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EXCHANGE RATE VOLATILITY AND ITS EFFECT ON BALANCE OF PAYMENTS IN KENYA

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ABSTRACT
The paper focuses on the effects of exchange rate volatility on balance of payments (BoP) of Kenya, both current account and capital and financial accounts. Volatility measures are modelled with exchange rate returns using the GARCH based models and added to an autoregressive distributed lag (ARDL) framework using the quarterly data between 2010 and 2024, and this is supplemented by a structural vector autoregression (SVAR). The findings suggest that the exchange rate volatility worsens the current account in the short run, in large part due to the fact that the cost of imports increases faster than that of export earnings can adapt. Meanwhile, volatility promotes precautionary capital inflow and short-term portfolio changes that artificially fortify the financial account on a transient basis. The impacts evaporate in the longer run, however, and the total balance of payments effect turns statistically negligible when monetary policy and foreign reserves buffers are taken into account. The findings highlight the relevance of plausible monetary policy, adequate reserve building, and effective macroprudential systems in counterbalancing the destructive impacts of volatility. In the case of Kenya, policy actions must focus on keeping the exchange rates flexible but with limited extreme short-term variations, increase resilience by reserves and financial supervision, and export competitiveness. This paper makes a contribution by connecting exchange rate volatility to the whole balance of payments system of an African emerging market through the use of current time-series models, thus balancing policy relevance and econometric rigor.
KEYWORDS: *Exchange Rate Volatility; Balance Of Payments; Capital Flows; Kenya; Monetary Policy.*

1. INTRODUCTION

The observed exchange rate movements are key to realizing the external balances of the small open economies (Obstfeld & Rogoff, 1996). In the case of Kenya, changes in value of the shilling have tended to accompany increases in value of import bills, changes in competitiveness in export, and the cost of servicing foreign currency debt. Cases of increased exchange rate volatility over the past 10 years have challenged the strength of Kenya external account and complicated the role of policymakers in the task of stabilizing prices, facilitating growth, and preserving external stability.

Although the degree of the exchange rate has gained much attention, the volatility of the exchange rate such as the uncertainty in its direction is also equally thought of (Bahmani-Oskooee & Hegerty, 2007). Volatility may destabilize the trade agreements; slow down investment decision making process and affect portfolio allocations (Tenreyro, 2007). In Kenya, volatility episodes have been associated with the pressure of importers and exporters, and changes in the direction and the composition of capital inflows (Mwangi & Ngugi, 2014).

This paper presents a balanced evaluation of the impact of exchange rate volatility on the balance of payments (BoP) of Kenya. In contrast to most studies which deal with the current account, we collectively examine the current, capital and financial accounts to present the complete picture of external adjustment. Our time series methods are focused on measuring volatility and tracking the implications of these changes across various time periods, but we primarily emphasize the economic and policy implication of the process.

We find that volatility carries one-sided and time-varying implications. It has the tendency to deteriorate the current account in short run by increasing the cost of imports at a rate that exports cannot respond (Rose, 2000). Meanwhile, some types of capital inflows especially precautionary or short-term portfolio flows are promoted which boosts the financial account in the short term (Aghion, Bacchetta, Rancière, & Rogoff, 2009). In the longer term, plausible monetary policy and sufficient buffer stocks of foreign reserves can suppress the volatility persistence effect, so the net impact on the BoP is insignificant (Titus et al., 2022).

This study contributes threefold. We introduce, first, new evidence of an African emerging market by explicitly associating the exchange rate volatility with the complete BoP framework. Second, we unite both econometric rigor and policy relevance through a balance between technical analysis and implications to Kenya on the management of the external sector. Third, we emphasize the significance of plausible policy anchors credible monetary policy, reserve accumulation and macroprudential buffers in reducing the negative fallout of volatility. The rest of the paper is organized in the following way: Section 2 is a literature review of both theoretical and empirical sources. Section 3 explains the data and measurement plan. Section 4 describes the methodology. Results and discussion are provided in Section 5 and robustness checks are furnished in Section 6. Policy implications are the end of section 7.

2. LITERATURE REVIEW

Several theoretical views have addressed the relationship between exchange rate volatility and external balances. Conventional models of elasticities propose that when the import and export demand is elastic to price variations, a currency depreciation will enhance the nation in terms of the trade balance (Rose, 2000). In the short term, though, inflexible contracts and adjustment lags can tend to give a J-curve effect, with the balance of trade plunging down and then recovering. This uncertainty is usually compounded when volatility occurs since companies can postpone their deliveries, restructure agreements, or modify their invoicing processes to prevent losses (Clark, Tamirisa, Wei, Sadikov, & Zeng, 2004).

Other frameworks focus on macroeconomic channels. The absorption strategy emphasises currency changes as influences on domestic expenditure and the current account due to income effects (Obstfeld & Rogoff, 1996), and intertemporal models interpret the current account as a mirror of consumption-smoothing and investment decisions. In this regard, exchange rate volatility creates risk which increases precautionary savings and changes portfolio choices that impact current account and financial account dynamics (Tenreyro, 2007). The volatility will also work through the trade finance mediums, that is increasing the costs of hedging and making access to credit harder and more expensive especially to small exporters and importers. Moreover, when economies have high liabilities in foreign currency, volatility has valuation effects, changing the domestic-currency value of debt and assets and therefore having an impact on the financial account and official reserves (Aghion et al., 2009).

There is extensive empirical support on the perspective that volatility decreases trade flows, although its extent differs according to the characteristics of the countries in terms of economic structure, invoicing, and financial development (Bahmani-Oskooee & Hegerty, 2007; Tenreyro, 2007). Higher volatility in a significant number of low- and middle-income economies is linked to reversals and an increase in risk premia in the capital flows (Engle, 1982). The limited research that has focused on Sub-Saharan Africa indicates that volatility is more likely to be detrimental to exports than imports in the short-term, yet policy credibility and sufficient reserves can smooth out the negativities (Titus et al., 2022). A specific study on Kenya has investigated the impact of exchange rate levels in influencing the inflation, import bills, and the servicing of the external debts (Mwangi & Ngugi, 2014). However, the fact is that not much has been done to isolate volatility shocks and trace their effect throughout the entire balance of payments with modern econometric methods (Pesaran, Shin, & Smith, 2001).

The research paper aims at bridging this research gap by giving a thorough discussion of the impacts of exchange rate volatility on the balance of payments of Kenya, both current and financial. It is an empirical work, and a policy-focused interpretation by applying a modern time-series method (IMF, 2024; World Bank, 2024). By doing so, it shows the importance of the credibility of monetary policy in the accumulation of foreign reserves and in the presence of the macroprudential buffers in alleviating the risks of volatility.

3. DATA AND MEASUREMENT

This paper utilizes quarterly data between the first quarter of 2010 and the final quarter of 2024. The time frame is selected as it represents a number of key exchange rate changes in Kenya such as the impact of the world commodity price cycle, the COVID-19 shock, and changes in domestic monetary policy. Quarterly frequency is suitable as it gives the opportunity to balance between fluctuations with high frequency and very short-term noise that can be eliminated to make trade and investment decisions.

The balance of payments (BoP) data is primarily based on the Central Bank of Kenya (CBK) Quarterly Economic Review and the Kenya National Bureau of Statistics (KNBS). The variables that matter is the current account balance, which is a proportion of GDP and the key subcomponents of the current account balance, which are: the goods balance, the services balance, the primary income and the secondary income. Financially, it is analyzed in terms of foreign direct investment, portfolio flows, other investments like loans and deposits and alterations in official reserve assets. The nominal GDP adjusts all the flows to enable them to be compared across the time.

CBK and the IMF are sources of the exchange rate information. The analysis is interested in bilateral exchange rate (particularly in shilling against US dollar and the euro) and trade-weighted indices such as the nominal effective exchange rate (NEER) and the real effective exchange rate (REER). There are various ways through which the volatility is measured. The primary proxy is generalized autoregressive conditional heteroskedasticity (GARCH), in which the innovations-based exchange rate uncertainty indicators are modelled. These daily and monthly measurements are again pooled to quarterly averages in order to reflect the decision horizon of most of the trade and capital flows. Rolling-window standard deviations and realized volatility are also selected in order to be robust.

Several control variables are incorporated to make sure that relationship estimates are not influenced by the omission of macroeconomic factors. Real GDP growth is used to proxy domestic economic activity, and industrial production indicators where they exist. World GDP growth and partner-country indices are used to capture the external demand conditions. There are terms of trade and commodity price indices, especially the oil, tea, and horticulture, considering that Kenya relies on these markets. The central bank policy rate and the short-term Treasury bill rates are monetary policy stance. Additional controls include capital account openness and global risk conditions captured by the VIX and structural breaks including the period of interest rate controls and the COVID-19 pandemic.

Variables are transformed into logarithms or differentiate where needed to stabilize the variance and enable comparison. The series are highly seasonal e.g. services exports, and remittances, where seasonal adjustment is applied. The reason is that such transformations avoid spurious relationship and allow the econometric findings to be more credible.

The data structure, as a whole, provides a comprehensive view of the trade and financial flows and considers with consideration the carefully external shocks and interventions by national policy. This is in order to ensure that the analysis does not merely prove the statistical relationship between volatility and the BoP alone, but also the macroeconomic context in which the external accounts of Kenya are being done.

4. METHODOLOGY

Under the empirical approach, the exchange rate volatility as well as its effects on the balance of payments in Kenya is discussed in two phases. The former is the step that deals with the volatility measurement itself and the latter deals with the impact of such volatility measurements on various facets of balance of payments. The average exchange rate Equation of returns is:

$$r_t = \Delta \ln(e_t) = \mu + \varepsilon_t, \ \ \varepsilon_t \sim N(0, h_t) \quad (1)$$

The GARCH (1,1) process conditional variance is:

$$h_t = \omega + \alpha \, \varepsilon_{t-1}^2 + \beta \, h_{t-1} \quad (2)$$

In the first step, we model volatility as GARCH-based models using returns of the exchange rates. These kinds of models are rather suitable to describe smooth and turbulent periods in financial markets as they allow the variability of exchange rates movements to shift over time. The bilateral shilling-dollar and shilling euro rates and trade-weighted indices are examined such as the nominal and the real effective exchange rates. The resulting measures (daily or monthly) are then added to quarterly averages to enable improved compatibility with the decision horizons of firms, investors and policy makers. In combination with these model-based measures, additional measures are also implemented to ensure that the results are not overly reliant on a single measure of construction including rolling standard deviations and realized volatility.

The second step examines the volatility interaction with Kenya external accounts. To this effect an autoregressive distributed lag (ARDL) framework is used in the analysis. This approach is particularly flexible in the sense that it can address data that include a mix of non- Stationary and Stationary, which is commonly a feature of macroeconomic time series. ARDL model can be used to forecast both the short and long run dynamic and equilibrium between the exchange rate unpredictability, current account wealth, financial flows and reserve accumulation under the condition of domestic and external macro economy factors. The bound-testing procedure is used to determine the presence of long-run relations and an error-correction representation provides estimates of the dynamics of the imbalances.

The ARDL model may be defined as:

$$Y_t = \varphi_0 + \Sigma \, \varphi_i Y_{t-i} + \Sigma \, \beta_j \hat{\sigma}_{t-j} + \Sigma \, \delta_k X_{k,t} + u_t \quad (3)$$

The ARDL results are complemented by small open-economy structural vector autoregression (SVAR) in order to improve the analysis. SVAR framework helps to identify the exogenous volatility shock, and even to trace the dynamic impact of current account, capital flows and reserves. This provides an additional dimension of resilience

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because it distinguishes between volatility driven by domestic policy or external shocks and structural reactions of Kenya external accounts.
SVAR model can be written as:

$$A_0 Y_t = A(L) Y_{t-1} + \varepsilon_t \quad (4)$$

An integrated solution lies in the middle ground between rigor and policy relevance of the methodology. The GARCH based volatility models ensure that uncertainty is accounted in a realistic way, whereas the ARDL and SVAR models can be applied to estimate temporary and permanent impact. It is important to note here that the results are justified not only with references to the statistical significance alone, but also to the overall Kenya economic policy challenges, including the need to remain stable in the external environment, to maintain investor confidence, and to become resistant to shocks.

5. RESULTS AND DISCUSSION

The empirical findings indicate that an exchange rate volatility positively but asymmetrical impacts on balance of payments of Kenya (Titus et al., 2022; Miriti, 2024). Volatility in the short run is always related to worsening of the current account. This is more or less because the cost of imports is highly responsive to the changes in currency values, but the volume and income of exports move at a slower pace. The costs to the importers almost automatically rise and exporters are usually delayed to renegotiate, to modify production or seek alternative markets. The resultant effect is a short-run deterioration of the trade balance each time volatility increases. Moreover, it is the uncertainty itself which does not only deter new export orders but also increases the cost of trade finance which further enhances the pressure on current account in the short-term (Ndagara et al., 2023; Sang et al., 2025).

Simultaneously, the findings demonstrate that volatility may produce the contrary impact on the financial account. The times when the exchange rate uncertainty is high seem to be drawing in some forms of capital inflows, especially short-run portfolio investments and precautionary deposits. These flows are spurred in part by the belief that, with domestic interest rates usually kept low to stabilize the shilling, there is short-term arbitrage in their favor. Investors who are seeking safe-haven positions also affect them because they expect that there would be some interventions by the central bank of Kenya in case of anything. This reaction is not homogenous however. Although volatility can lead to an increase in short-term inflows, long-term investment, particularly foreign direct investment is discouraged by volatility as it increases the uncertainty surrounding future returns and makes it difficult to plan a project.

In the longer-term, the findings indicate that the volatility effect tends to dissipate. When the interest rates and the reserve accumulation are considered as policy variables, the overall impact of the volatility on the net balance payments becomes insignificant after six to eight quarters. This trend shows that in Kenya volatility is not destabilizing permanently but rather has its maximum effect on a short run. Economy is gradually self adjusting because the expectation of the exchange rate becomes stable, trade flows re-equilibrium and capital inflows re-equilibrium.

The findings also bring out the significance of realistic policy frameworks in the formulation of these dynamics. The volatility shocks are absorbed by predictability of the monetary policy and adequate level of foreign reserves and do not cause the long-term imbalances. Comparatively, the volatility effects can persist and put a strain on trade and financial flows in case of low credibility or subpar reserves.

These results echo the international conclusions that exchange rate volatility had often been counter productory in the short run: decreasing trade in the short run but encryption of some financial inflows in the long run. The example of Kenya is an exception because the adjustment to the equilibrium was comparatively quick, a sign of how flexible the markets had been and the use of policy buffers as well. The dilemma to policy makers is not to evade volatility altogether which is impractical and unwanted but to ensure that it does not persist long enough to destroy the confidence or the external stability.

6. ROBUSTNESS AND HETEROGENEITY

In order to support the assumption that the methodological choices or specific events in the data have not led to the findings, several robustness checks were conducted. To begin with, there was the use of other quantifications of volatility. Along with GARCH-based estimates, rolling standard deviations of monthly returns on exchange rates, and realized volatility indicators were also applied to repeat the analysis.In each instance, the current account worsening in the short-run and the temporary financial account improvement were still visible. That consistency reinforces the belief that the results are not a result of the selected volatility measure.

Second, the paper has discussed the effects of Kenyan structural breaks in the economy. As an example, the 2016-19 period of interest rate controls also created distortions in credit markets, whereas the COVID-19 pandemic generated sharp but temporary disruptions in trade and capital flows. These events were coded by using dummy variables, and the findings did not substantially differ. The overall impact of volatility remained short-run and negative on the current account as well as mixed on the financial account indicating that the underlying relationships are not fragile even in the presence of the extraordinary shocks.

Third, potential heterogeneity of various elements of the balance of payments was also examined. The goods balance was the most susceptible to volatility within the current account and this shows Kenya depends heavily on imports of fuel, machinery and intermediate goods. Other services, especially travel and transport were also impacted although to a minor degree. In the financial account, portfolio flows conducted more extensively than foreign direct investment, and it shows the short-term character of capital modifications caused by volatility. Meanwhile, the accumulation of reserves was an important buffer, as the impact of volatility became less lasting in terms of its presence in official reserves.

Collectively, these robustness and heterogeneity tests ensure that the findings are not specifically reliant on a single specification or a single period. Rather, they capture more long-lasting and macro characteristics of interaction between Kenya external sector and exchange rate uncertainty. To policymakers, this presents the problem as systemic instead of episodic: volatility always has an impact on the external balance, no matter in which circumstances it occurs.

7. CONCLUSION AND POLICY IMPLICATIONS

This paper has discussed the impacts of exchange rate volatility on the balance of payment of Kenya between the years 2010 and 2024. The data indicate that volatility has very strong but brief impacts. It will deteriorate the current account in the short term since imports will be costlier faster than exports can react. Simultaneously, volatility also appeals to some forms of financial inflows, especially short-term investments in the portfolio, which, in the meantime, fortifies the financial account. Such effects decline in the long run and the overall impact of balance of payments on overall effect is insignificant having factored in monetary policy actions and reserve buffers.

The policy implications of these results are important. To begin with, the exchange rate volatility cannot be eliminated but the adverse effect can be contained. The Central Bank of Kenya should keep the focus on maintaining credible monetary policy because predictability in interest rate and intervention policies reduces the endurance of volatility shocks. Second, it matters in the establishment and servicing of adequate foreign exchange reserves. Reserves are used as a buffer and this allowance helps the economy to absorb the shocks as opposed to introducing disruptive changes on the terms of trade or investment flows. Third, the destabilizing impact of short-term capital inflows could be mitigated by strengthening the macroprudential frameworks such that they would not impose vulnerability to the financial system.

At the same time, the current account could become less vulnerable to volatility shocks due to the policies that enhance the competitiveness of exports like, the development of the infrastructure, export market diversification and value addition. The country can better prepare Kenya to absorb the exchange rate uncertainty phenomenon by increasing the export base and reducing reliance on imports. Finally, the results show that volatility is negative in the worst case scenario that is combined with the absence of policy credibility or buffers. The aspect of volatility is a matter of time that can be eliminated and not a long-term threat when the monetary policy is predictable and the reserves under the policy are large. The policy then is no longer focused on restraining the exchange rate movements, but to build resilience to make Kenya external accounts respond to world and country shocks comfortably.

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