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# Effect of Public Debt on Inflation in Kenya: An ARDL Approach

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**Abstract**

Aspects contributing to inflation warrant consideration in attaining price stability, especially for an economy facing escalating public debt levels. Kenya's public debt has been increasing significantly, raising concerns about its potential impact on inflation dynamics. The specific objectives of this research were to determine public debt trends in Kenya, assess historical inflation patterns, and analyze the effect of public debt on inflation. The study was founded on the Fiscal Theory of Price Level (FTPL), the Classical Quantity Theory of Money, and the Monetarist Theory, highlighting the interplay between fiscal and monetary policy in influencing price levels. The researcher applied descriptive, causal, and correlational research designs to provide a comprehensive analysis of the relationship among variables. The analysis entailed trend analysis to observe the trajectory of public debt, the Hodrick-Prescott (HP) Filter to isolate inflationary patterns, and the Autoregressive Distributed Lag (ARDL) Model coupled with the bounds cointegration test to examine the long-term relationships among variables. An error correction model was used to measure the speed at which inflation returns to equilibrium. The study utilized quarterly secondary time series data from 2000 to 2022, ensuring a robust dataset for examining both short-term and long-term effects. Stationarity tests confirmed that inflation, public debt, money supply, exchange rate, and GDP series were integrated at the first order, while the 91-day treasury bills interest rates series was integrated at level (order zero). Trend analysis indicated that government borrowing in Kenya is on a sustained upward trajectory. The HP Filter findings demonstrated that inflation in Kenya exhibits minimal cyclical pressure, suggesting structural factors dominate. The ARDL bounds test confirmed a long-run association among all variables; however, the model failed to reject the null hypothesis, implying that public debt does not significantly affect inflation in Kenya. Past values of inflation, money supply, and 91-day treasury bills interest rates significantly influence inflation only in the short run. An Error Correction Term of (–0.008) reveals a very slow adjustment process, requiring policymakers to adopt both short-term inflation-targeting interventions and long-term macroeconomic stabilisation policies.

## 1. Introduction

Public debt and inflation stand as two macroeconomic variables with far-reaching implications for economic stability, particularly in emerging and developing economies. As governments resort to deficit financing to fund development projects and social programmes, mounting debt levels have ignited debate on whether such fiscal behaviour translates into inflationary pressures (Olaoye & Olomola, 2022). These debates were intensified in the aftermath of the COVID-19 pandemic and the Russian–Ukraine war, both of which generated severe supply–demand imbalances and triggered global inflation (IMF, 2022a).

Kenya presents a compelling case study. Its public debt stock rose from Kshs. 629,558 million in 2002 to Kshs. 8,588,281 million by June 2022, simultaneously breaching several regional debt sustainability thresholds — including the East African Community Monetary Protocol's 50 percent debt-to-GDP benchmark and the African Monetary Cooperation Programme's 60 percent ceiling (IMF, 2021). Concurrently, the Central Bank of Kenya (CBK) revised its monetary policy rate target upward from 7.5 percent to 8.25 percent in response to global inflationary pressures (CBK, 2022), suggesting that conventional monetary instruments may be insufficient to contain emerging price pressures.

Despite growing policy concern, the academic literature on the public debt–inflation nexus in Kenya remains sparse, with most studies focusing on the debt–growth relationship. The seminal Kenyan study by Mweni et al. (2016) found that external debt significantly and positively affects inflation; however, it employed OLS on data from 1972 to 2012 without controlling for other inflation determinants such as money supply, interest rates, exchange rates, and output. This study therefore bridges that gap by applying a more comprehensive ARDL–ECM framework, incorporating the full complement of macroeconomic control variables and utilising more recent quarterly data spanning 2000 to 2022.

The specific objectives of this study are: (1) to determine public debt trends in Kenya; (2) to assess historical inflation patterns; and (3) to analyse the effect of public debt on inflation in Kenya. The null hypothesis tested is that public debt has no significant effect on inflation in Kenya.

# 2 Theoretical Framework and Literature Review

## 2.1 Fiscal Theory of Price Level (FTPL)

The anchor theory underpinning this study is the Fiscal Theory of Price Level (FTPL), a framework that fundamentally reconceptualises the determinants of the general price level. Whereas conventional monetary theory attributes inflation exclusively to the actions of a central bank, the FTPL challenges this orthodoxy by positioning fiscal policy — specifically the size and sustainability of government debt — as an independent and potentially dominant force in shaping price dynamics. The theory's intellectual origins trace to the independent and near-simultaneous contributions of Leeper (1991), Sims (1994), and Woodford (1995, 2001), who collectively formalised the conditions under which fiscal variables exert a primary influence on the price level.

At the core of the FTPL lies the intertemporal government budget constraint, which equates the real market value of outstanding government liabilities to the expected present value of current and future primary fiscal surpluses. This relationship is expressed as:

**P = (M + B) / EPV(future surpluses)**

where M is the stock of money in circulation, B represents the face value of outstanding government bonds, P is the general price level, and EPV denotes the expected present discounted value of future primary surpluses. The equation reveals a fundamental insight: if the government's anticipated future surpluses are insufficient to back the current stock of liabilities, the price level must adjust upward to restore the real value balance — generating inflation as a fiscal equilibrating mechanism.

The FTPL distinguishes between two fundamentally different fiscal–monetary policy regimes, each with profoundly different implications for inflation dynamics. In a Ricardian or passive fiscal regime, the government commits to adjusting future taxes or expenditures to satisfy its budget constraint regardless of the price level. In this setting, fiscal policy passively accommodates monetary policy, and the central bank retains full control over inflation. By contrast, in a non-Ricardian or active fiscal regime — the scenario most relevant to developing economies like Kenya — the government sets fiscal variables without regard to intertemporal solvency. The burden of equilibrating the government's budget constraint then falls on the price level itself. Households holding government bonds perceive them as net wealth, and a fiscal expansion — whether through increased spending or debt issuance — generates a positive wealth effect that stimulates aggregate demand and drives up prices (Woodford, 2001).

This wealth channel is central to understanding how public debt can be inflationary. When a government issues bonds to finance a deficit without credibly committing to future fiscal adjustment, bondholders rationally anticipate that the real value of their claims will be eroded through inflation. This anticipation itself elevates current demand and accelerates price increases, creating a self-fulfilling inflationary dynamic (Cochrane, 2001). Furthermore, the FTPL highlights the concept of fiscal dominance: a situation in which the scale of government borrowing is so large that monetary authorities are effectively compelled to monetise debt — injecting money into the economy to service obligations — thereby subordinating price stability objectives to fiscal imperatives (Sargent & Wallace, 1981). Fiscal dominance is particularly pertinent in developing economies, where central bank independence may be limited, capital markets are shallow, and government revenues are vulnerable to external shocks.

The FTPL also provides a framework for understanding the interaction between debt structure and inflation. External debt obligations denominated in foreign currencies expose a government to exchange rate risk; as the domestic currency depreciates — a common occurrence when external debt burdens become unsustainable — the domestic-currency cost of debt service rises, worsening the fiscal position and potentially triggering further inflationary pressure. Domestic debt, by contrast, can be partially addressed through financial repression or debt monetisation, both of which carry inflationary consequences (Reinhart & Sbrancia, 2015). These transmission channels are directly relevant to Kenya, where external debt constituted approximately 50.1 percent of total public debt stock as at June 2022 (Republic of Kenya, 2023).

Despite its theoretical elegance, the FTPL is not without criticism. Buiter (2002) argues that the theory conflates an equilibrium condition — the budget constraint — with a theory of price-level determination, and that its predictions depend critically on assumptions about monetary policy that may not hold in practice. McCallum (2001) similarly contends that the FTPL produces an indeterminate price level under certain policy configurations. Canzoneri et al. (2001) empirically test the FTPL for the United States and find mixed evidence, suggesting that the applicability of the theory is sensitive to the prevailing monetary and fiscal policy regime. Nevertheless, the FTPL remains the dominant theoretical framework for examining fiscal determinants of inflation in developing economies, where active fiscal policy regimes are more frequently observed, and it constitutes the primary theoretical lens through which this study analyses Kenya's public debt–inflation nexus.

## 2.2 Classical Quantity Theory of Money and Monetarist Theory

### The Classical Quantity Theory

The Classical Quantity Theory of Money, formalised by Irving Fisher (1911) as the equation of exchange, provides the foundational monetary explanation for inflation. Fisher's framework posits a direct and proportional relationship between the money supply and the general price level, expressed as:

$$MV = PT$$

where M denotes the total stock of money in circulation, V represents the velocity of money — the average frequency with which a unit of currency is used in transactions within a given period — P is the weighted average price level, and T is the total volume of transactions in the economy. Fisher further extended this formulation to incorporate bank deposits, acknowledging that the credit creation activities of commercial banks effectively augment the money supply:

$$P = (MV + M'V') / T$$

where M' represents bank deposits accessible through cheque transfers and V' is the corresponding velocity of their circulation. Under the classical

assumptions of constant velocity and full employment output — implying that T is fixed in the short run — any increase in M or M' translates directly and proportionally into a rise in P. This dichotomy between the real and nominal sectors of the economy, often referred to as the classical dichotomy, implies that monetary variables determine price levels but have no lasting effect on real output.

A critical implication of the quantity theory is that inflation is, at its root, always and everywhere a monetary phenomenon — a proposition later made famous by Friedman (1968). The theory informed this study's inclusion of money supply as a primary explanatory variable and GDP as a proxy for the economy's real output capacity. It also highlights the limitation of treating inflation purely as a fiscal phenomenon, providing the theoretical counterpoint to the FTPL: where the FTPL attributes price determination to fiscal surpluses, the quantity theory attributes it to money supply dynamics, setting up an empirically testable tension that this study seeks to resolve in the Kenyan context.

#### The Monetarist Theory

Milton Friedman's Monetarist Theory (1956, 1968) represents a significant refinement and challenge to the classical quantity theory. While Friedman retained the centrality of money supply in explaining inflation, he rejected the classical assumption of strict proportionality and introduced important temporal distinctions. His permanent income hypothesis established that consumer spending — and by extension, aggregate demand — is driven by long-run expectations of income rather than current income, implying that monetary shocks have complex and lagged effects on the price level.

Friedman restated the quantity theory in a demand-for-money framework, expressing the money market equilibrium as:

$$MV = PY$$

where Y is real output (GDP) rather than total transactions, and V is the income velocity of money. By treating V as a stable function of interest rates and other financial variables rather than a constant, Friedman introduced the interest rate as a key transmission variable between money supply and inflation. The price level can thus be expressed as:

$$P = MV / Y$$

Monetarists argue that monetary authorities exogenously control the money supply, and that market forces, operating through the interest rate channel, transmit monetary impulses to the real economy. An expansionary monetary policy — increasing M — reduces interest rates in the short run, stimulating investment and output. However, in the long run, with output returning to its natural level, the additional money supply manifests entirely as higher prices. This distinction between short-run output effects and long-run price-level effects is empirically important: it explains why Kenya's short-run ARDL estimates may differ from the long-run coefficients, and why persistent monetary expansion ultimately generates inflationary pressure even if its immediate effect is muted.

Critically, the Monetarist Theory also underscores the role of inflation expectations. Friedman's expectations-augmented Phillips curve (1968) posits that any systematic attempt by policymakers to exploit the short-run trade-off between inflation and unemployment will be frustrated by rational expectation revision, leaving inflation permanently higher. In the Kenyan context, this implies that the CBK's inflation-targeting credibility is a crucial determinant of actual inflation outcomes — a finding consistent with this study's observation that past inflation values are significant short-run determinants of current inflation, reflecting inertial expectations formation.

The Classical and Monetarist theories collectively justify the inclusion of money supply (M2), 91-day treasury bills interest rates, exchange rates, and GDP as control variables in this study. They also provide the theoretical counterpoint to the FTPL: where the FTPL predicts that fiscal variables drive inflation, these theories predict that monetary aggregates dominate. Empirically adjudicating between these theoretical predictions in the specific institutional context of Kenya — where the CBK has adopted a formal inflation-targeting framework — constitutes one of the central contributions of this study.

### 2.3 Empirical Literature Review

#### Evidence from Advanced Economies

Empirical research on the public debt–inflation nexus in advanced economies has yielded largely inconclusive results, reflecting the institutional capacity of these economies to manage debt without resorting to monetisation. Cochrane (2001) provided early empirical support for the FTPL in the United States, demonstrating that fiscal shocks explain a non-trivial portion of price-level variation, particularly at longer horizons. Similarly, Davig and Leeper (2011) document regime-switching dynamics in U.S. fiscal and monetary policy, showing that periods of fiscal dominance — when the FTPL logic applies — alternate with periods of conventional monetary dominance. Their findings suggest that the relevance of the FTPL is contingent on the prevailing policy regime, a qualification that is particularly important when interpreting results from developing economies.

Tanner and Ramos (2003) examined the fiscal–monetary interaction in Brazil, finding strong evidence of fiscal dominance in the 1990s, during which rising public debt directly transmitted into inflation through the monetisation channel. This changed markedly after Brazil's adoption of an inflation-targeting framework in 1999 and the passage of the Fiscal Responsibility Law in 2000, underscoring the importance of institutional reforms in severing the fiscal–inflation link. For advanced economies broadly, Slater (2021) finds that public debt surges accompanied by significant monetary expansion generate a median inflation rise of approximately 4 percent, while episodes of debt accumulation without commensurate monetary growth have a far smaller inflationary impact — a finding that reinforces the primacy of the monetary transmission channel even in the presence of high debt.

#### Evidence from Sub-Saharan Africa

The empirical literature from Sub-Saharan Africa, while growing, remains concentrated in a handful of countries, and the evidence is decidedly mixed. Aimola and Odhiambo (2021a) conducted one of the most comprehensive studies in the region, examining the public debt–inflation nexus in Ghana using an ARDL–ECM framework on annual data from 1983 to 2018. They established a statistically significant positive relationship between public debt and inflation in both the short and long run, consistent with the FTPL's predictions and Ghana's history of fiscal dominance prior to its debt restructuring under the Heavily Indebted Poor Country (HIPC) initiative. Their companion study (Aimola & Odhiambo, 2021b) for Nigeria similarly confirmed a long-run cointegration among public debt, money supply, inflation, and interest rates, though the direct debt–inflation coefficient was more muted, reflecting Nigeria's larger and more diversified economy.

Aimola and Odhiambo (2022) extended this line of research to The Gambia using a Nonlinear ARDL (NARDL) approach, revealing asymmetric effects:

positive changes in public debt were found to be inflationary in both the short and long run, while negative changes had a more limited deflationary effect. This asymmetry has important policy implications, suggesting that debt accumulation is more inflationary than an equivalent debt reduction is deflationary. Saungweme and Odhiambo (2021) documented similar long-run associations in Nigeria, while Ezeanyeji et al. (2019) confirmed a substantial positive impact of public debt on inflation in Nigeria using vector autoregression (VAR), attributing the relationship primarily to the monetisation of fiscal deficits.

In Southern and Eastern Africa, the evidence is more varied. Afonso and Ibraimo (2019) analysed the macroeconomic effects of public debt in Mozambique, finding that the debt–inflation link was context-dependent and sensitive to the composition of debt — with external commercial debt having a stronger inflationary effect than concessional borrowing, owing to exchange rate pass-through. Maitra (2019) examined Sri Lanka — an economy sharing several structural characteristics with Sub-Saharan African nations, including high import dependency and limited monetary independence — and found that domestic debt significantly influences price levels, while external debt effects are transmitted primarily through the exchange rate channel. In East Africa specifically, Ngasamiaku and Ngong'ho (2022) documented persistently rising public debt in Tanzania despite a 2007 debt relief grant, and found a significant positive association between public debt growth and inflation, particularly following the acceleration of infrastructure borrowing after 2012. These findings collectively point to the existence of a debt–inflation channel in developing economies, but with considerable heterogeneity in its magnitude and conditionality.

#### Evidence from Kenya

The empirical literature specifically focused on Kenya's public debt–inflation nexus remains sparse, representing a significant gap that this study seeks to address. The most directly relevant prior study is Mweni et al. (2016), who examined the effect of external debt on the inflation rate in Kenya using OLS regression on annual data from 1972 to 2012. They found a statistically significant positive relationship between external debt and inflation, consistent with theoretical expectations that external borrowing depreciates the domestic currency and elevates import prices. However, the study's reliance on OLS — a method unsuited to non-stationary time series data — and its omission of control variables for money supply, interest rates, and output limit the robustness and generalisability of these findings.

More broadly, several studies have examined Kenya's public debt from the angle of economic growth and fiscal sustainability. Thotho et al. (2021) documented the structural evolution of Kenya's domestic debt market, tracing the shift from short-term treasury bills to longer-tenure bonds following the 2001 domestic debt restructuring reforms. KIPPRA (2020) highlighted the growing debt service burden and its potential crowding-out effects on public investment, with secondary implications for inflationary supply-side constraints. The National Treasury's Annual Public Debt Management Reports (2021–2022) have consistently noted the rapid pace of debt accumulation — particularly external commercial borrowing through Eurobonds — without a comprehensive assessment of the macroeconomic consequences for price stability.

The absence of a rigorous, multivariate time series study on Kenya's public debt–inflation nexus using contemporary econometric methods represents the central knowledge gap motivating this research. This study addresses that gap by employing the ARDL bounds cointegration test and ECM, controlling for money supply, interest rates, exchange rates, and output, and utilising quarterly data from 2000Q1 to 2022Q4 — a sample period that encompasses the full arc of Kenya's debt accumulation cycle, including the pivotal post-2010 acceleration, the 2017 Eurobond issuance, and the COVID-19 pandemic fiscal shock.

#### Summary of Knowledge Gaps

The foregoing review reveals four critical gaps in the existing literature. First, most Sub-Saharan African studies employ annual data, which may obscure important short-run dynamics captured by quarterly observations. Second, prior Kenyan studies (notably Mweni et al., 2016) examine only external debt rather than total public debt, potentially understating or misattributing inflationary effects. Third, the control variable sets in existing studies are often incomplete, omitting critical inflation determinants such as GDP, the exchange rate, or short-term interest rates. Fourth, no existing study for Kenya tests the applicability of the FTPL as a formal theoretical framework in a multivariate cointegration setting. This study addresses all four gaps simultaneously, making a substantive contribution to both the Kenya-specific and broader Sub-Saharan African empirical literature on fiscal–price-level dynamics.

## 3 Methodology

### 3.1 Data and Sample

The study utilised quarterly secondary time series data spanning 2000Q1 to 2022Q4 (N = 92 observations), sourced from the Central Bank of Kenya (CBK), Kenya National Bureau of Statistics (KNBS), and World Bank databases. The sample period was selected purposively to capture key structural shifts in Kenya's debt management architecture following the 2001 domestic debt restructuring reforms, and to encompass major economic events including the 2008 global financial crisis and the COVID-19 pandemic.

### 3.2 Variable Specification

The core model specifies inflation (INF), measured by the Consumer Price Index (CPI), as the dependent variable. The independent variable is total public debt (PD), disaggregated into external and domestic components and expressed as percentage changes. Control variables include: Money Supply M2 (MS), 91-day Treasury Bills Interest Rates (I), Exchange Rate (EXR, Kenya Shilling to US Dollar), and real GDP (output). The functional form of the model is:

$INF_t = f(PD_t, MS_t, I_t, EXR_t, GDP_t)$

### 3.3 Estimation Strategy

Prior to estimation, all series were subjected to the Augmented Dickey-Fuller (ADF) and Kwiatkowski-Phillips-Schmidt-Shin (KPSS) unit root tests. Given the mixed orders of integration identified — interest rates being I(0) and all other variables being I(1) — the Autoregressive Distributed Lag (ARDL)

bounds testing approach (Pesaran et al., 2001) was adopted. The ARDL model was estimated in its Error Correction Model (ECM) form to capture both long-run equilibrium dynamics and short-run adjustment. The optimal lag structure was selected using the Akaike Information Criterion (AIC), yielding ARDL(4,0,2,2,1,0). Seasonal dummy variables were incorporated to control for quarterly seasonality.

Model robustness was validated through: White's heteroscedasticity test, the Breusch-Godfrey Serial Correlation LM test, Jarque-Bera normality test, Ramsey RESET specification test, Variance Inflation Factor (VIF) multicollinearity test, and recursive CUSUM and CUSUMSQ stability tests.

## 4 Results and Discussion

### 4.1 Descriptive Statistics

Table 1: Summary Descriptive Statistics — Source: CBK/KNBS databases

| Statistic | INF | PD | MS | I | EXR | GDP |
|---|---|---|---|---|---|---|
| Mean | 65.36793 | 2638976. | 1785270. | 8.035978 | 87.69815 | 1253381. |
| Median | 62.17500 | 1483042. | 1400133. | 8.000000 | 84.13000 | 1517188. |
| Maximum | 128.3900 | 8930158. | 4475675. | 19.29000 | 121.9500 | 2526757. |
| Minimum | 23.87000 | 594880.7 | 343878.0 | 1.160000 | 62.65000 | 230418.0 |
| Std. Dev. | 30.74537 | 2473572. | 1325292. | 3.071979 | 14.29418 | 823103.0 |
| Skewness | 0.340298 | 1.157995 | 0.553281 | 0.518020 | 0.458501 | -0.141619 |
| Kurtosis | 1.845100 | 3.037037 | 1.921230 | 5.108892 | 2.105257 | 1.377698 |
| Jarque-Bera | 6.888515 | 20.56653 | 9.154867 | 21.16308 | 6.292252 | 10.39633 |
| Probability | 0.031928 | 0.000034 | 0.010281 | 0.000025 | 0.043018 | 0.005527 |
| Observations | 92 | 92 | 92 | 92 | 92 | 92 |

The standard deviation showed the spread of the series around their mean. The public debt variable had a high standard deviation of 2,473,572, while money supply and output also recorded high variability of 1,325,292 and 823,103 respectively. Skewness values were positive for all variables except GDP, indicating rightward distributional asymmetry. The Jarque-Bera normality tests rejected normality at 0.05 for inflation, money supply, interest rates, exchange rate, and output, while public debt was normally distributed. These distributional characteristics informed the transformation of variables — notably, public debt was expressed as a percentage change (PDpt) to attain stationarity.

### 4.2 Correlation Analysis

The Pearson correlation matrix revealed a moderate and statistically significant positive correlation between public debt percentage changes and inflation (r = 0.419). A very strong positive correlation was observed between money supply and inflation (r = 0.993), and between GDP and inflation (r = 0.953), and between exchange rate and inflation (r = 0.924). The 91-day treasury bills interest rate showed a weak and statistically insignificant correlation with inflation (r = 0.044). No perfect multicollinearity was detected among the regressors.

Table 2: Pearson Correlation Matrix (* significant at 0.05 level)

| Variable | INF | PDpt | MS | I | EXR | GDP |
|---|---|---|---|---|---|---|
| INF | 1.000000 | | | | | |
| PDpt | 0.418683* | 1.000000 | | | | |
| MS | 0.992596* | 0.384362* | 1.000000 | | | |
| I | 0.044340 | -0.167318 | 0.035173 | 1.000000 | | |
| EXR | 0.924359* | 0.361711* | 0.944531* | 0.113154 | 1.000000 | |
| GDP | 0.953084* | 0.514470* | 0.930188* | 0.075523 | 0.882515* | 1.000000 |

### 4.3 Stationarity Tests

Both ADF and KPSS unit root tests confirmed that all series except the 91-day treasury bills interest rate are non-stationary at levels but become stationary upon first differencing — I(1). The interest rate variable was confirmed stationary at levels — I(0). This mixed integration order satisfies the precondition for application of the ARDL bounds cointegration framework.

Table 3: Stationarity Tests (* significant at 0.05 level)

| Variable | ADF at I(0) | ADF at I(1) | KPSS at I(0) | KPSS at I(1) | Order |
|---|---|---|---|---|---|
| INF | -1.197816 | -8.599884* | 0.300772 | 0.055982* | I(1) |
| PDpt | -2.377677 | -11.21659* | 0.258335 | 0.102664* | I(1) |
| MS | -2.124344 | -8.154415* | 0.311440 | 0.157672* | I(1) |
| I | -4.027443* | -7.153796* | 0.094117* | 0.048367* | I(0) |
| EXR | -1.963739 | -7.810615* | 0.233917 | 0.048617* | I(1) |
| GDP | -2.466422 | -9.980515* | 0.113113* | 0.082727* | I(1) |

### 4.4 Public Debt Trend Analysis

Trend analysis using line plots revealed a persistent upward trajectory in both external and domestic debt from 2000Q1 to 2022Q4. External debt grew linearly from 2000 to 2010, after which it accelerated sharply, punctuated by a brief stagnation between 2019Q1 and 2020Q1 before resuming its upward climb. Domestic debt exhibited slow but steady growth between 2000 and 2009 — consistent with the treasury bond restructuring reforms of 2001 — followed by sharp acceleration from 2009 onwards. Overall, Kenya's total public debt stock rose from Kshs. 629,558 million in 2002 to Kshs. 8,588,281 million in June 2022, signalling structural fiscal challenges including over-reliance on borrowing and insufficient revenue mobilisation.

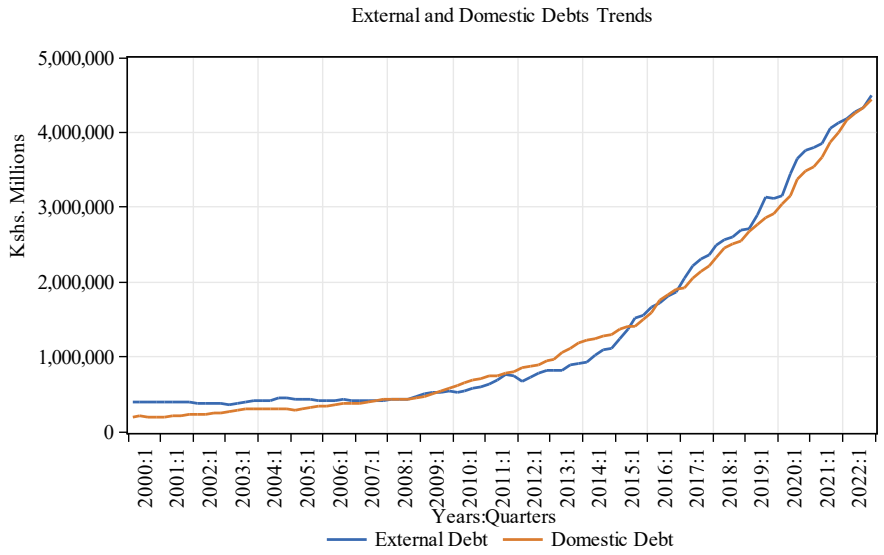


Figure 1: Line Plot of External and Domestic Debts

### 4.5 HP Filter Analysis of Inflation Patterns

The Hodrick-Prescott (HP) Filter decomposed Kenya's quarterly inflation into trend and cyclical components over 2000Q1–2022Q4. The trend component exhibited a steady upward trajectory with a mean growth rate of 4.06 percent. The cyclical component recorded a mean virtually indistinguishable from zero (2.05e-13), with a narrow range of –0.053 to +0.047, confirming minimal short-term inflation deviations around the long-term trend.

Key cyclical deviations aligned with major structural and external events: negative cycles in 2002, 2007, 2018, and 2022 coincided with Kenya's general election years — associated with reduced economic activity — while the sharp negative deviation in 2020 reflects the COVID-19 global contraction. Positive cycles around 2008 capture the inflationary impact of the global financial crisis. The near-zero cyclical component implies that Kenya's inflation is predominantly driven by long-term structural factors rather than short-term business cycle dynamics.

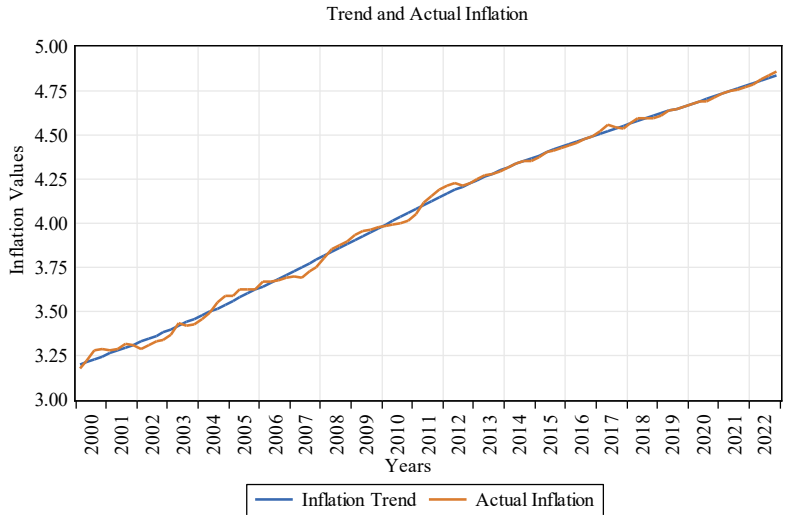


Figure 2: Trend and Actual Inflation Plot

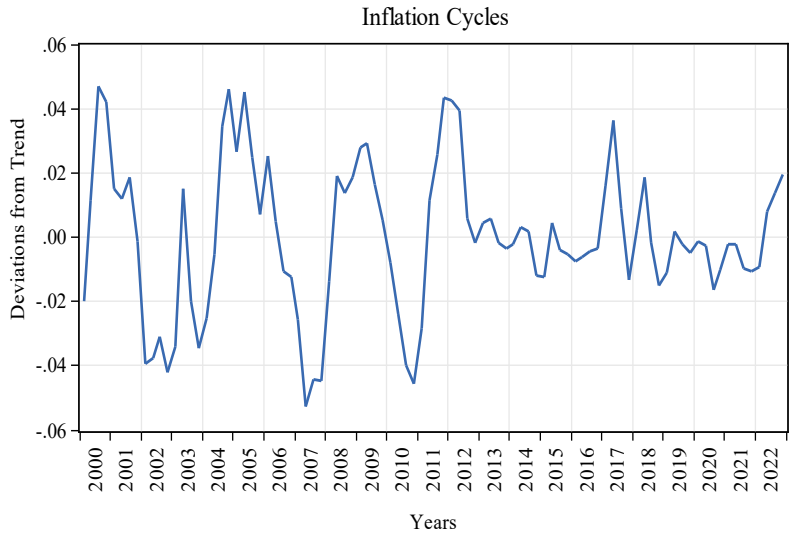


Figure 3: Inflation Cycles

Table 4: HP Filter Descriptive Statistics

| Component | Mean | Minimum | Maximum | Std. Dev. |
|---|---|---|---|---|
| **Trend component** | 4.060488 | 3.192411 | 4.835666 | 0.504177 |
| **Cyclical component** | 2.05e-13 | –0.052899 | 0.047128 | 0.023045 |

## 4.6 ARDL Bounds Test for Cointegration

The ARDL bounds test generated an F-statistic of 3.975, exceeding the upper critical bound of 3.606 at the 5 percent significance level for a sample size of 80 observations. The null hypothesis of no cointegration is therefore rejected, confirming the existence of a stable long-run relationship among inflation, public debt, money supply, 91-day treasury bills interest rates, exchange rates, and GDP.

| Dependent Variable | Function | F-statistic | Cointegration |
|---|---|---|---|
| **Inflation** | INF = f (PDpt, MS, I, EXR, GDP) | 3.975242 | **Cointegrated** |

Critical Bounds at 5%: I(0) = 2.550 | I(1) = 3.606 (Sample n=80; ARDL selected: 4,0,2,2,1,0 based on AIC)

## 4.7 Long-Run ARDL Estimates

The long-run ARDL estimates reveal that the public debt coefficient is positive (7.107) but statistically insignificant (p = 0.881), indicating that public debt does not exert a significant long-run effect on inflation in Kenya. Money supply (p = 0.826), exchange rate (p = 0.856), and GDP (p = 0.850) were similarly insignificant. The 91-day treasury bills interest rate carried a negative long-run coefficient of –5.497 but also proved insignificant (p = 0.881). These results fail to support the FTPL's prediction that rising public debt generates inflationary pressure through a fiscal wealth channel.

Table 5: ARDL Long-Run Estimates — Dependent Variable: INF

| Regressor | Coefficient | Std. Error | t-statistic | p-value |
|---|---|---|---|---|
| **PDpt** | 7.106866 | 47.22722 | –0.150482 | 0.8808 |
| **MS** | 0.000068 | 0.000308 | 0.220138 | 0.8263 |
| **I** | –5.496740 | 36.62210 | –0.150094 | 0.8811 |
| **EXR** | –1.810154 | 9.950296 | –0.181920 | 0.8561 |
| **GDP** | 0.000035 | 0.000186 | 0.189424 | 0.8502 |

## 4.8 Short-Run ARDL Estimates and Error Correction

The short-run dynamics present a more nuanced picture. The first lag of differenced inflation D(INF(–1)) is positive and significant (β = 0.279, p = 0.010), while the second lag D(INF(–2)) exerts a negative and significant correction effect (β = –0.381, p = 0.000). These opposing lagged inflation effects reflect the volatility induced by external shocks and policy regime shifts.

Money supply at its first lag D(MS(–1)) is statistically significant but negatively signed (β = –7.6e-06, p = 0.005), consistent with Aimola and Odhiambo's (2021b) short-run evidence from Ghana. The 91-day treasury bills interest rate is positive and significant both contemporaneously (β = 0.142, p = 0.007) and at its first lag (β = 0.121, p = 0.035). The Error Correction Term (ECT = –0.008, p = 0.000) confirms the long-run relationship and implies that only 0.80 percent of any disequilibrium in inflation is corrected each quarter — an extremely slow adjustment speed with profound implications for monetary policy effectiveness and inflation forecasting.

Table 6: ARDL Short-Run Estimates (* significant at 0.05 level)

| Variable | Coefficient | Std. Error | t-statistic | p-value |
|---|---|---|---|---|
| **D(INF(–1))** | 0.278965 | 0.104742 | 2.663360 | **0.0096*** |
| **D(INF(–2))** | –0.380933 | 0.096745 | –3.937482 | **0.0002*** |
| D(INF(–3)) | 0.155062 | 0.098597 | 1.572685 | 0.1203 |
| D(MS) | –8.40e-08 | 2.60e-06 | –0.032337 | 0.9743 |
| **D(MS(–1))** | –7.6e-06 | 2.61e-06 | –2.917219 | **0.0047*** |
| **D(I)** | 0.142108 | 0.051452 | 2.761954 | **0.0073*** |
| **D(I(–1))** | 0.121183 | 0.056428 | 2.147554 | **0.0352*** |
| D(EXR) | 0.054635 | 0.033670 | 1.622669 | 0.1092 |
| @QUARTER=1 | –0.083372 | 0.230980 | –0.360948 | 0.7192 |
| @QUARTER=2 | 0.352233 | 0.242386 | 1.453188 | 0.1506 |
| **@QUARTER=3** | –0.506179 | 0.228164 | –2.218486 | **0.0298*** |
| **ECT(–1)** | –0.008035 | 0.001462 | –5.496530 | **0.0000*** |
| *$R^2$ = 0.6011 \| Adj. $R^2$ = 0.5434 \| F-stat = 10.41 (p = 0.000) \| AIC = 2.295 \| ARDL(4,0,2,2,1,0)* | | | | |

### 4.9 Model Diagnostic Tests

All diagnostic tests confirm the statistical adequacy of the estimated ARDL model. The White heteroscedasticity test (Chi-square p = 0.063) fails to reject homoscedasticity. The Breusch-Godfrey LM test (p = 0.844) confirms the absence of serial correlation. The Jarque-Bera test (p = 0.774) supports normally distributed residuals. The Ramsey RESET test (p = 0.720) validates the linear functional form, and the VIF of 1.629 — well below the threshold of 10 — confirms the absence of problematic multicollinearity. The CUSUM and CUSUMSQ plots remained within the 5 percent significance bounds throughout the sample period, affirming parameter stability and the absence of structural breaks.

Table 7: Model Diagnostic Test Summary

| Test | Statistic | p-value | Decision |
|---|---|---|---|
| **White Heteroscedasticity** | Chi-sq = 26.664 | 0.0632 | Homoscedastic ✓ |
| **Breusch-Godfrey LM** | F = 0.1695 | 0.8444 | No serial correlation ✓ |
| **Jarque-Bera Normality** | JB = 0.5017 | 0.7740 | Residuals normal ✓ |
| **Ramsey RESET** | F = 0.1296 | 0.7200 | Correct specification ✓ |
| **VIF (Multicollinearity)** | VIF = 1.629 | < 10 | No multicollinearity ✓ |
| **CUSUM / CUSUMSQ** | Within bounds | — | Parameter stable ✓ |

## 5 Conclusion and Recommendations

CONCLUSIONS AND POLICY IMPLICATIONS

This study examined the effect of public debt on inflation in Kenya using quarterly data from 2000Q1 to 2022Q4, employing the ARDL bounds cointegration test and ECM estimation. Three main conclusions emerge.

First, Kenya's public debt has been on a sustained upward trajectory over the study period, with no significant reductions. This signals growing fiscal vulnerability and underscores the need for structural reforms to strengthen revenue mobilisation and reduce dependence on debt financing for recurrent expenditures.

Second, inflation in Kenya follows a predominantly long-term trend, with minimal short-term cyclical volatility. The HP Filter findings suggest that structural factors — rather than demand-driven business cycle fluctuations — are the primary drivers of Kenya's inflationary dynamics. CBK's inflation-targeting regime appears to have been effective in containing short-term price instability, though persistent external shocks remain a challenge.

Third, and most significantly, public debt does not exert a statistically significant effect on inflation in Kenya, either in the short run or the long run. The FTPL is thus not empirically supported in the Kenyan context. Instead, past inflation values, money supply, and 91-day treasury bills interest rates are the dominant short-run inflation drivers. The extremely slow ECT of –0.008 implies that monetary policy interventions will require considerable time to transmit their effects to inflation, necessitating sustained and persistent policy commitment.

These findings carry important policy implications. Policymakers should recalibrate their inflation management frameworks to prioritise money supply management and interest rate adjustments over debt-reduction targets as the primary anti-inflation levers. Financial sector practitioners — including risk managers, bond traders, and inflation-sensitive asset allocators — should incorporate the prolonged inflation adjustment dynamics into their pricing models and hedging strategies. Future research should explore the disaggregated effects of external versus domestic debt on inflation, examine the role of monetary policy regimes as a moderating variable, and investigate the causal direction of the public debt–inflation relationship through Granger causality analysis.

### Declaration of Competing Interests

The authors declare that they do not have any known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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**Ethical considerations**

The article followed all ethical standards appropriate for this kind of research.

## References

Aimola, A. U., & Odhiambo, N. M. (2021a). Public debt and inflation: Empirical evidence from Ghana. Cogent Economics & Finance, 9(1), 1922325.

Aimola, A. U., & Odhiambo, N. M. (2021b). Public debt and inflation nexus in Nigeria. Journal of African Business, 22(4), 510–524.

Aimola, A. U., & Odhiambo, N. M. (2022). Public debt and inflation in the Gambia: A nonlinear ARDL analysis. Macroeconomics and Finance in Emerging Market Economies, 16(3), 430–448.

Afonso, A., & Ibraimo, Y. (2019). The macroeconomic effects of public debt in Mozambique. Applied Economics, 52(2), 212–226.

Blanchard, O. (2017). Macroeconomics (7th ed.). Pearson.

Buiter, W. H. (2002). The fiscal theory of the price level: A critique. Economic Journal, 112(481), 459–480.

Canzoneri, M. B., Cumby, R. E., & Diba, B. T. (2001). Is the price level determined by the needs of fiscal solvency? American Economic Review, 91(5), 1221–1238.

Central Bank of Kenya (CBK). (2022). Monetary Policy Committee press release: September 2022. CBK.

Cochrane, J. H. (2001). Long-term debt and optimal policy in the fiscal theory of the price level. Econometrica, 69(1), 69–116.

Coleman, W., Minford, P., & Wickens, M. (2021). Fiscal theory and fiscal policy. Oxford Review of Economic Policy, 37(3), 567–591.

Davig, T., & Leeper, E. M. (2011). Monetary-fiscal policy interactions and fiscal stimulus. European Economic Review, 55(2), 211–227.

Dwivedi, D. N. (2019). Macroeconomics: Theory and policy (4th ed.). Tata McGraw-Hill.

Ezeanyeji, C. I., Imoagwu, C. P., & Ejefobihi, U. F. (2019). Public debt and inflation in Nigeria: A VAR approach. International Journal of Advanced Studies in Economics and Public Sector Management, 7(1), 48–62.

Fisher, I. (1911). The purchasing power of money. Macmillan.

Friedman, M. (1956). The quantity theory of money: A restatement. University of Chicago Press.

Friedman, M. (1968). The role of monetary policy. American Economic Review, 58(1), 1–17.

IMF. (2021). Debt sustainability analysis: Kenya. International Monetary Fund.

IMF. (2022a). World economic outlook: War sets back the global recovery. International Monetary Fund.

IMF. (2023). Regional economic outlook: Sub-Saharan Africa. International Monetary Fund.

KIPPRA. (2020). Kenya economic report 2020: Making Kenya's public debt sustainable. Kenya Institute for Public Policy Research and Analysis.

Leeper, E. M. (1991). Equilibria under 'active' and 'passive' monetary and fiscal policies. Journal of Monetary Economics, 27(1), 129–147.

Maitra, B. (2019). Public debt and inflation in Sri Lanka. South Asian Journal of Macroeconomics and Public Finance, 8(1), 1–24.

McCallum, B. T. (2001). Indeterminacy, bubbles, and the fiscal theory of price level determination. Journal of Monetary Economics, 47(1), 19–30.

Mweni, F., Njuguna, A., & Okoth, T. (2016). Effect of external debt on inflation rate in Kenya, 1972–2012. International Journal of Financial Research, 7(2), 111–121.

Ngasamiaku, W., & Ngong'ho, V. (2022). Public debt and inflation in Tanzania. Journal of African Development, 24(1), 55–76.

Olaoye, O. O., & Olomola, P. A. (2022). Sub-Saharan Africa's rising debt: In search of a fiscal response function. Journal of Policy Modeling, 44(2), 320–337.

Pesaran, M. H., Shin, Y., & Smith, R. J. (2001). Bounds testing approaches to the analysis of level relationships. Journal of Applied Econometrics, 16(3), 289–326.

Reinhart, C. M., & Sbrancia, M. B. (2015). The liquidation of government debt. Economic Policy, 30(82), 291–333.

Republic of Kenya, National Treasury. (2023). Annual public debt management report 2021–2022. National Treasury and Planning.

Sargent, T. J., & Wallace, N. (1981). Some unpleasant monetarist arithmetic. Federal Reserve Bank of Minneapolis Quarterly Review, 5(3), 1–17.

Saungweme, T., & Odhiambo, N. M. (2021). Public debt and inflation dynamics in Nigeria. Cogent Economics & Finance, 9(1), 1921819.

Sims, C. A. (1994). A simple model for study of the determination of the price level and the interaction of monetary and fiscal policy. Economic Theory, 4(3), 381–399.

Slater, M. (2021). Surging public debt and inflation: Historical evidence. World Economic Forum Global Risks Report Supplement.

Tanner, E., & Ramos, A. M. (2003). Fiscal sustainability and monetary versus fiscal dominance: Evidence from Brazil, 1991–2000. Applied Economics, 35(7), 859–873.

Thotho, E., Momanyi, G., & Onchiri, M. (2021). Dynamics of Kenya's domestic public debt market: A historical analysis. African Development Review, 33(2), 195–210.

Urquhart, A. (2021). Public debt and inflation in Paraguay. Latin American Journal of Economics, 58(1), 45–68.

Woodford, M. (1995). Price-level determinacy without control of a monetary aggregate. Carnegie-Rochester Conference Series on Public Policy, 43, 1–46.

Woodford, M. (2001). Fiscal requirements for price stability. Journal of Money, Credit and Banking, 33(3), 669–728.

World Bank. (2022a). Kenya economic update: Edition 23. World Bank.

World Bank. (2022b). Kenya debt sustainability analysis. World Bank Group.