Fiscal Sustainability and Macroeconomic Determinants of Public Debt: Insights from Morocco 2000–2023

EL HAJJAMI Wiame[1], EL IDRISSI zahira[2], Hafid EL HASSANI[3], MAJD Abdelmouneim[4], BAKKALI Salma[5], QASSID Ayoub[6]

Abstract

This paper investigates the dynamic relationship between some main macroeconomic variables, namely, inflation, interest rate, exchange rate, the GDP growth and budget deficit, and the public debt in Morocco between 2000 and 2023. Using a Restricted Error Correction Model (RECM), the study shows that the budget deficit is the primary engine of debt accumulation. We show that inflation and interest rates have different effects in the short and the long run; GDP growth is hiring for public debt in the short run but in the long run reduces it, emphasizing that macroeconomic stability and sustained growth is key. This research sheds light on the impact of global financial crises and the COVID-19 pandemic on the debt dynamics within Morocco, an underreported but unique economic context. By offering novel insights into the dynamics of macroeconomic fundamentals and public debt, the findings provide a strong basis for future academic studies while suggesting implications for enhancing fiscal discipline and long-term debt sustainability.

Keywords: *Public Debt, Inflation, Exchange Rates, Interest Rates, GDP Growth, Budget Deficit, Debt Sustainability, Fiscal Discipline, Economic Stability.*

Introduction

In developing economies such as Morocco, fiscal stability is crucial for sustainably promoting economic growth, which has led policymakers around the world to focus on public debt. Understanding this is key, as it provides guidance as to how ravenous socioeconomic systems can respond to being whole in addition to specific. One is that the doings of public debt dynamics, which depend on inflation, exchange rates, interest rates, GDP growth, and budget deficits. The interplay of these variables is complex, and the relationships among them are critical to the design of sound and sustainable economic policies.

In Morocco, the evolution of public debt has been influenced by both internal challenges, such as fiscal imbalances, and external shocks, including global financial crises and fluctuations in international commodity markets. While public borrowing has facilitated the financing of development projects and economic recovery efforts, it has also raised concerns about fiscal sustainability and the risks associated with excessive debt levels. Such challenges highlight the importance of contextualizing Morocco's debt dynamics within both domestic and international frameworks.

Additionally, theoretical frameworks, for instance the Keynesian perspective of fiscal policy, Ricardian equivalence theory, focus on macroeconomic variables on public debt management. Despite these frameworks analyses specific to Morocco remain limited, especially those focusing on how macroeconomic fundamentals and external shocks affect together the sustainability of debt.

Despite the growing body of research on public debt, there remains a lack of detailed analysis specific to Morocco, a country that faces unique economic challenges and opportunities. Key questions remain unanswered: **What are the short- and long-term effects of inflation, interest rates, exchange rates, GDP, and budget deficits on Morocco's public debt? How do internal economic policies interact**

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[1] Faculty of Legal, Economic and Social Sciences, Sidi Mohammed Ben Abdellah University, Fez, Morocco
[2] Faculty Multidisciplinary Nador, LEJ2PM, University Mohamed Premier, Nador, Morocco
[3] Faculty of Legal, Economic and Social Sciences, Sidi Mohammed Ben Abdellah University, Fez, Morocco
[4] Faculty of Legal, Economic and Social Sciences, LRJAP, Cadi Ayyad University, Marrakesh, Morocco
[5] Faculty of Economics and Management, Sultan Moulay Slimane University, Beni Mellal, Morocco
[6] Faculty of Economics and Management, Sultan Moulay Slimane University, Beni Mellal, Morocco

with external shocks to shape the country's debt dynamics? Addressing these questions is critical to understanding Morocco's debt sustainability and identifying effective policy measures to mitigate fiscal vulnerabilities.

This research fills an important gap in the existing literature as Morocco, which has undergone a specific economic trajectory shaped by both domestic and global factors. The study's focus on the years 2000 through 2023 captures key moments in the economy, including the global financial crisis, years of extended growth and the economic impact of the COVID-19 pandemic. The research employs a strong econometric approach to investigate the relationships between macroeconomic factors and public debt, seeking to produce policy-relevant findings.

In addition, the research ultimately seeks to enrich both academic discourse and policy formulation with actionable, data-driven insights that are specific to Morocco's economic context. With these recommendations in mind, they are expected to support their fiscal reforms, as well as help with resilience for such economic disruptions in the future.

Research Objectives

To this study aims to achieve the following:

- Analyze the short- and long-term impacts of macroeconomic factors such as inflation, interest rates, exchange rates, GDP growth, and budget deficits on Morocco's public debt.

- Identify the key drivers of public debt dynamics in Morocco over the period 2000 to 2023.

- Provide evidence-based recommendations for policymakers to improve fiscal management and mitigate risks associated with excessive public debt.

Literature Review

Several studies have been conducted to identify the determinants of public debt across countries. These studies have relied on econometric models to analyze the factors influencing public debt. In this section, we review the empirical works on the subject, focusing on both economic and political determinants.

Public debt is an important measure of fiscal discipline, determined by a variety of economic and institutional factors. In his 1936 *General Theory*, Keynes highlighted the role of public debt as an effective instrument to stabilize the economy during recession periods. However, he also emphasized the importance of fundamental economic forces, suggesting that sustainable levels of debt depend on macroeconomic conditions such as growth, inflation, and interest rates. These macro-financial variables are crucial in assessing the trajectory of public debt, with direct implications for government borrowing and the long-term sustainability of public finances.

However, excessive borrowing may lead to the crowding-out effect, where increased government borrowing raises interest rates and reduces credit availability for private investors Elmendorf & Gregory Mankiw, (1999). In this context, economic growth, interest rates, and inflation play a crucial role in shaping the trajectory of public debt.

The Ricardian equivalence theory (Ricardo, 1820; Barro, 1974), however, the way the government finances its spending through either borrowing or taxation may still have an equal effect on the economy. According to this view, economic agents expect that future tax increases to service the debt will raise their future tax liabilities, thereby increasing their current savings, which neuters the stimulative effects of fiscal policy on aggregate demand.

Rational expectations theory, which calls for the need for understanding that rational expectations have a bearing on public debt accumulation, is what this theory is all about. The empirical evidence suggests the central role of macroeconomic fundamentals (e.g., US GDP growth, US inflation, and structural variables) as determinants of public debt dynamics.

For instance, Natalia (2006) examined the determinants of public debt in emerging economies and found that key macroeconomic variables such as GDP per capita, economic growth, inflation, and unemployment significantly influence debt levels. Specifically, the study emphasized how structural economic conditions, particularly economic growth, shape public debt dynamics in emerging markets.

Building on the role of economic growth, Bittencourt (2015) analyzed the main determinants of government and external debt in the young democracies of South America from 1970 to 2007. His study found that economic growth significantly reduces debt ratios, with a 1% increase in GDP growth leading to a 0.7% decrease in public debt. The study also highlighted the negative impact of inflation on debt, reinforcing the importance of macroeconomic stability in managing debt levels.

Similarly, Phiri (2024) focused on Zambia, quantifying the economic impact of regime changes and macroeconomic indicators on debt stress using the Autoregressive Distributed Lag (ARDL) Bounds test. The study found that a 1% short-term increase in GDP led to a 3.16% increase in debt stress, followed by a 7.21% reduction in the subsequent year. Over the long run, a 1% increase in GDP lowered debt stress by 22%. Inflation and the lending rate also played significant roles, with inflation decreasing debt stress by -1.52%, while the lending rate contributed to an increase in debt stress by 3.90%.

Several studies further emphasize the impact of fiscal policies, such as the budget deficit, trade openness, and investment, on public debt accumulation, with a strong focus on governance and institutional factors. Abindaw Nabieu (2023) examines the impact of fiscal deficits on public debt accumulation in the Sub-Saharan region from 1980 to 2017. The study utilizes the standard debt equation within a fiscal reaction and impulse response framework to assess the trajectory and sustainability of public debt. The findings reveal that when public debt exceeds 50% of GDP, fiscal deficits significantly contribute to the growth of debt, with an estimated increase of approximately 120% over a ten-year period.

Omrane Belguith & Omrane (2017) examined the determinants of public debt in Tunisia from 1986 to 2015, using a VECM model. Their study found that inflation and investment help reduce public debt, while the budget deficit, real interest rates, and trade openness contribute to its growth. Notably, the budget deficit was identified as the most significant determinant of public debt in Tunisia, highlighting the critical role of fiscal policy.

Similarly, Chiminya et al., (2018) studied external debt in 36 Sub-Saharan African countries and found that debt relief and external assistance were associated with lower debt accumulation. They also observed that economic activity and openness helped reduce debt levels, while political factors such as democratic systems tended to lead to higher debt accumulation. In contrast, constrained executives and competitive electoral systems were associated with lower debt levels.

In a similar vein, Pirtea et al (2013) explored Romania's debt-to-GDP ratio from 2000 to 2011 and found that fiscal balance, real interest rates, and GDP growth were key factors influencing public debt. They concluded that GDP growth's effect on the debt-to-GDP ratio became more sensitive after the financial crisis, underscoring the importance of sound fiscal management.

Political factors and institutional frameworks also play a significant role in shaping debt outcomes, as highlighted by Sinha et al., (2011), who analyzed public debt determinants in middle- and high-income countries. They discovered that GDP growth negatively impacted debt in middle-income countries, while the current account balance had a positive relationship with debt. For high-income countries, GDP growth was the primary determinant, providing insights into how institutional and economic factors influence public debt accumulation.

Gargouri & Ksantini, (2016) explored public debt in 12 European countries and found that bank nonperforming loans, military expenditures, and imports positively affected public debt, while GDP growth and bank reserves had a negative impact. Their study emphasized the persistence of the debt-to-GDP ratio and the critical role of institutional factors.

Similarly, Mah et al., (2013) investigated the relationship between government expenditure and public debt in Greece from 1976 to 2011, showing a positive correlation between public debt and national expenditure and inflation, while foreign direct investment had a negative relationship with public debt. Their study reinforced the significant role of national income and government expenditure in driving public debt dynamics.

In conclusion, several researchers have examined the issue of public debt in Morocco and its interactions with macroeconomic indicators, addressing the subject from various perspectives. These studies have analyzed, among other factors, the impact of fluctuations in economic growth, exchange rates, inflation rates, and budget deficits on the sustainability of Morocco's public debt(Bou Ssas & Regragui, 2016; Majid et al., 2023; E.-Q. Mohamed & Zhor, 2021; E.-S. Mohamed et al., 2024, 2025; Rachid, n.d.; Zouheir & Meskini, n.d.). The contributions emphasize the need for macroeconomic stability and fiscal discipline for sustainable and efficient public debt management.

Methodology

Our objective is to analyze the dynamic relationship between macroeconomic indicators (inflation, exchange rate, interest rate, Gross domestic product, budget deficit) and Morocco's public debt. Focusing on assessing the impact of these factors on the country's debt, the study seeks to understand how internal and external economic factors influence the evolution of public debt over time. The analysis highlights the links between these variables and Morocco's debt sustainability, with a view to providing useful recommendations for political decision-makers in the country's economic management.

Data Description

The period covered by the study runs from 2000 to 2023. This timeframe is chosen to capture important economic evolutions, including periods of global financial crisis and phases of economic growth. The choice of Morocco as the geographical area allows us to take an in-depth look at the dynamics of public debt, against a backdrop of internal and external economic fluctuations.

The following table summarizes the economic variables used in this study, as well as their respective sources:

Table 1. Variables Description

Variable	Description	Source
Debt (DT)	Total public debt of Morocco	**FMI**
Inflation (INF)	Annual inflation rate	**FMI**
Exchange Rate (ER)	Real exchange rate	**WDI**
Interest Rate (IR)	Interest rates	**BAM**
Gross Domestic Product (GDP)	Annual gross domestic product (in constant USD)	**WDI**
Budget Deficit (BD)	Difference between public revenue and expenditure	**FMI**

The data used is sourced from reliable and recognized sources, being the World Bank Development Indicators (WDI) for economic variables such as GDP, inflation and budget deficit, and the International Monetary Fund (IMF) for information on public debt, interest rates and exchange rates. These international databases provide reliable and comparable time series, ensuring the robustness of the analysis. Data is extracted using the R programming language, guaranteeing integrity and reproducibility of results.

The collected data is processed using R software, allowing to run stationarity tests, to estimate ARDL models, and to interpret econometric results. The results obtained will be analyzed to check the robustness of the relationships identified and to formulate conclusions on the impact of macroeconomic variables on Morocco's public debt.

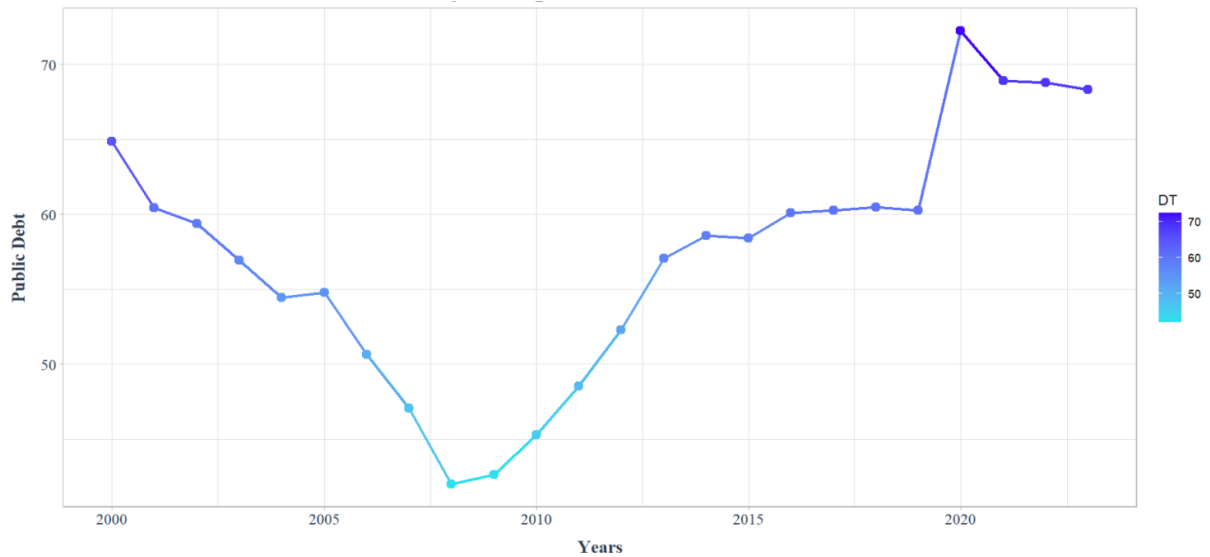**Fig.1. Total Public Debt of Morocco**

Fig.1. shows a general upward trend in Morocco's public debt between 2000 and 2023. After a slight decline in the early 2000s, debt began to increase from 2004 onwards. This increase can be explained by several factors, notably the global financial crisis of 2008, which led to an increase in public spending to support the economy. The upward trend continued in subsequent years, reaching a peak in 2020 that is likely to be linked to the global health crisis of COVID-19, which required considerable government spending to cope with the economic and social impacts of the pandemic. By 2023, debt looks set to stabilize at around 68-69 billion dirhams, although still at a high level compared with previous years.

Model Specification

The econometric approach adopted in this study is based on the use of the RECM (Restricted Error Correction Model), which is an extension of the ARDL (AutoRegressive Distributed Lag) model. The RECM model is particularly well-suited for analyzing the short- and long-term relationships between macroeconomic indicators and Morocco's public debt. It allows for a simultaneous estimation of the short-run dynamics and the long-run equilibrium relationship, while taking into account potential cointegrating relationships among the variables.

The RECM model is advantageous because it incorporates error correction terms (ECT) that help capture the speed at which the variables return to their long-term equilibrium after short-term shocks. This is crucial when studying the relationship between public debt and macroeconomic indicators, as it highlights the adjustments needed to maintain a long-term balance. The model used in this study is expressed as follows:

$$DT_t = \alpha_0 + \gamma ECT_{t-1} + \sum_{i=1}^{p_1} \beta_i \, DT_{t-i} + \sum_{j=1}^{p_2} \beta_j \, INF_{t-j} + \sum_{k=1}^{p_3} \beta_k \, ER_{t-k} + \sum_{l=1}^{p_4} \beta_l \, IR_{t-l}$$

$$+ \sum_{m=1}^{p_5} \beta_m \, GDP_{t-m} + \sum_{n=1}^{p_6} \beta_n \, BD_{t-n} + \varepsilon_t$$

In this equation, the model captures both short-term dynamics through the differenced variables and long-term equilibrium relationships through the inclusion of the lagged error correction term (ECT). The use of RECM allows us to better understand how changes in the explanatory variables (e.g., inflation, interest rate, etc.) influence public debt in Morocco both in the short and long term, while accounting for the necessary adjustments toward equilibrium.

Results

Descriptive Analysis

The results of the descriptive analysis of the variables provide several key insights into the distribution and variability of the data used in this study.

Table 2. Descriptive Statistic

	DT	BD	INF	IR	ER	GDP
nbr.val	24.000	24.000	24.000	24.000	24.000	2.400e+01
nbr.na	0.000	0.000	0.000	0.000	0.000	0.0000000
min	41.990	0.120	0.240	1.500	95.382	4.301e+10
max	72.250	7.150	6.650	5.000	114.853	1.444e+11
range	30.260	7.030	6.410	3.500	19.470	1.013e+11
sum	1372.630	95.160	43.650	70.500	2457.489	2.381e+12
median	58.475	4.150	1.460	3.125	101.172	1.085e+11
mean	57.193	3.965	1.819	2.938	102.395	9.921e+10
var	68.762	3.191	2.246	0.599	24.568	9.524e+20
std.dev	8.292	1.786	1.499	0.774	4.957	3.086e+10
normtest.p	0.498	0.701	0.001	0.035	0.155	6.800e-02

First of all, all variables have 24 observations, and there are no missing data, which guarantees the consistency of the sample. The ranges of values (minimum and maximum) reveal some interesting differences. For example, the DT (Public Debt) variable shows a wide range from 41.99 to 72.25, indicating significant variation between observations. Similarly, GDP shows a wide range, from 4.301e+10 to 1.444e+11, reflecting the differences in size between the different values of the economy of the country studied.

In terms of means and medians, DT values are relatively balanced, with a mean of 57.19 and a median of 58.475, suggesting a fairly symmetrical distribution. However, for BD (Budget Deficit), the mean (3.97) is slightly lower than the median (4.150), indicating an asymmetrical distribution to the right, with a concentration of higher values. The INF (Inflation) and IR (Interest Rate) variables also show averages below their medians, suggesting some asymmetry.

Standard deviation and variance highlight the variability of the different variables. DT has a standard deviation of 8.292, indicating a wide dispersion around the mean. Likewise, ER (Exchange Rate) shows notable variability, with a standard deviation of 4.957. Other variables such as BD and INF show more moderate variability, suggesting greater relative stability.

With regard to normality tests, it is interesting to note that DT, BD, and ER do not deviate significantly from normality, with p-values greater than 0.05. On the other hand, INF and IR have p-values below 0.05, indicating that these variables do not follow a normal distribution.

In order to remedy the non-normality of certain variables and reduce the size differences between them, it would be appropriate to apply a transformation. This transformation could help stabilize the variance and make the data more suited to the requirements of econometric models.

Correlation Analysis

The table below shows a moderate correlation between public debt (DT) and budget deficit (BD) (0.535) suggesting a logical relationship, where an increase in budget deficit could lead to an increase in public debt. In contrast, the correlation between debt and other variables such as GDP (0.260) is relatively weak, indicating that the size of the economy has no significant influence on public debt in this context. Furthermore, the low to moderate correlations with other variables such as inflation (INF) and interest rates (ER) suggest that, if relationships exist, they are not particularly strong.

the absence of strong correlation between explanatory variables (e.g., between inflation, exchange rate or GDP) reduces the risk of multicollinearity in econometric model estimation. This allows each variable to make a distinct contribution to the explanation of public debt, without excessively interfering with the others. In conclusion, these results suggest that appropriate econometric modeling, such as ARDL or ECM, could be useful for further exploring the relationships between public debt and economic variables, while minimizing the problems associated with multicollinearity.

Table 3. Variables Correlation

	DT	BD	INF	IR	ER	GDP
DT	1.000	0.535	0.103	-0.396	0.049	0.260
BD	0.535	1.000	-0.223	-0.480	-0.419	0.350
INF	0.103	-0.223	1.000	0.107	0.093	0.135
IR	-0.396	-0.480	0.107	1.000	0.632	-0.765
ER	0.049	-0.419	0.093	0.632	1.000	-0.799
GDP	0.260	0.350	0.135	-0.765	-0.799	1.000

Stationarity Test

From the application of the unit root test (ADF test) on the five series, we observe that the p-value for the ADF test is less than 5% for the series LDT, LIR, LER, and LGDP, indicating that these series are stationary after first differencing. This implies that their order of integration is (1). On the other hand, the series LBD and LINF are level stationary, meaning they do not require differencing, and are integrated of order (0).

This mixed order of integration, some series being stationary at levels and others at first differences justifies the use of the ARDL (Autoregressive Distributed Lag) model.

Table 4. Unit Root Test

Variables	observations	ordre d'integration
LDT	Non-stationary	I(1)
LBD	Stationary	I(0)
LINF	Stationary	I(0)
LIR	Non-stationary	I(1)
LER	Non-stationary	I(1)
LGDP	Non-stationary	I(1)

RECM Model

To estimate the RECM, we first estimate the ARDL model, which is a necessary step to ensure the appropriate lag structure and the identification of potential cointegrating relationships. Once the ARDL model is estimated, we proceed to estimate the RECM, which allows us to examine both the short- and long-term dynamics of the relationship. The results of the RECM estimation are presented in Table 5.

Table 5. Results of the Restricted Error Correction Model (RECM) Estimation

	Estimate	Std.Error	t-value	Pr(>|t|)
d(L(DT,1))	-0.86405	0.18184	-4.752	0.001042**
d(BD)	1.65601	0.23837	6.947	6.71e-05***
d(L(BD,1))	-0.87858	0.28822	-3.048	0.013829*
d(INF)	-0.07149	0.32718	-0.219	0.831901
d(L(INF,1))	-1.53812	0.37388	-4.114	0.002621**
d(IR)	-9.34832	1.63160	-5.730	0.000284***
d(L(IR,1))	-1.25108	1.08685	-1.151	0.279352
d(ER)	0.09314	0.22645	0.411	0.690466
d(L(ER,1))	-0.06035	0.19959	-0.302	0.769242
d(GDP)	15.32539	5.21009	2.941	0.016447*
d(L(GDP,1))	-9.34607	3.55813	-2.627	0.027508*
ect	-0.73250	0.09241	-7.926	2.38e-05***

Note: *, ** and *** represent significance level at 10%, 5% and 1% respectively.

Interpretation of Results:

The variable d(L(DT,1)), representing the first lagged difference in public debt, is negatively and significantly associated with current public debt, with a p-value of 0.001042. This suggests that when public debt increases in the past, it is correlated with a reduction in current debt.

With regard to the budget deficit (d(BD)), a positive and highly significant relationship (p-value < 0.0001) is observed, indicating that an increase in the budget deficit leads to an increase in public debt. Conversely, the lagged first difference in budget deficit (d(L(BD,1))) has a negative and significant coefficient (p-value = 0.013829), suggesting that a reduction in the deficit in the past contributes to a reduction in current public debt.

The inflation variable (d(INF)), meanwhile, shows no significant impact on public debt (p-value = 0.831901), suggesting that inflation fluctuations have no direct effect on public debt in this model. However, the first lagged difference in inflation (d(L(INF,1))) shows a significant negative effect (p-value = 0.002621), which could indicate that a fall in inflation in the past is linked to a reduction in public debt.

The interest rate (d(IR)) also has a negative and significant impact on public debt (p-value = 0.000284), suggesting that an increase in interest rates helps to reduce public debt. However, the first lagged difference in the interest rate (d(L(IR,1))) has no significant effect (p-value = 0.279352), indicating that a previous variation in interest rates does not directly influence public debt.

As for the exchange rate (d(ER)), this variable has no significant impact on public debt (p-value = 0.690466), as does the first lagged difference in the exchange rate (d(L(ER,1))), which has no significant effect (p-value = 0.769242).

Gross domestic product (d(GDP)) shows a positive and significant relationship with public debt (p-value = 0.016447), indicating that an increase in GDP is associated with an increase in public debt. Conversely, the first lagged difference in GDP (d(L(GDP,1))) shows a significant negative effect (p-value = 0.027508), suggesting that a reduction in GDP in the past may be linked to a reduction in public debt.

Finally, the error correction term (ect) is highly significant (p-value < 0.0001), showing that there is a stable long-term cointegrating relationship between the variables. The negative value of the ect coefficient (-0.73250) indicates that any deviation from long-term equilibrium is quickly corrected.

Cointegration Test

The Bounds F-test is used to determine the presence of a cointegrating relationship in an ARDL (or RECM) model.

TEST	F-STATISTIC	P-VALUE
	22.57937	1e-06

the test p-value is 1e-06 is extremely low and well below the standard significance level of 5% (or 0.05). This means that the null hypothesis (no cointegration) is rejected, concluding that there is a cointegrating relationship between the variables in the model. the long-term equation is written as follows:

$$DT.l2 = 1.000 \cdot DT.l2 - 0.4344089 \cdot DB.l2 - 0.1732981 \cdot INF.l2 - 0.1476606 \cdot TIR.l2 - 0.8592402 \cdot GDP.l2$$

The cointegration relationship for DT.l2 (lagged public debt) reveals key long-term dynamics between public debt and other macroeconomic variables. DT.l2 is positively correlated with itself, as expected, but negatively related to BD.l2 (lagged budget deficit), INF.l2 (lagged inflation), IR.l2 (lagged interest rate), and GDP.l2 (lagged GDP). Specifically, a higher budget deficit and inflation are associated with lower public debt, while higher GDP and interest rates are linked to a reduction in debt levels. These findings suggest that stronger economic growth and fiscal discipline over time can reduce public debt.

Model Diagnosis

The results of the RECM diagnostic tests are generally favorable to the model specification.

Test	p-value	Conclusion
Breusch-Godfrey test	0,7446	No autocorrelation
Breusch-Pagan test	0,8148	No heteroscedasticity
Jarque-Bera test	0,5846	the residuals follow a normal distribution

The Breusch-Godfrey test indicates a p-value of 0.7446, suggesting no autocorrelation of order less than 1 in the model residuals. This means that the errors are independent and that there is no major autocorrelation problem.

In the Breusch-Pagan test, the p-value is 0.8148, meaning that there is no heteroscedasticity detected in the model residuals. Error variance appears to be constant.

Finally, the Jarque-Bera test indicates a p-value of 0.5846, suggesting that the residuals follow a normal distribution. This normality of residuals is important to ensure robust hypothesis testing and confidence intervals in the model.

Discussion

The findings highlight several significant relationships between public debt and the main macroeconomic variables. The first lagged difference in public debt shows a negative relationship with current public debt, suggesting that an increase in public debt in the past is associated with a reduction in current debt. This result is consistent with the dynamics of debt management, where periods of increasing debt can induce fiscal consolidation measures that reduce long-term debt.

The budget deficit is positively related to public debt, indicating that an increase in the budget deficit leads to an increase in public debt. This result is consistent with the work of Elmendorf and Mankiw (1999), who point out that higher budget deficits lead to greater pressure on public debt, often as a result of increased public borrowing. On the other hand, the delayed difference in budget deficits has a negative effect, suggesting that a reduction in past deficits could contribute to a reduction in current debt. This phenomenon is also observed in the study by Abindaw Nabieu (2023), which indicates that excess budget deficits contribute significantly to debt growth.

As regards inflation, the results show that it has no significant impact on public debt. However, the first lagged difference in inflation has a negative effect, suggesting that lower inflation in the past could be linked to a reduction in public debt. This dynamic is in line with the results of Bittencourt (2015), who found that inflation had a negative impact on public debt, reinforcing the importance of economic stability in debt management.

Interest also has a negative effect on public debt, suggesting that a rise in interest rates helps to reduce public debt. This result is in line with the observations of Mah et al (2013), who found that inflation and public spending have a positive relationship with debt, while foreign investment and interest rates had opposite effects. Nevertheless, the lagged difference in the interest rate has no significant effect, which could reflect an inertia in the response of debt to past variations in interest rates, a similar phenomenon observed by Phiri (2024) in his study of Zambia.

The exchange rate has no significant effect on public debt, as does its first lagged difference. This result may reflect the absence of a direct link between the exchange rate and public debt, which is in line with the findings of Chiminya and Nicolaidou (2015), who observed that economic openness and economic activity had a stronger influence on debt levels than exchange rate factors.

Finally, GDP shows a positive relationship with public debt, indicating that an increase in GDP is associated with an increase in public debt. This may reflect the use of public debt to finance economic expansion. However, the lagged difference in GDP has a negative effect, suggesting that a reduction in GDP in the past could be associated with a reduction in public debt. This result is in line with the work of Natalia (2006) and Bittencourt (2015), who found that economic growth reduces the public debt ratio, a key aspect for debt sustainability.

The error correction term is highly significant, indicating a stable long-term cointegration relationship between the variables. The negative value of the coefficient of the error correction term shows that a deviation from long-run equilibrium is quickly corrected, reflecting a return-to-equilibrium dynamic that is also observed in the studies of Sinha et al. (2011), where institutional and economic factors influence debt management.

Conclusion

This paper examined the determinants of public debt using a multi-component error correction model (RECM), which analyzed both short-term and long-term relationships between public debt and several macroeconomic variables. The results show significant relationships, confirming the importance of economic and budgetary factors in public debt management.

Firstly, the budget deficit appears to be a major determinant of debt accumulation, which is consistent with numerous previous studies highlighting the pressure exerted on public finances by high deficits. The negative relationship between past and current public debt suggests a certain dynamic of fiscal consolidation, indicating that past increases in debt may lead to adjustments to control long-term indebtedness. Moreover, inflation and interest rates, while having variable effects in the short and long term, underline the importance of stable economic management to limit the risks of debt growth.

The results for GDP also confirm that sustained economic growth is crucial to controlling the public debt ratio, although the use of debt to finance economic expansion may also play a role in increasing debt. On the other hand, variables such as the exchange rate showed no significant impact on public debt, which might suggest that, in the context of this model, other internal macroeconomic factors (such as fiscal management and growth) exert a more direct influence.

Finally, the error correction term confirms the existence of a stable long-term relationship between public debt and economic variables, with a rapid return to equilibrium when deviations are observed. This highlights the importance of debt management based on coherent economic policies that are adapted to economic fluctuations.

In sum, this study makes a significant contribution to the understanding of public debt dynamics, highlighting the importance of fiscal discipline, macroeconomic stability and economic growth in maintaining a sustainable public debt trajectory. The results pave the way for future research that could delve deeper into the mechanisms underlying these relationships, particularly by taking into account the specific economic and institutional contexts of each country.

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