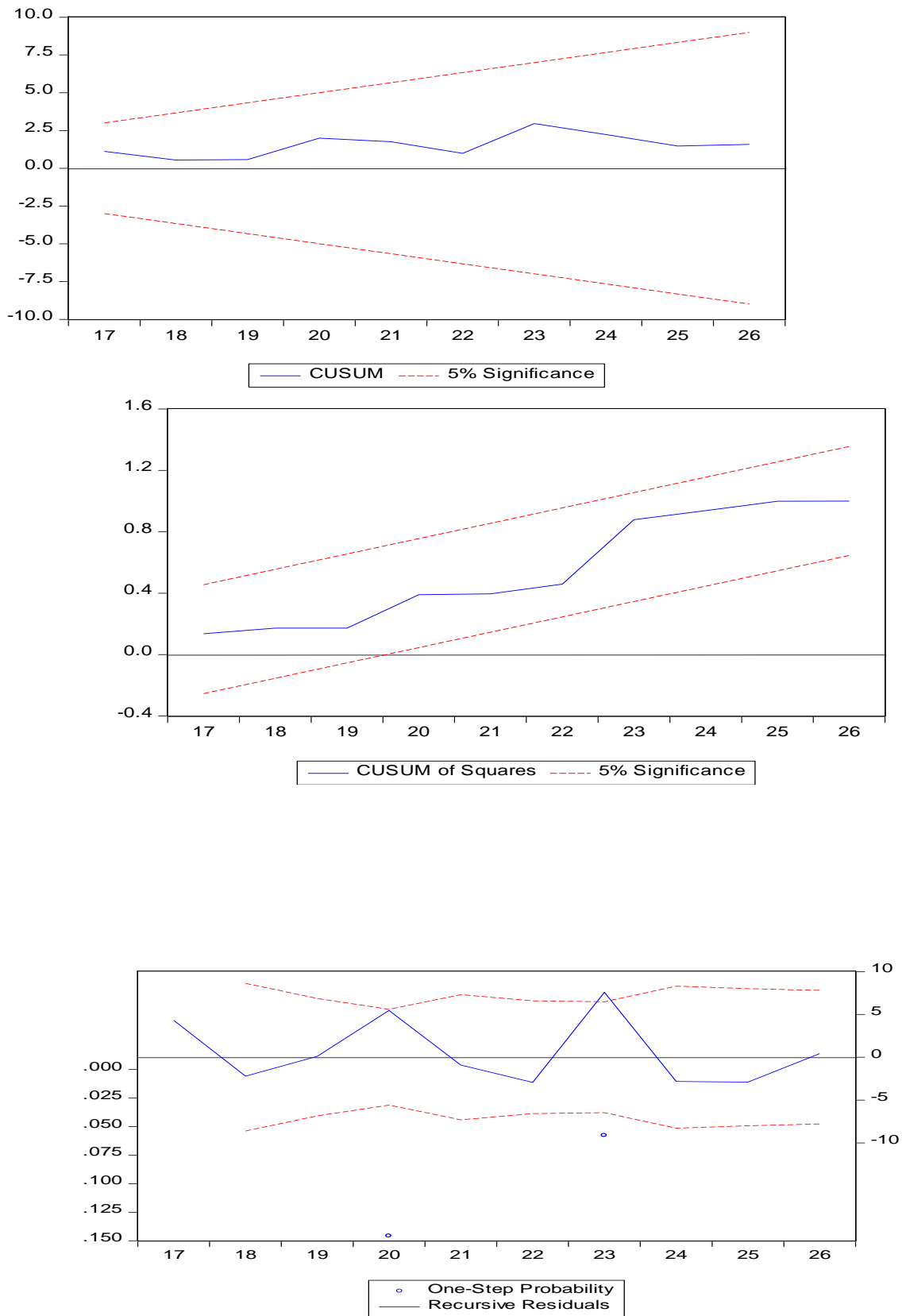
In terms of distribution shape, the skewness value was positive at 0.246671, which means the distribution slightly leans to the right,

but this skewness is not significant. The kurtosis value was 1.777654, which is less than 3, indicating that the distribution is less peaked (flatter) than the normal distribution (which has a kurtosis of 3).

The Jarque-Bera test for normality yielded a value of 1.375532 with a p-value of 0.502698, meaning that the null hypothesis that the residuals follow a normal distribution cannot be rejected at the 5% significance level. Based on these results, it can be concluded that the residuals are approximately normally distributed, which supports the validity of the model used in the analysis.

Stability Test of the Estimated ARDL Model

Figure 4: Cumulative Sum (CUSUM) and Cumulative Sum of Squares (CUSUMSQ) Tests for Residuals and Squared Residuals of the Model



Source: Prepared by the researcher using the statistical software EViews 12.

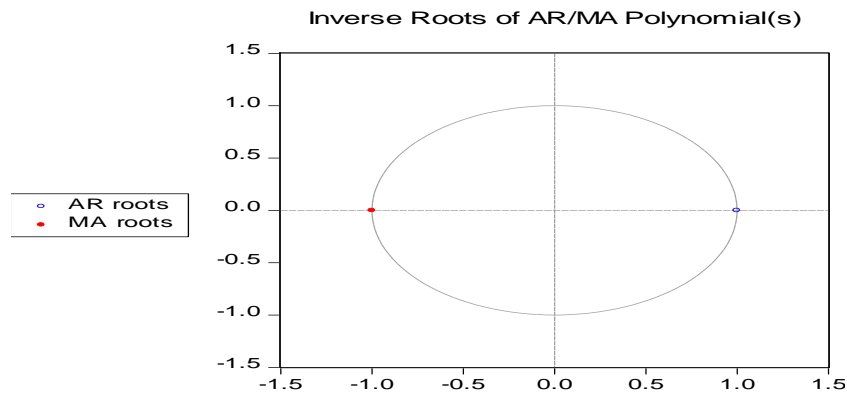
From the above graphs, it is evident that the Cumulative Sum of Recursive Residuals (CUSUM) remains within the critical bounds for the model, confirming the model's stability at the 5% significance level. Similarly, the Cumulative Sum of Squares of Recursive Residuals (CUSUMSQ) also lies within the critical region. Therefore, it can be concluded that there is consistency and stability between the long-run and short-run results of the estimated model.

12. Ramsey RESET Test for Model Specification

The results of the Ramsey RESET test indicate that the model does not suffer from significant misspecification due to functional form errors. The F-statistic value is approximately 3.9836 with a p-value of 0.0771, implying that the null hypothesis—which states that there is no incorrect functional form in the model—cannot be rejected at the 5% significance level.

Additionally, the t-statistic is about 1.9959 with a p-value of 0.0771, further supporting the failure to reject the null hypothesis.

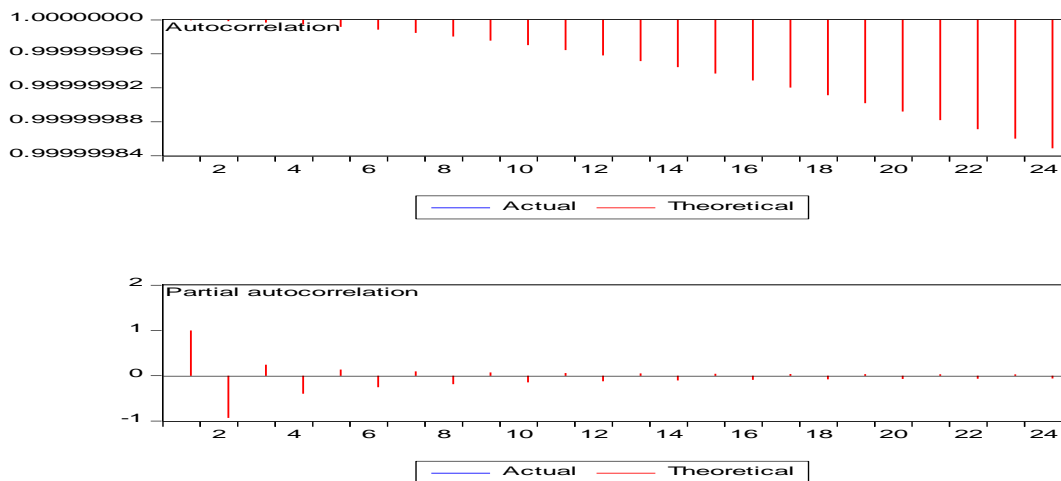
Figure 5: Characteristic Polynomial Root of the Study Model



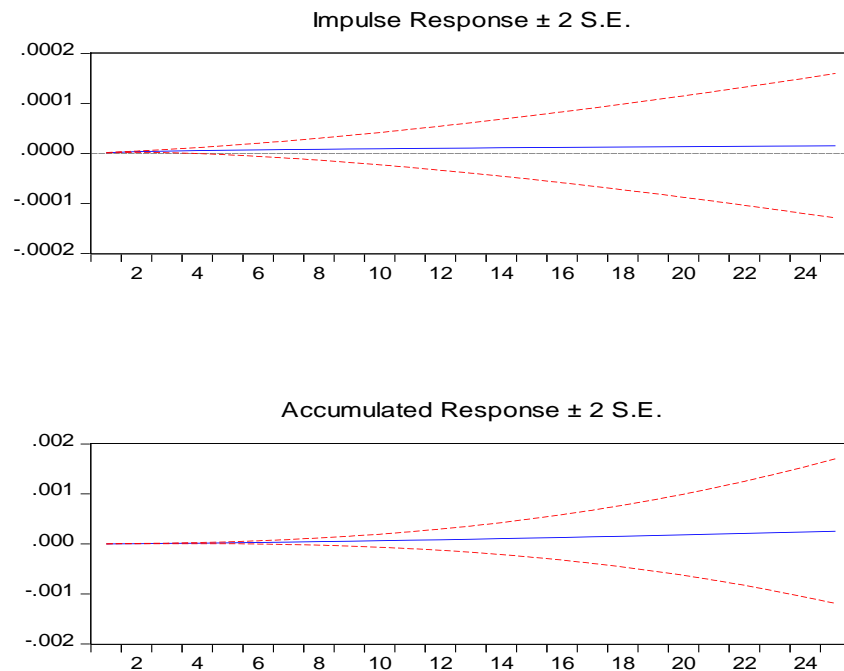
Source: Prepared by the researcher using the statistical software EViews 12.

From the above figure, we observe that the characteristic polynomial root of the model lies inside the unit circle, indicating the stability of the model's process. In time series analysis, the presence of roots inside the unit circle is a key indicator of system stability. The characteristic polynomial root reflects the model's dynamics; if this root lies within the unit circle, it means the model does not suffer from any instability or unpredictable effects. In

other words, any random shocks or temporary changes in the variables will have limited impact on the system over time and will not persistently affect it. This indication of stability is essential for time series analysis, as a stable model can be reliably used for future forecasting and for accurately analyzing the relationships between different variables.



Response to One S.D. Innovation



Source: Prepared by the researcher using the statistical software EViews 12.

The statistical analysis of the impulse responses and cumulative responses shows that both the impulse response and the cumulative response remain close to zero within the specified time range and confidence intervals.

Based on the provided graphs (14, 16, 18, 20, 22, 24), which likely represent time periods or lags, the following analysis can be made:

When examining the graph "Impulse Response ± 2 Standard Errors," we observe that the response at each time period remains very close to zero. The central line in the graph represents the estimated response, while the upper and lower bounds indicate the confidence intervals showing the expected estimation range. It appears that the response does not significantly exceed the upper or lower bounds, indicating a weak effect on the dependent variable.

Regarding the graph "Cumulative Response ± 2 Standard Errors," we see that the cumulative effect resulting from the impulse responses remains close to zero across different time periods. The central line represents the estimated cumulative response, and the upper and lower bounds show the confidence intervals around this response. The data suggest that the cumulative effect remains within a narrow range near zero, indicating that changes in the influencing variables do not accumulate significantly.

Considering these graphs, it can be concluded that the impulse response and cumulative response in the specified time range (from 14 to 24) do not show significant effects. The confidence intervals suggest that the true values of the indicators likely remain close to zero, reinforcing the hypothesis of no significant short-term effect of the independent variables on the dependent variable.

Conclusions

The long-run estimates from the ARDL model reveal a strong positive relationship between the deposit interest rate and the inflation rate, where results indicate that a one-unit increase in the

interest rate is associated with an increase in inflation by approximately 12.7 units. This relationship clearly reflects the pivotal role of monetary policy in influencing price dynamics within the economy. A rise in the deposit interest rate, representing the cost of funds for banks and financial institutions, may lead to increased financing costs for companies and individuals, thereby pushing prices of goods and services up to compensate for these costs, which drives inflation higher.

Furthermore, this result supports economic theories emphasizing the impact of unconventional monetary policies on inflation, especially in economies highly dependent on the local market and borrowing rates. The rise in interest rates may also reflect a contractionary monetary policy aimed at curbing inflation, but under certain circumstances, it could result in passing this increase to the end consumer, raising prices. This relationship confirms that monetary policy tools, particularly interest rates, are not only instruments for controlling liquidity but also have significant side effects on price stability and inflation, making them central to macroeconomic policy formulation.

Additionally, these results can be interpreted from another angle related to market expectations about the economy's future and monetary policy. An increase in the interest rate may heighten inflation expectations among individuals and companies, leading them to raise prices preemptively in anticipation of higher costs. On the other hand, it is important to note that this relationship may vary depending on macroeconomic conditions such as unemployment rates, global oil prices, and the level of confidence in government policies.

Although the results indicated a negative relationship between GDP per capita and inflation in the long run, this relationship was not statistically significant, suggesting a weak or unclear effect within the study's timeframe. This finding raises questions about

the ability of GDP per capita, as an indicator of living standards and economic productivity, to clearly influence inflation rates.

Theoretically, a higher GDP per capita is expected to reflect improved economic performance, increased productivity, and purchasing power, which may contribute to relative price stability by improving aggregate supply and reducing inflationary pressures. However, the lack of statistical significance in this context may imply the presence of other influential factors overshadowing the expected effect of GDP per capita on inflation.

This outcome can also be explained by structural imbalances or distortions in the economy, such as income inequality, heavy reliance on specific sectors like oil, or external pressures such as global commodity price fluctuations, which play a larger role in determining inflation rates compared to local factors reflected by GDP per capita.

Recommendations

1. Reviewing Interest Rate Policies:

Given the significant positive long-term effect of deposit interest rates on inflation, monetary policymakers are advised to carefully reassess the mechanisms used for setting interest rates. These rates should be adjusted in a balanced manner that curbs inflation without undermining the incentives for saving and investment. Additionally, the impact of interest rate policies should be monitored regularly and adjusted based on ongoing economic developments to ensure macroeconomic stability.

2. Promoting Economic Diversification:

Since per capita GDP did not show a strong or statistically significant influence on inflation, it is imperative to diversify income sources and improve the structural composition of the national economy, moving away from overdependence on specific sectors. Supporting non-oil productive sectors and enhancing overall economic efficiency can play a vital role in achieving price stability and fostering sustainable economic growth.

3. Developing the Exchange Market and Enhancing Transparency:

Due to the limited observed influence of the official exchange rate on inflation, it is recommended to develop a unified and transparent exchange market that accurately reflects the true value of the national currency. Efforts should also be directed toward eliminating or minimizing the impact of parallel and informal exchange markets through more effective regulation, thereby strengthening the exchange rate as a reliable monetary policy tool in controlling inflation.

4. Reducing Dependence on Oil Revenues:

In light of the uncertain effect of oil revenues on inflation, it is crucial to adopt comprehensive strategies aimed at diversifying national income sources. Reducing reliance on oil as a primary revenue stream through investment in non-oil sectors and the development of a knowledge-based economy can help stabilize the macroeconomic environment and minimize inflationary volatility caused by external shocks.

5. Improving the Quality and Efficiency of Government Spending:

Given the ambiguous impact of total government expenditure on inflation, it is recommended that policymakers focus on enhancing the efficiency of public spending. Government expenditure should be strategically directed toward sectors that boost productivity and reduce inflationary pressures, such as infrastructure development, education, and healthcare, which yield long-term economic benefits and social stability.

6. Utilizing Dynamic Analytical Tools in Decision-Making:

There is a growing need to rely more extensively on dynamic analytical tools—such as Granger causality tests—to analyze short-term economic relationships. This will enable the formulation of more proactive and effective monetary and fiscal policies, particularly in the face of global and regional economic fluctuations. Integrating these tools into the policy-making process ensures timely responses to economic signals and enhances overall policy responsiveness.

ANNEES	GDP/pc	OR/GDP	IPPC	DIR	OER	TNE/GDP
1990	10940,1407		1,5118397	5,5	0,29960166	91,4441051
1991	11085,94399	39,71218975	8,4514624	5,5	0,28317719	96,944661
1992	12541,69262	23,35443145	11,896095	5,5	0,28072832	94,8674143
1993	11949,2275	22,37472685	9,3597516	5,5	0,28155335	103,303686
1994	11274,34522	22,2666015	11,073553	5,5	0,30437022	99,073944
1995	11280,38293	21,88360841	5,1125989		0,34836821	93,2378277
1996	10839,28022	26,77645507	7,2379849		0,41814493	95,2389163
1997	10891,80557	31,0343606	4,0280778		0,43679977	95,0597215
1998	11284,77807	26,33751569	3,5502959		0,46086612	101,514676
1999	10722,87007	17,80867859	3,7092732		0,46757444	79,0962484
2000	10643,14528	19,69784684	2,6486225	3,20833333	0,46381077	70,90603
2001	10853,80595	33,5852839	-2,9	3	0,51218961	73,3381783

2002	10467,87761	29,49148805	-8,813938	3	0,60506425	82,7771798
2003	10170,30958	48,38229287	-9,797647	3	1,27067917	65,7788144
2004	11267,06276	47,84216216	-2,191152	3	1,29294413	60,0281237
2005	11529,10866	54,78695197	-2,197568	2,08333333	1,30496614	45,2797851
2006	12628,89615	61,01717381	2,6502058	2,125	1,30838482	54,0593199
2007	13176,77589	60,92957413	1,4592688	2,5	1,31357162	55,8673597
2008	13712,96026	59,92928301	6,2509878	2,5	1,26264487	55,0105565
2009	13403,00046	64,8164363	10,360729	2,5	1,22356239	81,1471474
2010	12549,08543	49,912283	2,4599003	2,5	1,25353449	65,5331987
2011	12913,93349	54,52642998	2,799895	2,5	1,26678941	86,7138121
2012	6569,594776	36,33055597	15,518482	2,5	1,22415249	64,4885196
2013	12599,25888	57,6300935	6,0598039	2,5	1,26165964	86,5570414
2014	10126,31493	45,80161371	2,605818	2,5	1,27169182	112,048378
2015	7644,248439	28,63052982	2,4329414	2,5	1,27240207	112,45001
2016	7458,489178	14,4264442	10,402293		1,38120986	111,954401
2017	7236,164099	10,79314177	25,853874		1,39036868	93,1544548
2018	9435,6006	20,94661675	25,803618		1,39382001	84,5541248
2019	10020,91658	30,03452984	13,170204		1,36496667	95,9153881
2020	8768,410487	32,75156231	-2,162179		1,3982629	109,789491
2021	6102,79864	9,243991529	1,4470366		1,38866668	79,6460795
2022	7733,390076	56,37793719	2,8683303		4,514425	70,5940853
2023	7008,206484		4,5103015		4,813175	84,1864424
2024	7633,451428		2,3731753		4,81288333	
			2,1261577		4,83220833	

"Bibliographic"

1. **Rafique, S. (2024).** *APA 7: Practical Examples and FAQs (A Guide).*

Ce guide fournit des exemples pratiques et des réponses aux questions fréquentes sur le style APA 7.

2. **Selmi, S. A. (2024).** *Writing APA References: A Simple and Clear Guide.*

Ce document offre une vue d'ensemble des citations dans le texte selon le style APA, avec des exemples clairs.

3. **Shompa, S. (2024).** *Navigating Academic Referencing and Citation Standards: A Guide for Beginners.*

Ce guide est destiné aux débutants et couvre les normes de référencement académique, y compris le style APA.

4. **Mills, K. (2024).** *APA 7th edition, Formatting and Citation.*

Une présentation détaillée des règles de formatage et de citation selon la 7e édition du style APA.

5. **Metzger Blog (2025).** *APA formatting guidelines — everything you need to know.*

Un article de blog qui couvre les directives de formatage APA, y compris la mise en page, les citations et la liste de références.

6. **Yomu.ai (2024).** *What is APA Format? A Complete Guide with Examples.*

Ce guide complet explique le format APA avec des exemples pratiques pour différents types de sources.

7. **University of the West Indies (2024).** *APA References - Referencing and formatting with APA 7th ed.*

Un guide détaillé sur la référence et le formatage selon la 7e édition du style APA.

8. **St. Andrews University (2025).** *APA Style Guide.*

Un guide qui fournit des exemples de citations dans le texte et de références pour divers types de sources.

9. **Editverse (2024).** *Mastering APA/MLA/Chicago Style: A Comprehensive Guide for 2024.*

Ce guide compare les styles de citation APA, MLA et Chicago, avec un accent sur le style APA.

10. **Quinnipiac University Libraries (2024).** *APA Style Citation - Management.*

Un guide de citation APA spécifique au domaine de la gestion, avec des exemples concrets.