

# Exchange Rate Fluctuations and Macroeconomic Stability in Kenya: A SVAR Model

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Exchange Rate Fluctuations, Macroeconomic Stability, Kenya, SVAR Model, Purchasing Power Parity, Granger Causality, Impulse Response Functions, Fiscal Deficit, Inflation

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## Abstract

This study examines the dynamic relationship between exchange rate fluctuations and macroeconomic stability in Kenya over the period 1980–2024, a period characterized by persistent currency depreciation and fragile macroeconomic conditions. Anchored in Purchasing Power Parity (PPP) theory and supported by the Mundell-Fleming Model and New Keynesian Theory, the study adopts a pragmatist philosophy and employs a quantitative, descriptive-correlational research design. Annual time-series data on six macroeconomic variables — bilateral exchange rate (BIER), inflation rate (INFLR), GDP growth rate (GDPGR), net balance of payments (NBOP), interest rate (IR), and fiscal deficit (FD) — were analysed using the Structural Vector Autoregressive (SVAR) model, complemented by Granger causality tests, impulse response functions (IRFs), and forecast error variance decomposition (FEVD). Trend analysis yielded a coefficient of 2.707 ( $p = 0.000$ ), confirming a statistically significant and sustained depreciation of the Kenyan shilling. Granger causality results established that exchange rate fluctuations significantly precede fiscal deficit changes ( $p = 0.0225$ ), while fiscal deficit strongly Granger-causes interest rates ( $p = 0.0003$ ) and GDP growth ( $p = 0.0456$ ). IRF analysis demonstrated that a one-standard deviation exchange rate shock triggers an immediate rise in inflation, a short-term contraction in GDP growth, worsening of the balance of payments, and a tightening monetary policy response. Variance decomposition confirmed that while most macroeconomic variables are predominantly driven by their own past innovations, exchange rate shocks account for approximately 6.8% of inflation variance and up to 5.5% of fiscal deficit variance in the medium term. These findings underscore the centrality of exchange rate stability to Kenya's macroeconomic framework and call for coordinated fiscal-monetary policy responses, integration of exchange rate signals into inflation-targeting frameworks, and alignment of macro policy with the objectives of Kenya Vision 2030.

## 1. INTRODUCTION

Exchange rates occupy a central place in the macroeconomic architecture of any open economy, serving as transmission conduits between domestic and international economic conditions. For developing economies such as Kenya, exchange rate movements have profound implications for inflation, trade competitiveness, public debt sustainability, and the overall trajectory of macroeconomic stability.

The Kenyan shilling has experienced sustained depreciation over the past four decades, reaching a historic low of approximately KES 160.80 per US dollar in January 2024 — a 22% decline from March 2022 alone. This protracted depreciation has coincided with elevated inflation, persistent current account deficits averaging approximately -5% of GDP, rising public debt (reaching 73.1% of GDP in 2023), and GDP growth deceleration from 5.7% in 2023 to an anticipated 4.7% in 2024. The confluence of these pressures makes the nexus between exchange rate fluctuations and macroeconomic stability an urgent and policy-relevant area of inquiry.

While prior empirical studies have investigated individual dimensions of this relationship — primarily through VECM, ARDL, or simple regression approaches — they fall short of capturing the full system-wide dynamics, structural shocks, and transmission mechanisms that operate across the interconnected macroeconomic environment. This study addresses that gap by employing a Structural Vector Autoregressive (SVAR) model with 45 annual observations spanning 1980 to 2024, thereby providing a comprehensive, multi-variable, and dynamically rich empirical analysis.

The specific objectives of this study are to:

- Assess temporal trends of exchange rate fluctuations in Kenya;
- Evaluate Granger causality between exchange rate fluctuations and key macroeconomic stability indicators; and
- Analyse the structural dynamic relationships using impulse response functions and variance decomposition.

## 2. LITERATURE REVIEW

### 2.1 Purchasing Power Parity Theory

Purchasing Power Parity (PPP), originally conceptualised by Gustav Cassel (1918) and building on the Salamanca School of scholars, serves as the anchor theory for this study. PPP posits that, in equilibrium, exchange rates adjust to equalise the price levels of identical goods across countries. In its relative form, PPP asserts that the rate of change of the nominal exchange rate should mirror the inflation differential between two economies:  $S_1/S_0 = (1 + \pi_1)/(1 + \pi_2)$ . In Kenya's context, this framework helps explain how persistent domestic inflation differentials vis-à-vis trading partners have contributed to the long-run depreciation of the Kenyan shilling.

Empirical evidence on PPP is mixed. While long-run PPP holds in several economies (Akash et al., 2020; Belbali et al., 2024), short-run deviations driven by capital flows, speculative behaviour, market segmentation, and policy interventions are well-documented (Rogoff, 1996; Yun, 2017). For Kenya, PPP provides a foundational lens for understanding the co-movement of exchange rates and price levels, while acknowledging structural limitations such as import dependence and non-tradable goods.

### 2.2 Mundell-Fleming Model

The Mundell-Fleming model (Mundell & Fleming, 1960s) extends the IS-LM framework to open economies with capital mobility, capturing the trilemma of simultaneously pursuing fixed exchange rates, free capital movement, and independent monetary policy. In a flexible exchange rate regime, expansionary fiscal policy appreciates the currency through rising interest rates that attract capital inflows, thereby worsening the current account. The model explains Kenya's recurring twin-deficit phenomenon, wherein fiscal expansion contributes to current account deterioration — a pattern validated empirically (Devi & Sarma, 2022; Nautiyal et al., 2022).

## 2.3 New Keynesian Theory

New Keynesian Theory (Ball, Mankiw, & Romer, 1988) complements the above frameworks by emphasising price and wage stickiness as a source of short-run macroeconomic fluctuations. The New Keynesian Phillips Curve (NKPC) links current inflation to expected future inflation and the output gap:  $\pi_t = \beta E_t[\pi_{t+1}] + \kappa_t$ . In open economies, exchange rate pass-through operates through import price channels, amplified by price rigidities that delay full adjustment. The Taylor Rule provides a monetary policy response mechanism:  $i_t = \phi_\pi \pi_t + \phi_x x_t + \rho$ . Kenya's Central Bank rate adjustments in response to exchange-rate-induced inflationary pressures closely mirror this theoretical prediction.

## 2.4 Empirical Literature and Research Gap

Existing empirical studies on Kenya have employed various methodologies: Kitum et al. (2022) used VECM and found that exchange rate depreciation negatively impacted GDP growth ( $\beta = -0.828$ ,  $p = 0.001$ ); Njenga (2023) applied a VAR model and identified significant exchange rate pass-through to inflation; Gachoki et al. (2019) used ARDL to assess real exchange rate misalignment; and Wainaina (2025) applied SVAR exclusively to trade channels. Notably, no prior study employs a comprehensive SVAR framework incorporating all six variables simultaneously over the 1980–2024 period. This study fills that critical methodological and temporal gap.

# 3. METHODOLOGY

## 3.1 Research Design and Philosophy

The study adopts a pragmatist philosophical stance, favouring empirical problem-solving over adherence to a single epistemological tradition. A quantitative, longitudinal approach is employed, combining descriptive analysis of historical trends with a structural econometric model to capture causal and dynamic relationships among macroeconomic variables.

## 3.2 Data and Variables

Annual time-series data were sourced from the World Bank, International Monetary Fund (IMF), and Central Bank of Kenya (CBK), spanning 45 observations from 1980 to 2024. The dataset covers the following six endogenous variables:

BIER — Bilateral Exchange Rate (KES/USD): the independent variable measuring the nominal value of the Kenyan shilling against the US dollar.

INFLR — Inflation Rate (annual % change in CPI): a core macroeconomic stability indicator.

GDPGR — Real GDP Growth Rate (annual %): measuring overall economic activity.

NBOP — Net Balance of Payments (USD): capturing external sector performance.

IR — Central Bank Rate (%): the monetary policy control variable.

FD — Fiscal Deficit as % of GDP: the fiscal policy control variable.

## 3.3 Econometric Model: SVAR

The Structural Vector Autoregressive (SVAR) model was selected as the primary analytical tool due to its capacity to simultaneously model endogenous interactions, identify structural shocks via theory-driven restrictions, and trace dynamic responses through impulse response functions. The general SVAR specification is:

$$A_0 Y_t = B_0 + \sum B_1 Y_{t-s} + B_2 X_t + \varepsilon_t$$

where  $Y_t = \{BIER_t, INFLR_t, GDPGR_t, NBOP_t, IR_t, FD_t\}$  is the vector of endogenous variables, and structural shocks are identified via Cholesky decomposition, with the exchange rate ordered first as the globally determined, contemporaneously exogenous variable.

Pre-estimation unit root tests (Augmented Dickey-Fuller) confirmed mixed integration orders — INFLR, GDPGR, and IR are  $I(0)$ ; BIER, FD, and NBOP required first differencing to achieve stationarity  $I(1)$ . The Akaike Information Criterion selected an optimal lag length of 1. All eigenvalues of the companion matrix fall within the unit circle, confirming model stability.

## 4. RESULTS AND DISCUSSION

### 4.1 Descriptive Statistics

Prior to the econometric analysis, descriptive statistics were computed to provide an initial overview of each time-series variable. Table 1 summarises the central tendency, variability, and distributional properties of all six variables over the 1980–2024 period.

Table 1: Summary Descriptive Statistics — All Variables, Kenya 1980–2024

Statistic	BIER	INFLR	GDPGR	NBOP	IR	FD
Mean	66.12211	11.18898	3.844343	-1.66E+09	12.99045	-3.546418
Median	72.93060	9.377770	4.213517	-4.79E+08	12.21246	-3.124000
Maximum	156.4618	45.97888	8.058474	2.18E+08	55.70417	0.843000
Minimum	7.568500	1.554328	-0.799494	-6.28E+09	2.959561	-8.575000
Std. Dev.	36.97508	8.228109	2.221551	2.08E+09	8.404646	2.763334
Skewness	0.051943	2.157233	-0.330338	-0.975018	3.032328	-0.222254
Kurtosis	2.342964	8.789068	2.325490	2.381103	15.93663	1.840006
Jarque-Bera	0.829667	97.73988	1.671479	7.848139	382.7559	2.893451
Probability	0.660450	0.000000	0.433554	0.019761	0.000000	0.235340
Sum	2975.495	503.5042	172.9954	-7.49E+10	584.5701	-159.5888
Sum Sq. Dev.	60154.90	2978.878	217.1528	1.90E+20	3108.076	335.9847
Observations	45	45	45	45	45	45

Source: Researcher (2025)

The distributions are notably right-skewed for INFLR (skewness = 2.16) and IR (skewness = 3.03), with large kurtosis values of 8.79 and 15.94 respectively, indicating heavy tails and extreme outliers consistent with volatile macroeconomic episodes over the study period. GDPGR (-0.33) and NBOP (-0.98) are slightly left-skewed. The Jarque-Bera test rejects normality for INFLR, NBOP, and IR ( $p < 0.05$ ), which motivates the use of robust SVAR methods that do not impose normality on the data-generating process.

### 4.2 Trend Analysis of Bilateral Exchange Rate

To assess whether a statistically significant time trend exists in Kenya's exchange rate, an OLS regression of BIER on a linear time variable was estimated. The null hypothesis tested is  $H_{01}$ : there is no significant time trend in exchange rate fluctuations in Kenya. Table 2 presents the full regression output.

Table 2: OLS Trend Analysis — Bilateral Exchange Rate (BIER), Kenya 1980–2024 | Method: Least Squares | Observations: 45

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	6.565744	3.010516	2.180936	0.0347
TREND	2.707107	0.117841	22.97260	0.0000***
R-squared	0.924659	Adj. R-squared	0.922907	
S.E. of regression	10.26635	Akaike info criterion	7.539047	
Sum squared resid	4532.114	Schwarz criterion	7.619343	
Log likelihood	-167.6286	Hannan-Quinn criter.	7.568981	
F-statistic	527.7405	Durbin-Watson stat	0.929278	
Prob(F-statistic)	0.000000			

Source: Researcher (2025)

The trend coefficient of 2.707 is strongly positive and statistically significant ( $t = 22.97$ ,  $p = 0.000$ ), confirming that the Kenyan shilling has depreciated at an average rate of approximately KES 2.71 per year against the US dollar over the study period. The model explains 92.47% of the variance in the exchange rate ( $R^2 = 0.9247$ ), and the F-statistic of 527.74 ( $p = 0.000$ ) confirms overall model significance. The Durbin-Watson statistic of 0.93 (less than 2) indicates positive serial correlation in the residuals, consistent with the presence of a trending component — appropriately addressed by first-differencing in the SVAR model.  $H_{01}$  is therefore rejected.

### 4.3 Pre-Estimation: Unit Root Tests

Prior to SVAR estimation, all six endogenous variables were tested for stationarity using the Augmented Dickey-Fuller (ADF) test. Where variables were found to be non-stationary at levels, natural logarithm transformations and/or first-differencing were applied. Table 3 presents the results.

Table 3: ADF Unit Root Test Results — Stationarity Summary

Variable	Level ADF Stat.	Prob.	1st Diff. ADF Stat.	Prob.	Order	Decision
DBIER	0.119338	0.9636	-9.266796	0.000	I(1)	Stationary at first difference
INFLR	-3.557480	0.0108	—	—	I(0)	Stationary at levels
GDPGR	-4.759127	0.003	—	—	I(0)	Stationary at levels
IR	-3.422199	0.0154	—	—	I(0)	Stationary at levels
DFD	-1.516035	0.5159	-5.271133	0.0001	I(1)	Stationary at first difference
DNBOP	-0.674948	0.8420	6.543061	0.0000	I(1)	Stationary at first difference

Source: Researcher (2025)

The results confirm mixed orders of integration: INFLR, GDPGR, and IR are stationary at levels I(0), while BIER, FD, and NBPB achieve stationarity only after first-differencing I(1). Given these mixed integration orders, a long-run cointegration framework is not applicable. The SVAR model therefore focuses on short-run dynamic relationships, which is appropriate and consistent with the study’s objectives.

### 4.4 Optimal Lag Length Selection

Multiple lag orders were evaluated to determine the optimal lag length for the SVAR model. The Akaike Information Criterion (AIC), Schwarz Criterion (SC), and Hannan-Quinn Criterion (HQ) were applied to jointly balance model fit against over-parameterisation. Table 4 presents the lag order selection results.

Table 4: VAR Lag Order Selection Criteria | Endogenous Variables: DBIER INFLR GDPGR DNBOP IR DFD | Exogenous: C | Observations: 40

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-1450.448	NA	1.70e+24	72.82238	73.07572*	72.91398
1	-1392.039	96.37444*	5.68e+23*	71.70195	73.47527	72.34312*
2	-1356.836	47.52412	6.70e+23	71.74179	75.03511	72.93255
3	-1326.899	31.43358	1.29e+24	72.04496	76.85826	73.78530
4	-1277.960	36.70441	1.50e+24	71.39800*	77.73129	73.68792

\* indicates lag order selected by the criterion. LR: sequential modified LR test. FPE: Final prediction error. AIC: Akaike; SC: Schwarz; HQ: Hannan-Quinn. Source: Researcher (2025)

The Hannan-Quinn criterion (HQ) and the LR test both select lag 1, while AIC selects lag 4. Following Lütkepohl (2005), the HQ criterion is preferred in small samples due to stronger penalisation of over-parameterisation. Lag 1 is therefore selected as optimal for SVAR estimation.

### 4.5 Granger Causality Results

Pairwise Granger causality tests (2 lags) were conducted to examine the predictive relationships among all variables, addressing the second research objective. The null hypothesis tested is  $H_{02}$ : exchange rate fluctuations do not Granger-cause macroeconomic stability in Kenya. Table 5 presents the full results.

Table 5: Pairwise Granger Causality Test Results | Sample: 1980–2024 | Lags: 2

Null Hypothesis	Obs.	F-Statistic	Prob.	Result
INFLR does not Granger Cause DBIER	42	0.04951	0.9518	Not significant
DBIER does not Granger Cause INFLR		2.74427	0.0774	Weak (10%)
GDPGR does not Granger Cause DBIER	42	0.71477	0.4959	Not significant
DBIER does not Granger Cause GDPGR		0.00485	0.9952	Not significant
DNBOP does not Granger Cause DBIER	42	2.20737	0.1243	Not significant
DBIER does not Granger Cause DNBOP		0.54300	0.5856	Not significant
IR does not Granger Cause DBIER	42	0.48585	0.6190	Not significant
DBIER does not Granger Cause IR		0.95770	0.3931	Not significant
DFD does not Granger Cause DBIER	42	0.37375	0.6907	Not significant
DBIER does not Granger Cause DFD		4.21320	0.0225	✓ Significant (5%)
GDPGR does not Granger Cause INFLR	43	0.23646	0.7906	Not significant
INFLR does not Granger Cause GDPGR		0.24088	0.7871	Not significant
DNBOP does not Granger Cause INFLR	42	1.38693	0.2625	Not significant
INFLR does not Granger Cause DNBOP		0.42907	0.6543	Not significant
IR does not Granger Cause INFLR	43	1.16622	0.3224	Not significant
INFLR does not Granger Cause IR		1.09905	0.3435	Not significant
DFD does not Granger Cause INFLR	42	3.12708	0.0556	Weak (10%)
INFLR does not Granger Cause DFD		2.36579	0.1079	Not significant
DNBOP does not Granger Cause GDPGR	42	0.53372	0.5909	Not significant
GDPGR does not Granger Cause DNBOP		0.85908	0.4318	Not significant

IR does not Granger Cause GDPGR	43	1.25533	0.2965	Not significant
GDPGR does not Granger Cause IR		0.96598	0.3898	Not significant
DFD does not Granger Cause GDPGR	42	1.35291	0.2710	Not significant
GDPGR does not Granger Cause DFD		3.27023	0.0492	✓ Significant (5%)
IR does not Granger Cause DNBOP	42	0.53793	0.5885	Not significant
DNBOP does not Granger Cause IR		0.14723	0.8636	Not significant
DFD does not Granger Cause DNBOP	42	1.49491	0.2375	Not significant
DNBOP does not Granger Cause DFD		0.48778	0.6179	Not significant
DFD does not Granger Cause IR	42	0.88091	0.4229	Not significant
IR does not Granger Cause DFD		10.0195	0.0003	✓✓ Highly significant

Source: Researcher (2025)

The results reveal a selective set of statistically significant causal pathways. Exchange rate fluctuations (DBIER) significantly Granger-cause changes in fiscal deficit ( $p = 0.0225$ ), consistent with the theoretical expectation that currency depreciation raises the cost of external debt servicing and import expenditure. A weaker unidirectional effect on inflation is also observed ( $p = 0.0774$ ), supporting the exchange rate pass-through hypothesis embedded in PPP theory.

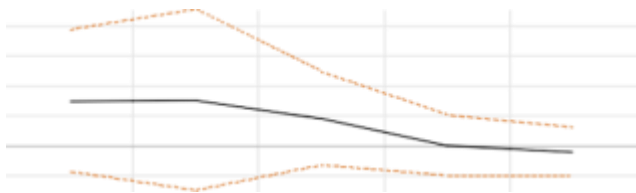
The fiscal deficit emerges as a powerful macroeconomic driver: it strongly Granger-causes interest rates ( $p = 0.0003$ ), consistent with the crowding-out mechanism in New Keynesian models, and significantly precedes GDP growth movements ( $p = 0.0492$ ), suggesting that short-term fiscal expansions stimulate output. The absence of significant exchange rate–GDP growth causality is consistent with the Mundell-Fleming prediction of limited real output responsiveness under high capital mobility.  $H_{02}$  is partially rejected.

#### 4.6 Impulse Response Functions

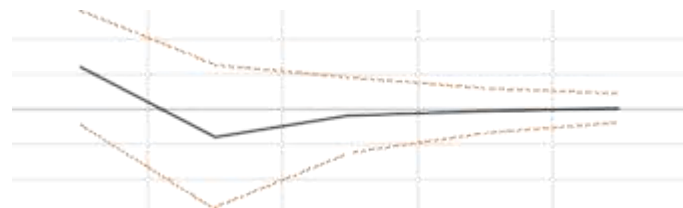
The SVAR model generates impulse response functions (IRFs) that trace the dynamic response of each macroeconomic variable to a one-standard deviation structural shock in the bilateral exchange rate (DLNBIER) over a five-period horizon.

Figure 1 presents the IRF plots for each variable.

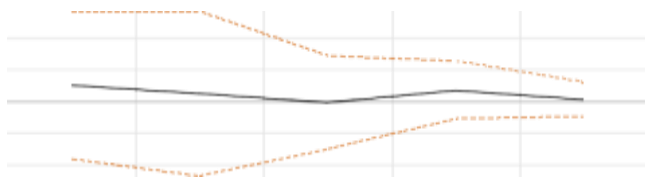
Response of INFLR to DLNBIER Innovation



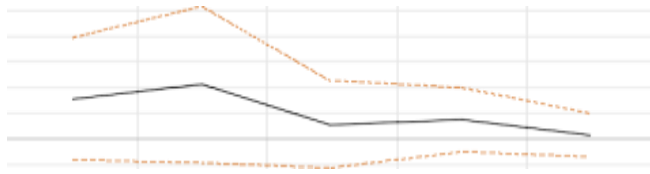
Response of GDPGR to DLNBIER Innovation



Response of DNNBOP to DLNBIER Innovation



Response of IR to DLNBIER Innovation



Response of DFD to DLNBIER Innovation

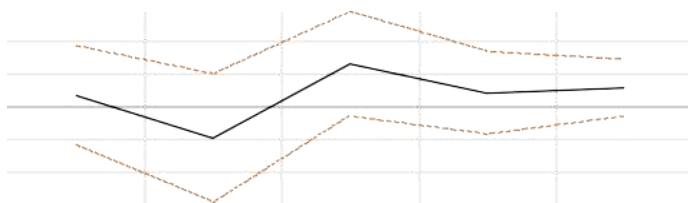


Figure 1: Impulse Response Functions — Response to One S.D. DLNBIER Shock  
 Response to Cholesky One S.D. (d.f. adjusted) Innovations  $\pm 2$  analytic asymptotic S.E.s  
 Source: Researcher (2025)

The IRF results reveal the following dynamic transmission patterns:

- Inflation (INFLR): Exchange rate depreciation immediately elevates domestic inflation, peaking in period 1 and gradually subsiding by period 3, confirming the exchange rate pass-through mechanism whereby import price increases translate into consumer price inflation — a central prediction of PPP theory and the New Keynesian open economy model.
- GDP Growth (GDPGR): A mild negative initial response reflects higher import costs, reduced investor confidence, and contractionary demand effects. The effect fades after period 3, indicating short-term contractionary dynamics with limited long-run output impact, consistent with Mundell-Fleming predictions for import-dependent, small open economies.
- Balance of Payments (NBOP): An initial slight improvement (J-curve effect) quickly reverses to a persistent deterioration, reflecting the structural inelasticity of Kenya’s export supply and import demand and the country’s vulnerability to external shocks.
- Interest Rate (IR): A moderate positive response peaking in period 2 reflects the Central Bank of Kenya’s inflation-targeting monetary tightening in response to exchange-rate-induced inflationary pressures, normalising by period 4.
- Fiscal Deficit (FD): A slight but positive response, consistent with Granger causality findings, reflects the fiscal burden of rising external debt servicing costs and import expenditure following currency weakening.

Overall, the IRF results confirm that exchange rate shocks generate a short-lived but discernible macroeconomic disruption, with the economy exhibiting partial self-correcting behaviour in the medium term.

#### 4.7 Variance Decomposition

Forecast Error Variance Decomposition (FEVD) quantifies the proportion of each variable’s forecast error variance attributable to shocks from other variables, complementing the IRF analysis by measuring the strength and persistence of dynamic interactions. Table 6 presents the FEVD results for all six variables over a five-period horizon.

Table 6: Forecast Error Variance Decomposition (FEVD) — All Variables, Periods 1–5

Period	S.E.	DLNBIER	INFLR	GDPGR	DNNBOP	IR	DFD
<b>Variance Decomposition of DLNBIER (Bilateral Exchange Rate)</b>							
1	9.5264	100.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2	11.1878	87.2509	0.4437	9.7641	0.1778	0.3399	2.0236
3	11.5494	86.0090	1.6106	9.2662	0.7207	0.3845	2.0089
4	11.6050	85.6040	1.7577	9.4846	0.7694	0.3808	2.0035
5	11.6287	85.5165	1.7807	9.4606	0.7879	0.3809	2.0734
<b>Variance Decomposition of INFLR (Inflation Rate)</b>							
1	7.4502	4.1219	95.8781	0.0000	0.0000	0.0000	0.0000
2	8.9268	5.7997	87.3661	0.0072	0.0785	1.1053	5.6431
3	9.2251	6.4288	83.4257	0.0320	0.0881	1.0538	8.9717
4	9.3149	6.3060	82.0373	0.0994	0.0977	1.5812	9.8784
5	9.4082	6.2280	81.4017	0.2469	0.0964	2.1993	9.8277
<b>Variance Decomposition of GDPGR (GDP Growth Rate)</b>							
1	2.0846	5.3274	21.0426	73.6300	0.0000	0.0000	0.0000
2	2.4051	5.7408	18.2351	67.2931	1.9762	3.8797	2.8752
3	2.4519	5.6052	17.6453	67.2197	2.1665	4.1523	3.2111
4	2.4602	5.5725	17.5350	67.2658	2.2084	4.1751	3.2432
5	2.4618	5.5665	17.5327	67.2692	2.2160	4.1762	3.2395
<b>Variance Decomposition of DNNBOP (Balance of Payments)</b>							
1	731.43	0.4920	3.2388	4.0854	92.1837	0.0000	0.0000
2	746.16	0.5804	4.1355	5.9164	88.7712	0.0430	0.5536
3	752.47	0.5733	4.8735	6.0136	87.3972	0.5960	0.5463
4	757.16	0.7858	5.2810	6.2285	86.3204	0.8178	0.5665
5	758.22	0.7882	5.3977	6.2632	86.0910	0.8757	0.5842
<b>Variance Decomposition of IR (Interest Rate)</b>							
1	7.5525	4.2271	38.8228	0.3660	0.0225	56.5616	0.0000
2	9.1497	8.2012	42.6670	3.5601	0.0695	45.3486	0.1536
3	9.5879	7.7950	44.1780	4.0882	0.2283	43.1442	0.5663
4	9.7529	8.1030	43.9799	4.5738	0.2410	42.0709	1.0314
5	9.7746	8.0837	43.8886	4.6412	0.2676	41.9054	1.2136
<b>Variance Decomposition of DFD (Fiscal Deficit)</b>							
1	0.9439	0.5159	3.9934	3.7665	3.4823	3.5476	84.6943
2	1.1565	3.0522	14.3997	4.7458	2.3275	7.2745	68.2003
3	1.3320	6.0870	25.2293	4.7186	1.8759	10.5685	51.5207
4	1.4001	5.8620	29.2931	4.7218	1.7742	11.5495	46.7994
5	1.4298	6.2851	30.0528	5.0518	1.7135	11.5905	45.3064

Cholesky ordering: DLNBIER → INFLR → GDPGR → DNNBOP → IR → DFD

Source: Researcher (2025)

In period 1, exchange rate innovations account for 100% of their own forecast error variance, confirming short-term exogeneity. By period 5, this declines to 85.5%, with GDP growth (9.5%) and fiscal deficit (2.1%) accounting for the remainder, supporting partial endogeneity in the medium term. Inflation is predominantly self-driven (95.9% in period 1; 81.4% by period 5), with exchange rate shocks contributing a persistent 6.2% by period 5, confirming the medium-term pass-through effect.

Fiscal deficit variance is highly self-driven initially (84.7%) but increasingly explained by exchange rate shocks (6.3%) and inflation (30.1%) by period 5, underscoring the fiscal sector's vulnerability to currency volatility. Interest rate dynamics are co-driven by own shocks (41.9%) and inflation (43.9%), validating Kenya's reactive, inflation-targeting monetary framework. These results collectively affirm that while macroeconomic variables are predominantly self-driven, exchange rate and fiscal shocks play persistent, system-wide roles.

## 5. CONCLUSION AND RECOMMENDATIONS

### 5.1 Conclusions

This study provides comprehensive empirical evidence that exchange rate fluctuations materially influence Kenya's macroeconomic stability across multiple transmission channels. The principal conclusions are:

- A statistically significant and persistent depreciation trend exists in the Kenyan shilling, with an average annual rate of approximately KES 2.71 per USD over 1980–2024, driven by inflation differentials, structural current account deficits, and external debt pressures.
- Exchange rate fluctuations Granger-cause fiscal deficit and weakly Granger-cause inflation, confirming that currency depreciation has predictable upstream fiscal and price-level consequences.
- Fiscal deficit is a dominant macroeconomic driver, strongly Granger-causing interest rates and GDP growth, underscoring the centrality of fiscal discipline in macroeconomic management.
- IRF analysis confirms exchange rate pass-through to inflation and a J-curve-consistent deterioration of the balance of payments, alongside the CBK's reactive monetary policy tightening.
- While short-run macroeconomic disruptions from exchange rate shocks are evident, the economy demonstrates partial self-correcting capacity in the medium term, consistent with the managed-float system's stabilising role.

### 5.2 Policy Recommendations

Based on these findings, the following evidence-based policy actions are recommended:

**Monetary Policy Integration:** The Central Bank of Kenya should formally incorporate exchange rate signals into its inflation-targeting framework, enabling more proactive — rather than reactive — policy interventions to anchor inflation expectations and reduce pass-through volatility.

**Fiscal Discipline:** The National Treasury must prioritise fiscal consolidation – through broadening the tax base, rationalising expenditure, and prudent external debt management – to break the chain of exchange rate depreciation → rising fiscal deficit → elevated interest rates that crowd out private investment.

**Coordinated Policy Framework:** A formal coordination mechanism between the CBK and the National Treasury is needed to align monetary and fiscal responses, minimising policy conflicts that amplify exchange rate and inflation volatility.

**Export Diversification:** Strategic investment in value-added export sectors — including agri-processing, manufactured goods, and services — is essential to improve the elasticity of export supply, reduce import dependence, and limit J-curve persistence.

**Vision 2030 Alignment:** All macroeconomic policy adjustments should be anchored in Kenya Vision 2030's targets of low inflation, low interest rates, and sustainable fiscal balance, ensuring that stability objectives are institutionally embedded in medium-term economic planning.

### 5.3 Directions for Future Research

Future research could extend this study in several directions: (i) nonlinear and asymmetric ARDL or Threshold VAR models to test whether depreciations and appreciations have asymmetric effects; (ii) regional comparative SVAR analysis across East African Community member states to assess monetary integration implications; (iii) incorporation of structural break tests and high-frequency data to capture discrete policy regime effects; and (iv) integration of qualitative policy perspectives to enrich interpretation of macroeconomic transmission channels.

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