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Exchange Rate Misalignment Determinants and Performance of Portfolio and Direct Asset Flows to Kenya: A Threshold Analysis

Benson Kiriga and Jacob Nato

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Kenya Institute for Public Policy
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Abstract

This study aimed to estimate the misalignment of Kenya's exchange rate, identify its drivers and assess its effect on portfolio and direct asset flows. Thus, the Fully Modified OLS (FMOLS), Threshold Autoregression (TAR) models, and Hodrick-Prescott (HP) filter were employed for analysis, using data from 1980 to 2023. From the results, there was evidence of mild exchange rate misalignment in Kenya, within a range of ± 4.0 per cent. The real exchange rate for Kenya is a stable function of a set of well-defined macroeconomic variables, implying that both macroeconomic and structural factors affect the exchange rate. Analysis of threshold effects showed that exchange rate misalignment negatively affected direct investment assets, whereas the effect on portfolio investments was positive—likely because Kenya has had only small magnitudes of misalignment. A 1.0 per cent increase in the Real Exchange Rate (RER) misalignment led to a decline in direct investment flows, and this depended on the cut-off level of the misalignment, while misalignment yielded a small positive impact on portfolio flows. Based on the study findings, three recommendations stand out. First, for proper exchange rate management, there is a need to ensure coherence in fiscal and monetary policy and work towards ensuring a stable exchange rate for Kenya. Second, the currency should be managed in a way that it does not get extremely misaligned beyond safe thresholds, as excessive deviations can be detrimental to the country's investment flows. Third, the country should work towards ensuring a steady flow of both direct and portfolio investments, which can be leveraged for economic growth and development. This would be supported by macroeconomic stability.

Abbreviations and Acronyms

ADF	Augmented Dickey-Fuller
ARDL	Autoregressive Distributed Lag model
BEER	Behavioural Equilibrium Exchange Rate
BETA	Bottom-Up Economic Transformation Agenda
CBK	Central Bank of Kenya
CMA	Capital Markets Authority
CPI	Consumer Price Index
ERER	Equilibrium Real Exchange Rate
FDI	Foreign Direct Investment
FEER	Fundamental Equilibrium Exchange Rate
FMOLS	Fully Modified Ordinary Least Squares
FPI	Foreign Portfolio Investment
GDP	Gross Domestic Product
IMF	International Monetary Fund
KIPPRA	Kenya Institute of Public Policy Research and Analysis
KNBS	Kenya National Bureau of Statistics
KSH	Kenya Shilling
M-TAR	Momentum Threshold Autoregression
NSE	Nairobi Securities Exchange
PEER	Permanent Equilibrium Exchange Rate
PPP	Purchasing Power Parity
REER	Real Effective Exchange Rate
RER	Real Exchange Rate
TAR	Threshold Autoregression
USD	United States Dollar

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1. Introduction

Portfolio and direct asset flows offer a potent source of financing for government development projects, such as the current Bottom-Up Economic Transformation Agenda (BETA) and the Fourth Medium Term Plan (MTP IV) of the Kenya Vision 2030. Foreign investors consider a country's competitiveness when deciding where to invest, including the stability of the currency. Kenya's currency depreciated significantly against the US dollar between 2021 and 2023. This study assesses the extent of Kenya's exchange rate misalignment and identifies the thresholds at which such misalignment affects portfolio flows.

The study, therefore, aims to estimate the extent of Kenya's currency misalignment, analyze the determinants of exchange rate misalignment, and empirically examine the relationship between exchange rate misalignment and portfolio inflows. It begins by estimating the long-run equilibrium real exchange rate model and then examining the degree of real exchange rate misalignment of the Kenyan shilling. This is followed by an assessment of the threshold effects of exchange misalignment on portfolio flows.

The motivation for this study stems from the fact that portfolio flows are affected by movements in the exchange rate and its misalignment. Understanding the thresholds at which exchange rate misalignment impairs portfolio flows will help policy makers in identifying and implementing interventions to prevent excessive misalignment. Additionally, there is limited empirical evidence on the extent of Kenya's currency misalignment, if any, which this study aims to address. A number of studies on exchange rate misalignment in Kenya have been documented, including those by Pokhariyal (2009), Khainga and Oduor (2010), Ndavi (2012), Kiptui, Wambua, and Maturu (2013), Mwega (2014), Ganesh (2014), Kiptui and Ndirangu (2015), IMF (2018), CBK (2019), Gachoki (2020), Gachoki, Okeri and Korir (2021), and Ayele (2022). These studies have yielded mixed findings on the extent of Kenya's currency misalignment, although most, such as IMF (2018) indicate that the currency is overvalued.

At the policy level, despite the uncertainties Kenya faced in 2023-2024 that affected the currency, the Kenyan shilling has since stabilized against major international currencies. The shilling was affected by supply chain disruptions, geopolitical tensions in Europe, monetary policy tightening in the USA, and a strengthening dollar. However, the government implemented several policy measures aimed at stabilizing the Kenyan shilling against major international currencies. These measures were primarily monetary and exchange rate policies executed by the Central Bank of Kenya (CBK), particularly through a contractionary monetary policy. Furthermore, improved diaspora remittances and forex reserves over time have also played a central role in helping to stabilize the domestic currency. In 2024, the government entered into a government-to-government oil deal with Saudi Arabia to further stabilize the shilling against major fluctuations in the dollar. Additionally, the successful repayment of the 2024 Eurobond, which was due, helped alleviate pressure on the shilling, further contributing to its stability.

1.1 Stylized Facts on Exchange Rate Misalignment and Portfolio Flows

As one of the essential prices in the economy, the exchange rate needs to remain stable over time. Kenya has a managed floating exchange rate market where the exchange rate is determined by the forces of demand and supply, with limited government intervention when necessary. This flexible exchange rate regime was adopted in 1995. An exchange rate is considered misaligned when the actual real exchange rate significantly deviates from its long-run equilibrium value (Jongwanich, 2009). Alternatively, a misaligned exchange rate is one that is out of line with its economic fundamentals for a sustained period of time (Bella, Lewis, and Martin, 2007), or one that fails to respond to changes in its drivers (Asfaha and Huda, 2002). Kenya has had episodes of exchange rate misalignment (Oduor and Khainga, 2010; Maturu, 2017; and CBK, 2019). The exchange rate may be affected by other factors beyond its fundamentals, such as speculation and the role of market expectations.

The analysis of exchange rate misalignment and its impact on resource inflows is crucial for public policy. The importance of addressing a misaligned exchange rate can be assessed based on its negative consequences. A misaligned exchange rate may lead to uncertainty in the economy, creates macroeconomic instability and generates structural imbalances in the economy, as well as aggravate the unemployment issue that may result in disinvestment (Dornbusch, 1988; CBK, 2019). If persistent, misaligned exchange rates could negatively influence many macroeconomic variables, including economic growth, welfare, export performance, and capital flows to the economy (Edwards, 1989; Dubas, 2005; Jongwanich, 2009; Mwega, 2014). Therefore, it is crucial to correct such misalignments, for example, through income policies, currency devaluation, or price and wage flexibility (Mwankemwa, 2013). These issues, among others, caused by exchange rate misalignment serve as the motivation for this study, which seeks to identify the underlying drivers of misalignment and offer recommendations for policy makers to prevent any potential cases of extreme misalignment.

Table 1.1 shows the exchange rate of the Kenya shilling against some selected foreign currencies for the period 2015 to 2023, along with a simple misalignment measured as a deviation from the mean.

Table 1.1: Kenya shilling nominal exchange rate for major currencies, 2015-2023

Year/ Currency	Euro	US\$	Pound Sterling	Chinese Yuan	Tsh/ Ksh	Ush/ Ksh
2015	109.0	98.2	150.2	15.6	20.7	32.9
2016	112.3	101.5	137.7	15.3	21.5	33.7
2017	116.7	103.4	133.2	15.3	21.6	34.9
2018	119.6	101.3	135.3	15.33	22.5	36.8B
2019	114.2	102.0	130.2	14.8	22.6	36.3

Year/ Currency	Euro	US\$	Pound Sterling	Chinese Yuan	Tsh/ Ksh	Ush/ Ksh
2020	121.7	106.5	136.7	15.5	21.8	34.9
2021	129.8	109.7	150.9	17.0	21.1	32.7
2022	124.2	117.9	145.8	17.5	19.7	31.3
2023	151.3	139.9	174.0	19.7	17.4	26.8
Mean	122.1	108.9	143.8	16.2	21.0	33.4

Source: CBK Monthly Economic Indicators (Various Issues)

Table 1.2: Deviations from the nominal mean for various forex (simple misalignment)

Year/ Currency	1 Euro	1 US Dollar	1 Pound Sterling	1 Chinese Yuan	Tsh/ Ksh	Ush/ Ksh
2015	(10.74)	(9.85)	4.46	(3.72)	(1.28)	(1.31)
2016	(7.98)	(6.81)	(4.24)	(5.75)	2.58	0.91
2017	(4.38)	(5.05)	(7.35)	(5.69)	3.01	4.63
2018	(2.00)	(7.00)	(5.92)	(5.51)	7.05	10.29
2019	(6.47)	(6.36)	(9.45)	(9.02)	7.77	8.82
2020	(0.35)	(2.24)	(4.89)	(4.77)	3.62	4.66
2021	6.29	0.68	4.93	4.79	0.58	(1.96)
2022	1.73	8.22	1.42	8.05	(6.00)	(6.22)
2023	23.90	28.41	21.04	21.61	(17.33)	(19.82)
Maximum	23.90	28.41	21.04	21.61	7.77	10.29
Minimum	(10.74)	(9.85)	(9.45)	(9.02)	(17.33)	(19.82)

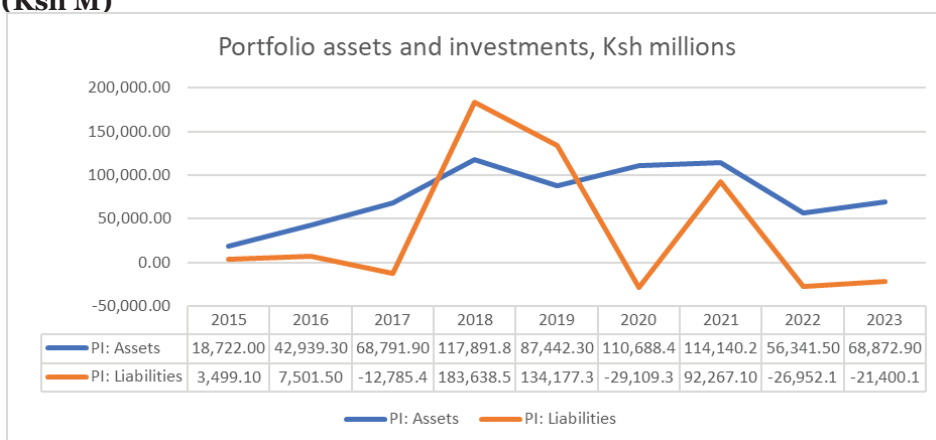
Based on Table 1.2, the nominal deviation from the mean, expressed as a percentage over the eight years, has fluctuated depending on the type of foreign currency. The US Dollar has the largest maximum nominal misalignment from its mean, with a maximum of 28.41 per cent. This was followed by the Euro (23.90%), the Chinese Yuan (21.61%), and the Pound Sterling (21.04%), respectively, from 2015 to 2023.

Turning to portfolio flows, a portfolio investment is defined as cross-border transactions and positions involving equity or debt securities, other than those included in direct investment or reserve assets (BOP Manual, 6th edition). Portfolio flows are one form of short-term capital flows that a country receives from external investors and are classified into two categories: portfolio investment assets and portfolio liabilities. Foreign portfolio investment (FPI) is a crucial source of financing for growth and development in both developed and developing countries (Michael, et al., 2014).

Portfolio investment is a category within the international investment position of the Balance of Payments (BOP), alongside four others: direct investment, financial derivatives and employee stock options, other investments, and reserves (IMF, 2013). Thus, it is a component of the financial account of the BOP. The other accounts of the BOP, other than the financial account, include the goods and services account, primary income account, secondary income account, and capital account. Portfolio investment appears as both an asset and a liability in the international investment position. Portfolio investment income includes income flows between residents and non-residents arising from positions in equity and debt securities other than those classified under direct investment or reserve assets.

The portfolio investment assets and liabilities related to Kenya have been unstable, exhibiting wide fluctuations from year to year. Figure 1.1 presents the flow of portfolio assets and liabilities from 2015 to 2023, measured in million Kenya shillings.

Figure 1.1: Portfolio investment flows to Kenya from 2015 to 2023 (Ksh M)



Source: KNBS Economic Surveys (Various Issues)

Note: The blue line represents portfolio investment while the orange line represents portfolio liabilities.

Portfolio investment assets increased from Ksh 18,722 million in 2015 to a peak of Ksh 117,891 million in 2018. However, they declined to Ksh 114,140 million in 2021 and further dipped in 2023 to Ksh 68,873 million (Figure 1.1). The performance of portfolio liabilities, on the other hand, has been quite volatile with peaks in 2018 and 2021 at Ksh 183,639 million and Ksh 92,267 million, respectively, and minimum points in 2017 and 2020 of Ksh -12,785 million and Ksh -29,109 million, respectively. These trends demonstrate that portfolio flows to Kenya have

not been stable and could thus be affected by several macroeconomic variables. Hence, the paper identifies the role that the exchange rate and its misalignment play in portfolios and direct investments.

1.2 Assessing the Nexus between Exchange Rate Misalignment and Portfolio Flows

According to the literature, an exchange rate misalignment beyond certain thresholds is harmful to the flow of capital into a country. Some studies, such as those conducted by Sidek, Yussof and Munir (2009), show that exchange rate fluctuations exceeding 5.0 per cent are sufficient to negatively impact portfolio flows. When portfolio flows are adversely affected, the negative effects extend to other macroeconomic variables such as economic growth, Foreign Direct Investment (FDI), inflation, among others (Waqas, Hashmi and Nazar, 2015). The causal link between exchange rate misalignment and portfolio flows is explained by the perception that investors view a declining exchange rate as an indicator of potential future exchange rate depreciation. Consequently, they may be motivated to withdraw their funds to maintain the value of their portfolios (Kodongo and Ojah, 2012). Additionally, portfolio inflows are likely to lead to an appreciation of the real exchange rate. Furthermore, direct asset flows are a potent source of financing for Kenya's development objectives, and hence the study also evaluates the implications of exchange rate misalignment on direct asset flows.

1.3 Objectives, Scope, and Organization of the Work

The main objective of the study was to examine the empirical relationship between exchange rate misalignment and portfolio and direct asset flows. Specifically, four objectives guided the study:

- (i) To estimate the long-run equilibrium real exchange rate model for Kenya;
- (ii) To examine the degree of real exchange rate misalignment of the Kenyan shilling against the US dollar;
- (iii) To determine the impact of exchange rate misalignment on portfolio flows to Kenya using both threshold and non-threshold analysis; and
- (iv) To determine the impact of exchange rate misalignment on direct asset flows to Kenya using both threshold and non-threshold analysis.

The motivation for the study stems from the fact that portfolio and direct asset flows are influenced by movements in the exchange rate and its misalignment. Understanding the thresholds at which exchange rate misalignment hampers portfolio and direct asset flows will help policymakers identify and implement interventions to prevent extreme misalignment.

2. Literature Review

2.1 Introduction

This section provides an overview of the theoretical frameworks and empirical literature linked to the determination of exchange rates, the computation of exchange rate misalignment, and the drivers of portfolio investment flows for studies and threshold concept analysis in Kenya, Africa, and globally.

2.2 Theoretical Review of Approaches for Determining Equilibrium Real Exchange Rate

2.2.1 Purchasing power parity

Purchasing power parity (PPP) is based on the law of one price, which states that in the absence of official trade barriers and transaction costs, identical goods in different markets will cost the same when prices are expressed in the same currency. The difference in rates of inflation or changes in prices between home and foreign markets is equal to the percentage depreciation or appreciation of the exchange rate. A decline in domestic currency purchasing power, indicated by an increase in domestic price levels, will lead to a proportional depreciation of the currency in the foreign exchange market (Krugman and Obstfeld, 2003). Conversely, an increase in domestic currency purchasing power, indicated by a reduction in domestic price levels, will lead to a proportionate appreciation.

The absolute PPP hypothesis states that the exchange rate should be equal to the price ratios between the countries.

$$E = \frac{P^f}{P^d} \dots\dots\dots(2.1)$$

Where E is the nominal exchange rate, P^f is the foreign price level and P^d is the domestic price level.

The relative PPP hypothesis, on the other hand, states that the exchange rate has a constant proportionate relationship with the ratio of price levels.

$$E = k \frac{P^f}{P^d} \dots\dots\dots(2.2)$$

Where k is a constant.

Transforming Equations 2.1 and 2.2 into natural logarithm gives Equation 2.3.

$$\ln(E) = c + \ln(P^f) - \ln(P^d) \dots\dots\dots(2.3)$$

Where c is zero under the absolute PPP hypothesis.

The validity of the PPP theory is centred on the relative PPP hypothesis since data on aggregate price levels differ in base years across different countries. The relative PPP holds in the long run after periods of adjustment but fails to hold in the short run (Bella, Lewis and Martin, 2007).

2.2.2 Macroeconomic balance approach

In the macroeconomic balance approach, also known as the fundamental equilibrium exchange rate (FEER), the exchange rate should be consistent with internal and external balance, or with medium-run macroeconomic balance (Bella, Lewis and Martin, 2007). Thus, the exchange rate should align with a level of output that is consistent with full employment and low inflation, as well as a sustainable current account position.

2.2.3 Permanent equilibrium exchange rate

The permanent equilibrium exchange rate uses time series data to decompose the real exchange rate into both permanent and transitory parts, that is, $e = e^p + e^t$. Where e^p represents the permanent part while e^t denotes the transitory part. The permanent part is taken to be the equilibrium long-run exchange rate.

2.2.4 Capital enhanced measures of the equilibrium exchange rate

This approach, also known as the CHEER approach, combines PPP and uncovered interest parity. It focuses on the relationship between the exchange rate and the capital account. The long-term persistence of the exchange rate is brought about by the interest differential between the domestic economy and a foreign economy. In a perfect capital mobility scenario, uncovered interest parity is represented as follows:

$$(r - r^f) = \Delta e \dots\dots\dots (2.4)$$

Assuming that the expected changes in the real exchange rate are determined by prices, uncovered interest rate parity can be expressed as follows:

$$(r - r^f) = \alpha(p - p^f) = e \dots\dots\dots (2.5)$$

$$e = \beta(r - r^f) - \alpha(p - p^f) \dots\dots\dots (2.6)$$

Based on CHEERS, the real exchange rate is, therefore, determined by price level and interest rate.

2.2.5 Behavioural equilibrium exchange rate approach

BEER approach considers both current account and capital account items to be important in the evolution of the real exchange rate. Consequently, the real determinants of real exchange rates are a key explanation for the slow reversal of PPP observed in data. It is constructed from the UIP hypothesis as follows:

$$\mu + (r - r^f) = \Delta e \dots\dots\dots (2.7)$$

Where μ is a time-varying risk premium. The relationship can be rewritten as:

$$\mu + (r - r^f) = e - E(e) \dots\dots\dots (2.8)$$

Where $E(e)$ is the expected exchange rate. Taking e to be the long-run exchange rate, then:

$$e = E(e) + (r - r^f) + \mu \dots\dots\dots (2.9)$$

The long-run real exchange rate can be taken to be the outcome of several real variables, including terms of trade, net foreign assets, and the relative price of tradable to non-tradable goods, so that:

$$E(e) = f(\text{tot}, \text{nfa}, \text{tnt}, z) \dots\dots\dots (2.10)$$

2.2.6 Natural real exchange rate

The natural real exchange rate (NATREX) is based on an internal-external equilibrium framework. It differs from the FEER by distinguishing the equilibrium real exchange rate into two horizons: the medium term and the long run. The notion of an equilibrium real exchange rate is based on full capacity utilization. The external balance is taken as the sustainability of the current account, that is:

$$CA = (S - I) = 0 \dots\dots\dots (2.11)$$

The advantage of NATREX over FEER is that it also takes into account the influence of the capital stock and net foreign debt on long-run real exchange rates.

2.2.7 The Samuelsson-Balassa hypothesis

According to the Samuelsson-Balassa hypothesis, the deviations between the actual REER and its purchasing power parity equilibrium could be due to higher productivity growth in the tradable sector in rich countries vis-à-vis that in poor countries. This hypothesis is based on the following assumptions: there is higher productivity growth in tradable sectors compared to non-tradable sectors; there is imperfect capital mobility between rich and poor countries; and there is perfect labour mobility across the sectors of the economy.

2.3 Theoretical Review of Direct and Portfolio Flows

This study relies on a portfolio balance approach. According to Branson (1968), foreign assets as a proportion of wealth are a function of both domestic and foreign interest rates, exchange rate risk, and the overall stock of wealth.

$$\frac{c^f}{w} = f(r, r^*, e, w) \dots\dots\dots (2.12)$$

Where; c^f is capital inflow, w is the stock of wealth, r is the domestic interest rate, r^* is the foreign interest rate and e is the exchange rate. This study modifies Equation 2.12 to focus on portfolio flows.

Darby et.al (1999) and Sidek et.al (2009) modify this relationship by substituting exchange rate with exchange rate misalignment. Rewriting Equation 2.12 to capture the misalignment:

$$k_t = \beta_0 + \beta_1 r + \beta_2 r^* + \beta_3 e^* + \beta_4 w + \beta_5 Z + \varepsilon \dots\dots\dots (2.13)$$

Z captures other variables that affect capital or portfolio flows, such as infrastructure, taxation, and liquid liability. Misalignment is the difference between actual and theoretical exchange rates.

2.4 Empirical Review

2.4.1 Exchange rate misalignment

To investigate whether the observed real exchange rate was close to its equilibrium, a study conducted for the Czech Republic by Babetski and Egert (2005) used monthly data for the period 1993:M1 to 2004:M9. The variables analyzed were the monthly bilateral real exchange rate of the Koruna (both CPI-based and PPI-based) vis-à-vis that of the euro area, net foreign assets, and average labour productivity. Two cointegration estimation techniques were employed: dynamic Ordinary Least Squares (OLS) Model and the Autoregressive Distributed Lag (ARDL) model. The study found that an increase in average labour productivity leads to an appreciation of the real exchange rate, whereas a decrease in net foreign assets also results in an appreciation of the real exchange rate. Additionally, the study ascertained that the Czech Behavioural Equilibrium Exchange Rate (BEER) was of good quality. The real exchange rate misalignment was measured as the difference between the fitted values of the selected regression and the observed values.

In another study, Sidek et.al (2009) utilized a threshold analysis model along with quarterly data from the Central Bank of Malaysia for the period 1991 to 2008. They found that an overvaluation of the currency by more than 5.0 per cent negatively affected portfolio inflows in Malaysia. The dependent variable in this study was capital inflows, while the explanatory variables were the exchange rate misalignment, interest rate differential, financial deepening, money supply, and government deficit. The degree of exchange rate misalignment was computed as the difference between the actual and hypothetical equilibrium exchange rate. The findings showed that a 1.0 per cent increase in misalignment led to a reduction in capital flows by about 1.2 per cent. Furthermore, an exchange rate misalignment more than 15 per cent would adversely affect Malaysia's capital inflows. The key

determinants of capital inflow identified were infrastructure, liquid liability, taxation, interest rate differential, money supply, budget balance, and FDI. Financial deepening and interest rate differential were also found to significantly influence FDI inflow.

Valladres and Terra (2010) examined the extent of exchange rate misalignment for 85 countries from 1960 to 1998. They characterized misalignment using a Markov Switching Model, computing the equilibrium real exchange rate based on terms of trade, openness, government expenditure, and international interest rates (proxied by US three-month Treasury bill). The study found that some countries had no evidence of misalignment, absence of misalignment in either of the three exchange rate regimes (fixed, floating, and pegged), and persistence of the appreciation regime in countries with two misalignment regimes.

Oduor and Khainga (2010) assessed the level of currency misalignment in Kenya using the FEER approach, employing monthly data for the period January 2000 to December 2006. The variables analyzed in the study included real exchange rate misalignment, interest rate differentials, net capital inflows, 30-day T-Bill rates, labour-augmented technical progress, terms of trade, household consumption expenditures, and primary deficits. The study utilized the structural Vector Auto-regression (VAR) model and the Vector Error Correction Model (VECM) to determine equilibrium exchange rates. It found that Kenya's real exchange rates were over-appreciated by 0.08 per cent in 2001, 0.36 per cent in 2002, 0.65 per cent in 2003, 0.85 per cent in 2004, 0.031 per cent in 2005, and 0.32 per cent in 2006. Overall, the country's exchange rate had been over-appreciated by about 0.074 per cent between October 2000 and December 2006, but it was found to be mean-reverting.

In Tanzania, Mwankemwa (2013) assessed the fundamental determinants of the country's equilibrium real exchange rate and its misalignment. The study found that a one standard deviation shock in real exchange rate misalignment had short-run effects on agricultural production (2.4%), export performance (10.7%), and GDP per capita (27.3%), and a short-run feedback effect on misalignment (3.4%).

Gouider and Nourira (2014) examined the impact of exchange rate misalignment on FDI in developing countries. The study used a sample of 50 countries drawn from Africa, Latin America and Asia for the period 1980 to 2010. The study first estimated the real effective exchange rate (REER) as a function of terms of trade, degree of openness, productivity bias, government consumption as a ratio of GDP, net capital inflow as a ratio of GDP, and debt service. All variables were measured in logarithms and utilized the fully modified ordinary least squares (OLS) approach.

Nourira and Sekkat (2015) analyzed the determinants of both the real effective exchange rate and exchange rate misalignment for 51 developing countries for the period 1980 to 2010. Using a dynamic modified OLS method, the study found the determinants of real effective exchange rates to be openness, geometric mean of real GDP per capita, government consumption to GDP ratio, and the financial crisis dummy. Using a generalized method of moments, the study further found that export dependence, an intermediate exchange rate regime, and the first lag of misalignment significantly increased exchange rate misalignment.

Waqas, Hashmi and Nazir (2015) found that there exists a relationship between macroeconomic variables such as exchange rates, interest rates, inflation, FDI, and GDP growth rates with portfolio inflows volatility. Inflation, FDI, and GDP growth rates were found to be negatively related to portfolio inflows volatility. However, a positive relationship between exchange rates and portfolio inflows was observed in China, although the relationship was unclear in other countries. A possible explanation is that China does not trade in primary goods, therefore, it does not experience exchange rate volatility. The real exchange rate had a positive effect on portfolio investment volatility. Interest rates were found to be positively related to portfolio investment volatility in Pakistan and India.

Sekkat (2016) examined exchange rate misalignment and export diversification in developing countries, including Kenya. The study employed a panel data estimation approach of REER for the period 1985 to 2009. The significant variables were openness (-0.36), Balassa Samuelson (0.33), debt service (-0.07), government consumption to GDP (0.04), and terms of trade (0.11). The insignificant variable was capital inflow to GDP. The goodness of fit was 54 per cent. Misalignment had a mean of 3.30 with a standard deviation of 35.58, with a minimum misalignment of -64.20 and a maximum of 484.69. There were 794 negative and 532 positive values of misalignment. The impact of misalignment on export diversification depended on institutional quality.

Spencer (2017) studied the key determinants of portfolio inflows in Jamaica. The study found that the key variables affecting portfolio inflows are exchange rate, inflation, economic growth, and interest rates (both domestic and foreign). However, the study noted that fiscal balance, interest rates, and inflation had a stronger impact on FDI than the other variables. Using variance decomposition, a one standard deviation shock to the exchange rate and foreign interest rate explained 4.0, 6.0, and 7.0 per cent of the total variations in portfolio investments, respectively.

Maturu (2017) conducted a study on the pressure on the exchange rate in Kenya from short-term capital flows, using quarterly data from 2000 to 2012. The variables analyzed in the study included the current account balance, GDP, CPI, nominal reserve money, the Central Bank Rate, change in net foreign assets, interest rate differential, equity return differentials, the exchange rate, and short-term capital flows. Using a VAR model (impulse response analysis), the study found that a sudden increase in net short-term capital inflows immediately induces a depreciating effect which increases during the first two quarters. This is followed by an appreciation of the exchange rate for four quarters, after which a correction ensues, and the appreciation effect dies off. Similarly, variance decomposition showed that the risk-adjusted interest rate differential was the most important factor driving the largest fluctuations in the US dollar-Kenya shilling rate.

Chen (2017), using a panel of developed and emerging economies, found that undervaluing the exchange rate slows technological innovation, which generates potential adverse effects on growth. On the other hand, Slimani and Ben Allem (2018) conducted an empirical analysis on the determinants of real exchange rate misalignment for the Middle East and North Africa (MENA) region. The study

found that the level of exchange rate misalignment in MENA region countries decreased by 20.74 points whenever the exchange rate increased by 1.0 per cent.

Couharde, Delatte, Grekou, Mignon and Morvillier (2018) developed a world database, EQCHANGE, which focuses on actual and equilibrium effective exchange rates, under the centre for research and expertise of the world economy (CEPII). This database encompasses 182 economies and utilizes data for the period 1973 to 2016, using fixed weights for all the countries. The variables used to estimate the real exchange rate were Balassa-Samuelson effect, net foreign assets, and terms of trade. They employed the behavioural equilibrium exchange rate (BEER) framework. The estimated coefficients were 0.0771 for Balassa-Samuelson effect, 0.0466 for net foreign assets, and 0.402 for terms of trade. The findings were that some countries had overvalued exchange rates, while others had undervalued exchange rates. Kenya's exchange rate was found to be overvalued, with a mean misalignment of 0.585.

At the global level, a study by Brito, Magud and Sosa (2018) empirically estimated the real effective exchange rate misalignment using a sample of 71 countries for the period 1980 to 2016. The study found that currency misalignment varied widely across different country groupings. The level of misalignment was measured as the percentage difference between the index at each point in time and the country's historical median. Based on the estimations, the study found that the mean level of misalignment for all countries was -0.99, with a median of -1.04, a minimum of -51.50 and a maximum of 371.19. In the case of emerging and developing economies, the mean was 2.45, the median was 0.17, while the minimum and maximum values were -51.50 and 371.19, respectively. Finally, for advanced economies, the mean misalignment was -2.39, the median was -1.30, with a minimum of -31.07 and a maximum of 54.49.

Bosupeng, Dzator and Nadolny (2019) examined the impact of exchange rate misalignment on capital flight in Botswana for the period 1980 to 2015 using an ARDL bounds testing procedure. The study found that Botswana's currency misalignment was caused by current account imbalances. The study used a 5.0 per cent threshold value to capture the significant misalignments of the REER. The variables used to estimate the REER included capital flight, reserves, GDP, inflation, aid, openness, debt, and misalignment. The misalignment was computed as the difference between the natural logarithm of REER and that of the equilibrium REER. Consequently, capital flight was regressed on reserves, GDP, inflation, interest rate differential, aid inflow, openness, external debt, and the misalignment variable. The study found that an overvaluation of the domestic currency beyond 5.0 per cent led to a substantial increase in capital flight.

Gachoki (2020) assessed the effect of exchange rate misalignment on bilateral trade between Kenya and the European Union, using quarterly data from 2000 to 2016. The study notes that the exchange rate was overvalued to a maximum of 5.9 per cent in the third quarter of 2003 and was undervalued by up to 5.2 per cent in the third quarter of 2006. Therefore, misalignment was within 10 per cent of its equilibrium level. The study first estimated a semi-log ARDL model for the REER and used the estimated values to compute the extent of exchange

rate misalignment. It found that the real exchange rate fundamentals were terms of trade, productivity, government expenditure, openness, net foreign assets, tax revenue, and oil. In addition, the study found that misalignment reduced imports from the European Union (EU) by 13 per cent, while it had a positive but statistically insignificant effect on exports. These findings corroborate a previous study by Mwega (2014), who found that real exchange rate misalignment discouraged exports and the production of importables.

The United Nations (2020) estimated the effect of monetary policy and other variables on the nominal and real exchange rates, as well as foreign reserves in Kenya, using monthly time series data for the period January 2000 to December 2017 and an ARDL model. The study found that speculation played a significant role in determining the exchange rate. Other long-run determinants of the real exchange rate are previous levels of the exchange rate, foreign exchange reserves, the first lag of repo, terms of trade shocks, previous levels of the consumer price index differential, the second lag of forward premium, total domestic credit, GDP, and the anti-speculation regulation dummy. The short-run determinants were past real exchange rate values, foreign exchange reserves, terms of trade shocks, the consumer price index differential and its past values, total domestic credit, and GDP.

Amaira (2021) studied the misalignment of the real effective exchange rate for Tunisia for the period 1986-2015. The study results showed that the equilibrium long-run exchange rate level depended on terms of trade, productivity, and government spending. Furthermore, the study found that the Tunisian dinar experienced over-valuation during the period 2004 to 2015, but exhibited very low misalignment during the structural adjustment programme.

Ayele (2022) examined real exchange rate misalignment and economic growth in East African least developed countries. A panel data approach was utilized, focusing on six east African Least Developed Countries (LDCs): Burundi, Ethiopia, Kenya, Rwanda, Tanzania, and Uganda. The study employed the ARDL model for a log-log function on REER, Terms of Trade (TOT), Net Foreign Assets (NFA), Productivity Differential (PD), Trade Openness (OP), and Broad Money Supply (MB). The estimated model yielded the following coefficients for the variables for the long-run model: 0.1978, 0.0096, 0.3905, -0.3623, and -0.2235, respectively. The error correction term coefficient was -0.2816.

Grossman and Orlov (2022) investigated the effect of three dimensions of exchange rate misalignments, that is, distance or absolute misalignment, direction in terms of over-valuation or undervaluation, and the degree of misalignments on the exchange rate volatility, using data for the period 1988 to 2014. The study sample consisted of 22 countries of which 13 were developed and nine (9) were developing countries. The study found that relative PPP-based exchange rate misalignments increased volatility. In addition, the study found that when the dollar is highly undervalued, capital flows had a destabilizing effect in developing countries, whereas they had a stabilizing effect on exchange rate volatility in developed countries.

Iqbal, Mahmood, Nosheen and Wohar (2023) explored the asymmetric impact of exchange rate misalignment on India's economic growth by applying the Hodrick-Prescott (HP) filter technique. The HP filter technique was employed to obtain estimates of exchange rate misalignments. In addition, the study used the ARDL model and error correction model. The variables used in the study were REER, real per capita GDP, NFA, TOT, total reserves as a percentage of GDP, domestic credit to the private sector as a percentage of GDP, law and order, and democratic accountability. The study found that exchange rate misalignment negatively impacted India's economic growth, while the undervaluation of the currency promoted growth in India.

Amor, Nouira, Rault and Sova (2023) examined the real exchange rate misalignment for Tunisia using quarterly data for the period 2001:1 to 2016:4. They applied the ARDL and bounds testing approach developed by Pesaran et al. (2001) and used a VEC model with an error correction term to estimate the equilibrium exchange rate. The study found that the long-run equilibrium level of exchange rate (RER) depended on productivity, terms of trade, and government spending. The long-run elasticity estimates were -0.31 for the error correction term, 0.24 for the terms of trade, 60.66 for government consumption, 0.35 for the Balassa variable, and -0.29 for the trade deficit. For the misalignment variable, 28 were negative while 36 were positive. Similarly, the study found that an overvalued exchange rate harmed long-run growth, while the results for undervaluation were insignificant. Adopting Hansen's (2000) threshold analysis, a 9.02 per cent for overvaluation threshold and 10.02 per cent undervaluation threshold were harmful for growth.

Lubu, Mabala, Onim and Ambroise (2023) assessed the determinants of the real exchange rate and the impact of exchange rate misalignment on economic growth in the DRC over the period 1980 to 2020, based on the BEER approach. Three models were applied for the analysis: the cointegration approach, vector error correction (VEC) model, and the ARDL. The study findings indicate a long-term relationship between the REER its fundamentals, which include relative productivity, terms of trade, public expenditure and foreign exchange reserves. Furthermore, misalignment of the exchange rate exerts a negative impact on real GDP growth. Whereas depreciation strengthened economic activity, appreciation of the currency constrained growth in the DRC.

A cohort of other studies has also used threshold regression models to perform various analyses. These include Komain and Brahmasrene (2007), and Tiwari and Mutascu (2016). Komain and Brahmasrene (2007) used the threshold autoregression (TAR) and momentum threshold autoregression (M-TAR) models to examine whether there was an asymmetric nexus between government revenue and spending for Thailand, using quarterly data from 1993 to 2016. The study found that there was no nonlinear relationship or threshold adjustment between revenue and spending. Conversely, Tiwari and Mutascu (2016) examined the relationship between government revenue and spending in Romania, utilizing the threshold regression, and found that a non-linear and asymmetric adjustment toward the long-run equilibrium existed.

In the case of Kenya, the historical performance of the country's currency, based on a survey of the literature, has yielded mixed findings. Ndung'u (1999) showed that between 1960s and 1970s, the currency was overvalued at certain points, and that the country's shilling was devalued three times in 1993. This phenomenon was not unique to Kenya, as it also affected other developing countries before the exchange rate reforms that were undertaken in the 1970s to the early 1990s. Nkurunziza (2002) asserted that governments devalue the currency to minimize misalignments in the exchange rate. More recently, the International Monetary Fund (IMF) found that the country's shilling was overvalued in both 2016 and 2018. It was moderately overvalued in 2016, and by 2018, it was overvalued by 17.5 per cent (IMF, 2016 and IMF, 2018). However, the CBK depicted that the currency was not overvalued, reporting a misalignment level of below 5.0 per cent. This study aims to contribute to assessing the extent of misalignment of the Kenyan currency and to explore the impact of such misalignment on direct asset and portfolio flows in Kenya.

2.4.1 *Determinants of Direct and Portfolio Investment Flows*

There is a dearth of literature and empirical studies on the determinants of portfolio investment flows, especially in the context of African countries. Thus, this section presents some of the recent studies conducted on the determinants of portfolio flows, not only for Kenya but also within Africa and beyond.

Tsaurai (2022) examined the determinants of foreign portfolio investment (FPI) for the BRICS countries (Brazil, Russia, India, China, and South Africa) for the period 1998 to 2020, employing a panel data approach. The models applied were fully modified OLS (FMOLS), fixed effects (FE), and pooled OLS models. Based on the study, the key findings indicated that economic growth, savings, and stock market development had a positive and significant effect on FPI based on the FE, FMOLS, and Pooled OLS models, respectively. However, the FMOLS model showed that human capital development had a negative effect on FPI.

Makoni (2020) assessed the relationship between foreign portfolio investment, exchange rates and capital openness, utilizing a panel data approach for analysis. The study used World Bank data for nine countries: South Africa, Botswana, Nigeria, Côte d'Ivoire, Morocco, Egypt, Mauritius, Ghana, and Kenya. The results showed that stock market development, institutional quality, the lag of FPI, and real economic growth rate played a role in attracting FPI. Furthermore, the real exchange rate, capital openness, and inflation rate had a negative relationship with FPI.

Ng'eno and Olweny (2019) investigated the drivers of portfolio equity flows to Kenya, focusing on four key variables: exchange rate, inflation rate, interest rate, and net portfolio equity flows. The dependent variable was the net equity in total turnover ratio (NEITR). The analysis included both Granger causality analysis and estimation of an ARDL model. The results of the Granger causality test found that the exchange rate granger causes net equity in total turnover ratio in a one-way causality. The interest rate differential, also granger, causes net equity in total

turnover ratio, while the inflation rate and the net equity in total turnover ratio exhibited two-way or bidirectional causality. The selected ARDL was ARDL (1, 0, 2, 1) model and showed that the significant variables for NEITR were the first lag of the log of NEITR (elasticity of 0.8054) and the second lag of the first difference of exchange rate, with an elasticity of 0.0061. The overall model goodness of fit was 59.33 per cent.

Garg and Dua (2014) analyzed the macroeconomic determinants of foreign portfolio inflows (FPI) to India using time series data for the period 1995 to 2011. The variables employed in the study were domestic output growth, interest rate differential, exchange rate, exchange rate volatility, risk diversification opportunities, and domestic equity performance. The study's results revealed a positive relationship between stock market performance, interest rate differential, domestic output growth and portfolio inflows but a negative one with risk diversification and exchange rate volatility on FPI. Therefore, the study's findings implied that greater risk diversification opportunities and lower exchange rate volatility were critical towards promoting portfolio flows.

De Santis and Luhrmann (2009) assessed the determinants of net international portfolio flows from a global perspective. The study made use of a panel of 72 countries and incorporated 222 observations in the analysis, based on the pooled OSL technique. Two models were run for the short run and medium model, based on three dependent variables – equity flows, debt, and current account balance. The findings for the medium model for the equity flows showed that the significant variables that affected net equity flows to countries were civil liberties (-0.3254), the first lag of money supply as a ratio of GDP (0.0053), relative youth dependency ratio (0.0098), and relative old-age dependency ratio (0.0074). The variables that were found statistically insignificant were the first lag of real GDP growth and relative income.

2.5 Overview of Literature

In summary, the determinants of portfolio investment flows vary from country to country, depend on the variables used in the analysis, and are influenced by the method of analysis employed. The findings also vary depending on the time horizon or the number of countries used in the analysis. This motivates this study to further understand the determinants of portfolio flows to Kenya up to the year 2023. The study makes use of threshold effects, particularly with respect to misalignment of the exchange rate, as a way of adding value or contributing to the literature.

3. Methodology

3.1 Theoretical Model

The theoretical underpinning for the study is based on the various theories that explain or determine the exchange rate. These include the elasticity approach, the absorption approach, the portfolio balance model, and the monetary approach to exchange rates. The elasticity approach maintains that the equilibrium exchange rate is the one that balances the flows of exports and imports. The theory further holds that a devaluation can improve the balance of payments (BOP) if the BOP is in equilibrium (Ahmed, 2001).

The absorption approach holds that if absorption in the economy, that is, the sum of consumption, investment, and government expenditure; exceeds what is produced, a trade deficit ensues, which then puts pressure on the exchange rate to depreciate. The resulting depreciation reduces absorption through imports and increases output through exports, which restores the balance of payments equilibrium (Ahmed, 2001).

The portfolio balance model posits that the exchange rate is determined by asset prices. It assumes that agents hold money alongside domestic and foreign bonds, the latter being denominated in foreign currency. The relative returns on these assets determine the composition of the portfolio of assets that are held. Thus, the short-run exchange rate is determined by the interest rate parity in the assets market, while the long-run equilibrium exchange rate is determined by the purchasing power parity in the goods market. The volatility of the exchange rate could thus be explained by the differences in the adjustment between the goods and assets markets (Ahmed, 2001).

The monetary approach to exchange rates holds that the exchange rate is determined by the balancing of the total demand and supply of the national currency in each country. At equilibrium, the demand for money is equal to the supply of money. The demand for money is a direct function of real income, the price levels and inversely related to the rates of interest. On the other hand, the supply of money is exogenously determined by the country's monetary authority or central bank. According to the monetary approach theory, a monetary expansion in a country leads to a fall in the interest rates, which subsequently affects the exchange rates. However, the monetary theory is based on the PPP theory. A key shortcoming of the theory is its assumption that domestic and foreign financial assets are perfect substitutes.

Based on these theories, and borrowing from Montiel (1999), the theoretical framework for this study is derived. We let the exchange rate at any moment be determined by a reduced-form relationship given as:

$$rer = f(x_1, x_2) \dots\dots\dots (3.1)$$

Where rer is the real exchange rate, x_1 is a set of real exogenous variables, while x_2 represents the current values of pre-determined macroeconomic variables that influence the exchange rate.

If it is assumed that the values of x_2 are changing over time, and by letting the values of x_2 reach their long-run equilibrium so that changes in x_2 get to zero, Equation 3.1 transforms to Equation 3.2 as follows:

$$0 = g(x_1, x_2) \dots\dots\dots (3.2)$$

This equation can then be solved implicitly to obtain the long-run values of x_2 , represented as follows:

$$x^*_2 = h(x_1) \dots\dots\dots (3.3)$$

Where x^*_2 represents the optimal or solution value for x_2 from Equation 3.2. Thus, Equation 3.3 assumes that the solution for x_2 can be expressed as a function of the complementary variables x_1 . The assumption that x_2 is a function of x_1 is necessary to link the two variables back to the function shown in Equation 3.1, as discussed below.

By substituting the values of x_2 in Equation 3.3 into Equation 3.1, we derive the equation for the long-run real exchange rate given as:

$$rer = f(x^*_1, h(x^*_1)) \dots\dots\dots (3.4)$$

Equation 3.4 expresses the theoretical model that captures the determinants of the real exchange rate based on a set of long-run fundamentals that affect the exchange rate.

Based on the theoretical and empirical literature review, Equation 3.4, a general expression, is thus transformed into Equation 3.5, which is specific as shown below. Thus, the real exchange rate is modelled as a function of its first lag (assuming persistence or memory effects in the series), external debt service, terms of trade, openness, inflation differential between Kenya and the USA, total debt, and net foreign assets. The model of interest is thus expressed as follows:

$$RER = \beta_0 + \beta_1 RER(-1) + \beta_2 Ext.Debt_{service} + \beta_3 TOT + \beta_4 OPEN + \beta_4^* (Inflation_differential) + \beta_5^* Total_{debt} + \beta_6^* NFA + E_t \dots\dots\dots (3.5)$$

Following Sidek et al. (2009), the degree of exchange rate misalignment will be computed as the difference between the actual and the hypothetical equilibrium exchange rate.

3.2 Estimation Approach

The study utilized a model that takes care of the level of stationarity of the variables, which are the ARDL and FMOLS Cointegration equation, and then identified the model that offers the most robust estimates, together with threshold analysis for assessing portfolio flows to Kenya. The ARDL model shows both short-run and long-run relationships and the variables need not be integrated in the same order (Pesaran and Shin, 1999). Furthermore, Pesaran and Pesaran (2009) specify that for estimating an ARDL bound model, all variables must be either $I(0)$ or $I(1)$, and none should be integrated of order two, that is, $I(2)$.

The lag length for ARDL estimation is determined using the Schwartz Bayesian Information Criterion (SBIC). To investigate the presence of a long-run relationship, the null hypothesis of $H_0: \theta_0 = \theta_1 = 0$ is tested against the alternative hypothesis $H_A: \theta_0 \neq \theta_1 \neq 0$. The bounds test is conducted to determine the existence of a long-run relationship based on a null hypothesis of no cointegration. This is achieved by comparing calculated F and t statistics with the lower bounds and upper bounds values. The rule of thumb is that if the F statistic is less than the lower bound, then the null hypothesis is not rejected. If the F statistic is greater than the upper bound, then the null hypothesis is rejected.

If some of the variables in the estimation are found to be $I(2)$, then the ARDL model would not apply. Instead, the FMOLS will be estimated. FMOLS is a method for estimating a single cointegrating vector, proposed by Phillips and Hansen (1990). The FMOLS estimator is asymptotically unbiased and has a fully efficient mixture of normal asymptotics. It also allows for heterogeneity of the long-run parameters and helps to overcome the problems of endogeneity, serial correlation, measurement errors, and omitted variable bias (Yakub, Achua, Ray, and Asuzu, 2019).

3.3 Threshold Regression Analysis

The threshold autoregression (TAR) model was initially proposed by Tong (1978), and later developed by Enders and Granger (1998) and Enders and Siklos (2001). The TAR model, along with the momentum threshold autoregression (M-TAR) model, is mainly used to test for non-linear cointegration and the asymmetric adjustment towards long-run equilibrium between variables (Jiranyakul, 2013). It can also be used to examine the threshold value at which one variable begins to influence another. For example, the threshold effects in the real exchange rate equation. This approach differs from the Johansen cointegration test, which assumes linear cointegration among variables. Both frameworks require that the series be non-stationary.

The basic TAR model allows the degree of autoregressive decay to depend on the state of the variable. The TAR model is a residual-based model used to estimate the asymmetric relationship between variables. A variant of the TAR model is the momentum threshold autoregression (M-TAR), introduced by Enders and Granger (1998). The M-TAR model allows a variable to display differing amounts of autoregressive decay depending on whether the variable is increasing or decreasing. The difference between TAR and M-TAR models is that the TAR model considers potential nonlinear deep movements in the residual, whereas the M-TAR model accounts for potential steep variability in the residuals (Enders and Siklos, 2001).

The study applies the TAR model to identify the threshold effects of the real exchange rate on portfolio flows to Kenya, if such a threshold exists. The optimal lags for both the TAR and momentum-TAR (M-TAR) models are determined by the lag criteria, which include the Akaike information criterion (AIC), Bayesian Information Criterion (BIC) or Ljung-Box Q-test.

The derivation of the TAR model follows the sample splitting approach proposed by Hansen (2000) and Sidek et al. (2011). The sample is split into high and low misalignment regimes. The model is specified as follows:

$$portfolio_investment = \alpha'_1 w_t + \epsilon_t y_t \leq \theta \dots \dots \dots (3.6)$$

$$portfolio_investment = \alpha'_2 w_t + \epsilon_t y_t > \theta \dots \dots \dots (3.7)$$

Where *portfolio-investment* is the dependent variable, w_t is the vector of explanatory variables (including real exchange rate misalignment), α'_1 and α'_2 are constants to be estimated, y_t is a threshold variable (misalignment), which divides the sample into two periods, θ is the threshold value that is estimated from the data or may be set equal to zero, and ϵ_t is an error term. The same approach is also applied for direct assets, in place of portfolio investment.

Equations 3.6 and 3.7 can be combined into a single equation as follows:

$$portfolio_investment_t = \alpha' w_t + \gamma' w_t (\theta) + \epsilon_t \dots \dots \dots (3.8)$$

Where a dummy variable, $d(\theta) = \{y_t \leq \theta\}$ with $d(\theta) = 1$ when $y_t \leq \theta$ and zero if otherwise, $\alpha = \alpha_2$ and $\gamma = \alpha_1 - \alpha_2$. Equation 3.8 is defined in matrix notation as:

$$portfolio_investment = W\alpha + W_\theta \gamma + \epsilon$$

The null hypothesis is that there is no threshold effect against the alternative of the existence of threshold effects. The decision criterion for the TAR model is that if the F statistic is less than the critical value at a given significance level, the conclusion is no evidence of threshold cointegration, and vice versa. Furthermore, for the M-TAR model, if the Φ statistic is less than the critical value at some specified significance level, then there is no evidence of threshold cointegration with asymmetric adjustment, and vice versa (Jiranyakul, 2013). The TAR model has received a few applications in literature. For example, Duasa (2009), applied the M-TAR model to examine the relationship between balance of trade and the real exchange rate for the case of Malaysia; and observed a symmetric cointegration between the two variables. Furthermore, based on the TAR model, the study established asymmetric cointegration between export volume and real exchange rate.

3.4 Variables, Measurement and Sources

The variables used in the study have been identified based on a review of empirical studies on exchange rate determination and the performance of portfolio flow drivers. Table 3.1 provides the variables, their measurements, and data sources.

Table 3.1: Variables, measurement and sources

Variable	Measurement	Data source
Direct investment – Assets	Ksh million	KNBS Economic Surveys
Domestic credit	Ksh million	KNBS Economic Surveys
External debt service charge as a % of GDP	Per cent	KNBS Economic Surveys
Foreign exchange reserves of CMAs	Ksh million	KNBS Economic Surveys
Inflation differential (Kenya - USA)	Per cent	KNBS/ WDI
Net foreign assets	Ksh million	KNBS Economic Surveys
Portfolio investment assets	Ksh million	KNBS Economic Surveys
Nominal exchange rate (Ksh/USD)	Rate	KNBS Economic Surveys
Terms of trade (TOT)	Index	KNBS Economic Surveys
Total debt	Ksh million	KNBS Economic Surveys
Real exchange rate (Ksh/USD)	Rate	Computed
Openness (exports + imports)/ GDP))	Per cent	Computed

3.5 Descriptive Statistics

The study conducted descriptive statistics to understand the statistical properties of the data and ensure that the estimable model had an appropriate functional form. Table 3.2 gives the mean, median, maximum, minimum, standard deviation, and number of observations for the portfolio flows and real exchange rates.

Table 3.2: Summary statistics between nominal and real exchange rates

	Directinv_ kshm	Portfoli- oinv_kshm	Rer_ksh_ euro	Rer_ksh_ pound	Rer_ksh_ usd
Mean	13,304.1	19,542.6	34.2	36.8	22.8
Median	6,698	3,241.7	22.6	24.2	17.8
Max	88,075.6	117,891.8	135.4	172.3	99.5
Min	-325.9	2	0.6	5.3	-2.9
Std. Dev	18,967.2	33,428.6	35.1	39.5	24.0
J-B Stat	112.05	36.37	14.95	81.39	33.81
Prob	0.0000	0.0000	0.0005	0.0000	0.0000
Obs	44	44	23	44	44

From Table 3.3, the real exchange rate of Ksh/US\$ had a mean value of 22.8 and a median of 17.8. The maximum and minimum RER values were 99.5 and -2.9, respectively, with a standard deviation of 24.0. Portfolio investments had a mean of Ksh 19,542.6 million, with a maximum of Ksh 117,891.8 million and

a minimum of Ksh 2 million. On the other hand, portfolio investment liabilities recorded a mean of Ksh 22,347 million, with maximum and minimum values of Ksh 331,663.4 million and Ksh -29,109.3 million, respectively.

3.6 Test for Stationarity

The Augmented Dickey-Fuller (ADF) test was employed to check for the stationarity of the variables used in the study. Table 3.3 presents the results for unit root tests based on the ADF test.

Table 3.3: Unit root tests – ADF Test

Variable	Level		1 st difference		2 nd difference		Conclusion
	Intercept	Trend and intercept	Intercept	Trend and intercept	Intercept	Trend and intercept	
Debt (internal) service charge	1.0000	1.0000	0.0490	0.0135	0.0000	0.0000	I(1)
Direct investment	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	I(1)
Domestic credit	1.0000	1.0000	1.0000	0.9999	0.0000	0.0000	I(2)
External debt service charge as a % of GDP	0.1455	0.1133	0.0000	0.0000	0.0000	0.0000	I(1)
Foreign exchange reserves of CMAs	0.0056	0.0114	0.0201	0.1045	0.3922	0.9112	I(0)
Inflation rate	0.0123	0.0247	0.0000	0.0000	0.0000	0.0000	I(1)
Broad money supply M ₃	1.0000	1.0000	0.9998	0.0002	0.0000	0.0001	I(2)
Net foreign assets	0.4227	0.4753	0.0533	0.0765	0.0000	0.0000	I(2)

Variable	Level		1 st difference		2 nd difference		Conclusion
Portfolio investment	0.9819	<0.99	0.0177	0.0890	<0.01	<0.01	I(1)
Real exchange rate (Ksh/USD)	0.0040	0.0015	0.0000	0.0000	0.0000	0.0000	I(0)
Outstanding total debt	1.0000	1.0000	1.0000	0.9999	0.0000	0.0000	I(2)

Based on Table 3.3, the variables had different orders of integration. Three variables were found to be stationary or I(0), these were foreign exchange reserves of Capital Market Authorities (CMAs), portfolio investment liabilities, and the real exchange rate. The other variables were mostly integrated of order one, with a few others being integrated of the second order.

4. Data Analysis and Findings

4.1 Overview

This section presents the analysis of data and interprets the findings of the study. It focuses on the estimated regression models for RER, estimations for RER misalignment, and estimation models for portfolio flows by assuming both threshold analysis and without threshold analysis.

4.2 Regression Results for Estimation of the Real Exchange Rate for Kenya

The estimation for the RER for Kenya was guided by empirical literature and theory, and the significance of variables in the model. Two cointegration estimations based on FMOLS and ARDL were undertaken for the RER and presented in Tables 4.1 and 4.2, respectively.

Table 4.1: Real exchange rate estimation using the ARDL technique

Dependent variable: RER_KSH_US\$ Sample: 1981-2023 Selected model: ARDL (1,0,0,1,1)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.*
RER_KSH_USD (-1)	0.4187	0.1303	3.2116	0.0028
EXT DEBT SERV CHARGE/GDP	2.6513	1.8013	1.4718	0.1499
TOT	-0.6416	0.3112	-2.0616	0.0467
OPENNESS	129.3659	49.3180	2.6230	0.0128
OPENNESS (-1)	-152.6851	46.0129	-3.3183	0.0021
INFLATION_KEN-				
INFLATION_USA	-2.3109	0.4344	-5.3190	0.0000
INFLATION_KEN (-1)-				
INFLATION_USA (-1)	1.5691	0.4292	3.6553	0.0008
C	78.3730	21.9178	3.5757	0.0010
Adjusted R-squared	0.5860	S.D. dependent var		24.2377
F-statistic	9.4946	Durbin-Watson stat		2.0695
Prob (F-statistic)	0.0000			

Source: Analysis from EViews package

Based on the ARDL model, Kenya's real exchange rate is modeled as a function of its own lagged value (to signal persistence or memory effects), the external debt service charge to GDP ratio, terms of trade, openness, and the inflation

differential between Kenya and the United States of America (USA). The selected model estimated is ARDL (1, 0, 0, 1, 1). Except for the external debt service charge to GDP ratio, the other variables were statistically significant at a 5.0 per cent level. Terms of trade negatively affected the RER as did the Kenya-USA inflation differential. However, the lagged RER, openness, and the first lag of the inflation differential positively affected the RER.

Table 4.2: Real exchange rate estimation using fully modified OLS cointegration

Dependent variable: RER_KSH_USD Method: Fully modified least squares (FMOLS) Sample: 1990-2023				
Variable	Coefficient	Std. Error	t-Statistic	Prob.*
RER_KSH_USD (-1)	0.2430	0.1072	2.2663	0.0313
EXT DEBT SERV CHARGE /GDP	4.5092	1.4711	3.0650	0.0047
TOT	-0.3641	0.3344	-1.0889	0.2854
OPENNESS	-14.6915	24.6584	-0.5958	0.5560
INFLATION_KEN-				
INFLATION_USA	-1.5140	0.3287	-4.6049	0.0000
C	57.8893	22.2346	2.6035	0.0145
Adjusted R-squared	0.3407	S.D. dependent var		25.4657
S.E. of regression	20.6771	Sum squared resid		11971.2403
Long-run variance	170.3334			

Source: Data analysis based on EViews package

Based on the fully modified OLS estimation (FMOLS), as was the case for the ARDL model, Kenya's real exchange rate is modelled as a function of its own lagged value, the external debt service charge to GDP ratio, terms of trade, openness, and the Kenya-USA inflation differential. However, the significant variables were the RER at the first lag, the external debt service charge to GDP ratio, and the Kenya-USA inflation differential. The external debt service charge to GDP had a positive effect on the RER, implying that higher debt servicing leads to exchange rate depreciation. The Kenya-USA inflation differential had a negative sign, indicating that higher inflation in Kenya relative to USA inflation would lead to an appreciation of the real exchange rate for Kenya. The estimated models initially included additional regressors, such as total debt, net foreign assets, and foreign exchange reserves. However, these variables were found to be insignificant and were, therefore, dropped from the estimations.

4.3 Estimation of the RER Misalignment for Kenya

The RER misalignment for the Kenya shilling was estimated based on the two estimated models. The misalignment was measured as the difference between the

actual RER and the equilibrium or estimated RER, in line with the theoretical and empirical literature on measuring real exchange rate misalignment. Thus, separate misalignment series were computed from each estimated model.

The Hodrick-Prescott (HP) filter is a mathematical tool that separates a time series into its trend and cyclical components. It is a nonparametric technique that does not rely on economic theory or prior trend specifications. The HP filter works by discounting the importance of short-term price fluctuations to determine the long-term trend of a time series. It also decomposes a time series into growth and cyclical components. Apart from the HP filter, other commonly used filters for extracting cyclical components from time series data include the Hamilton filter (regression filter), the Baxter-King filter, the Christiano-Fitzgerald filter, the Hodrick-Prescott with a one-sided filter, and the exponential smoothing filter. Each of these filters, however, has its own strengths and weaknesses depending on the specific data and analysis needs. This study thus adopted the HP filter due to its relative simplicity in methodology and utilization.

The Hodrick-Prescott (HP) filter has also been proposed as a technique for determining the trend of the estimated RER to separate the series from cyclical fluctuations. Hence, the HP filter was employed to obtain the equilibrium RER for each of the two regression models. Based on the two series for equilibrium RER derived from the HP filter, two additional series for misalignment were generated as the difference between the actual RER and the equilibrium RER (ERER).

The computation of the misalignment was based on both the ARDL and FMOLS estimation techniques, as well as the Hodrick-Prescott filters. The FMOLS estimation is used for computing the misalignment while ARDL findings are presented as a robustness check. The misalignment measure based on the Hodrick-Prescott filter of the FMOLS model is employed for estimations in the subsequent analysis since only one degree of freedom is lost after estimation.

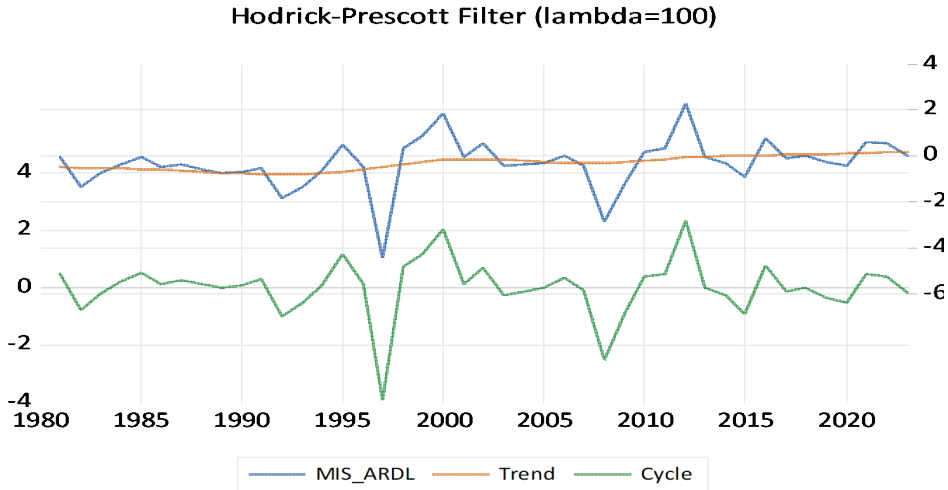
Table 4.3: Summary of Kenya’s real exchange rate misalignment measures

Misalignment based on Hodrick-Prescott filter trend for ARDL model: Mean = -0.32, Max = 0.19 (2023), Min = - 0.80 (1992)
Misalignment based on Hodrick-Prescott filter trend for FMOLS model: Mean = -0.34, Max = 0.40 (2023), Min = - 0.88 (2008)

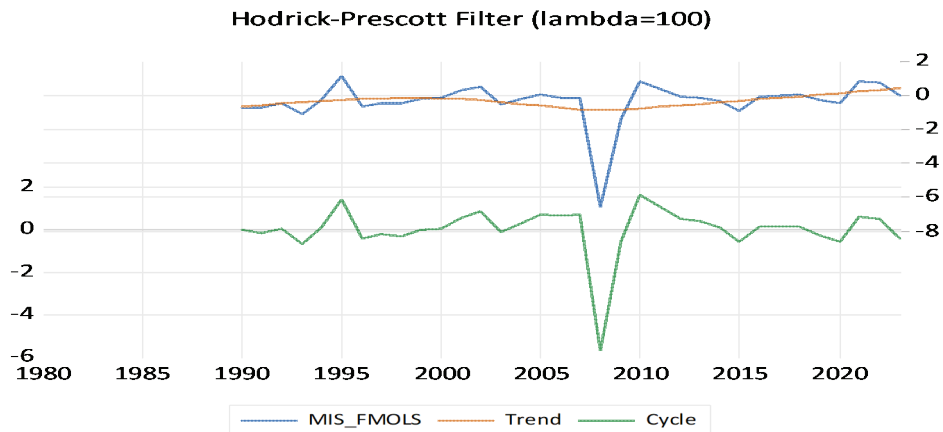
Source: Authors calculations based on data and HP Filter in EViews

4.4 Graphical Analysis for Actual versus Fitted RER and the Hodrick-Prescott Filter

The Hedrick-Prescott filter for the estimated real equilibrium exchange rates based on the first and second regression equations was computed. For annual time series data, the recommended HP filter should have a lambda value of 100. For both estimated models, the trend, cycle, and estimated RER are presented in Figures 4.1 and 4.2.

Figure 4.1: Hodrick-Prescott Filter (based on the ARDL regression model)

Source: EViews output of ARDL Hodrick Prescott RER Misalignment

Figure 4.2: Hodrick-Prescott Filter (based on FMOLS regression model)

Source: EViews output of FMOLS Hodrick Prescott RER Misalignment

The findings reveal evidence of exchange rate misalignment in Kenya. However, the misalignment has remained within ± 4.0 per cent for most years. According to Edwards (1994), there are two types of RER misalignment: macroeconomic-induced and structural-induced misalignment. Structural-induced misalignment occurs when changes in the real determinants of the equilibrium RER do not translate into actual changes in the RER in the short run, resulting in disequilibrium in the exchange rate. On the other hand, macroeconomic-induced misalignment

occurs when inconsistencies between macroeconomic policies and the official exchange rate system cause the actual RER to deviate from its equilibrium value. For this study, the structural-induced misalignment is most likely, given that the analysis employed structural models for the real determinants of the RER. Future studies could explore whether the misalignment could potentially be attributed to macroeconomic-induced factors.

4.5 Effect of Exchange Rate Misalignment on Direct and Portfolio Flows to Kenya

This section presents the findings of the study's second objective, which was to evaluate the effect of exchange rate misalignment on portfolio flows to Kenya. For completeness, the analysis adopted both a threshold and a non-threshold analysis. The real exchange rate misalignment adopted in the study was the Hodrick-Prescott misalignment, estimated from the ARDL model for the estimations in this section.

4.5.1 *Direct and portfolio flows and exchange rate misalignment without threshold effects*

First, the effect of exchange rate misalignment on portfolio flows was estimated for the full model without the application of threshold effects. Three estimations were made for direct investment and portfolio investment. The estimation results are presented in Tables 4.4 and 4.5, respectively.

Table 4.4: Estimation for direct investment without threshold effects

Dependent variable: DIRECTINV_KSHM Method: Dynamic least squares (DOLS)				
Variable	Coefficient	Std. Error	t-Stat	Prob.*
RER MISALIGNMENT	294.5983	150.7079	1.9547	0.0764
DOM CREDIT KSHM	-0.0091	0.0066	-1.3849	0.1934
FERSOFCMASKSHM	0.2805	0.0839	3.3421	0.0065
INFLATION_KEN	208.1988	192.2917	1.0827	0.3020
EXT DEBT SERV CHARGE/GDP	6062.2915	1335.4388	4.5395	0.0008
NFA_KSHM	-0.2578	0.0829	-3.1094	0.0099
RER_KSH/USD	507.2671	152.5497	3.3252	0.0067
C	-6771.9451	6592.3018	-1.0272	0.3263
Adjusted R-squared	0.9389	S.D. dependent var		17463.5710
Long-run variance	4136132.9793			

Source: EViews output for direct investment estimation by dynamic OLS approach

Based on the dynamic OLS estimation, a real exchange rate misalignment, where there are no threshold effects, has a significantly positive effect on direct investment, with a coefficient of 294.6 units. This result implies that little to moderate misalignment, as is the case for Kenya, could be beneficial for attracting direct investment. However, domestic credit and net foreign assets negatively impact direct investment. Additionally, the inflation rate (a measure of economic stability) did not significantly influence the country's direct investment.

Table 4.5: Estimation for portfolio investment without threshold effects

Dependent variable: LOG(PORTFOLIOINV_KSHM) Sample: 1982-2023 Selected model: ARDL (2,1,1,0,0,0)				
Variable	Coefficient	Std. Error	t-Stat	Prob.*
LOG (PORTFOLIO INV_KSHM (-1))	0.5454	0.1259	4.3303	0.0001
LOG (PORTFOLIO INV_KSHM (-2))	-0.2836	0.1186	-2.3906	0.0228
EXT DEBT SERVCHARGE/GDP	0.0818	0.1708	0.4790	0.6351
EXT DEBT SERV CHARGE/GDP (-1	0.4023	0.2040	1.9713	0.0573
NFA/GDP CURR PRICES KSHM	-18.8256	8.4170	-2.2366	0.0324
NFA/ GDP CURR PRICES KSHM (-1)	24.7694	8.6118	2.8762	0.0071
RER_MISALIGNMENT	0.0334	0.0163	2.0401	0.0496
RER_KSH/USD	0.0087	0.0108	0.8061	0.4261
INFLATION_KEN	-0.0996	0.0265	-3.7515	0.0007
C	6.1531	1.6234	3.7900	0.0006
Adjusted R-squared	0.8254	S.D. dep var		2.6504
F-statistic	22.5387	D-W stat		2.1455
Prob(F-statistic)	0.0000			

Source: EViews output for portfolio investment estimation by the ARDL approach

Based on the ARDL estimation, a real exchange rate misalignment where there are no threshold effects has a small positive impact on portfolio investment, with a coefficient of 0.03 per cent. Portfolio investments are thus relatively inelastic to real exchange rate misalignment. This result implies that little to moderate misalignment, as demonstrated in Kenya, could benefit portfolio investment. However, net foreign assets and the inflation rate negatively impact portfolio investment. There is also evidence of a persistent effect of portfolio investment on the country, with positive elasticity at the first lag and a negative elasticity at the second lag. Overall, the model results show that the misalignment of the real

exchange rate, if not severe, has a beneficial effect on both direct and portfolio investment.

4.5.2 Direct and portfolio flows and exchange rate misalignment – application of threshold analysis

The effect of exchange rate misalignment on direct and portfolio flows was also examined using the threshold analysis approach. Similarly, three estimations were made for direct investment and portfolio investment. The results for the three estimations are presented in Tables 4.6 and 4.7, respectively.

Table 4.6: Estimation for direct investment with threshold analysis

Dependent variable: DIRECTINV_KSHM Method: Discrete threshold regression Sample (adjusted): 1981-2023 Threshold variable: RER_MISALIGNMENT (HPTREND_ARDL)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.*
RER_MISALIGNMENT < -0.5043 -- 16 obs				
DOMCREDITKSHM	0.0650	0.0290	2.2422	0.0348
INFLATION_KEN	314.9651	101.8455	3.0925	0.0051
NFA_KSHM	-0.0327	0.1444	-0.2266	0.8226
RER_MISALIGNMENT	-163.2316	141.0320	-1.1574	0.2589
-0.5043 <= RER_MISALIGNMENT < -0.0698 -- 15 obs				
DOMCREDITKSHM	0.0054	0.0041	1.3278	0.1972
INFLATION_KEN	-18.1167	147.7300	-0.1226	0.9034
NFA_KSHM	-0.0452	0.0180	-2.5028	0.0198
RER_MISALIGNMENT	-187.2219	80.4586	-2.3269	0.0291
-0.0698 <= RER_MISALIGNMENT < 0.0569 -- 6 obs				
DOMCREDITKSHM	0.0601	0.0152	3.9299	0.0006
INFLATION_KEN	-3794.2325	1760.6373	-2.1550	0.0418
NFA_KSHM	-0.0392	0.0180	-2.1781	0.0399
RER_MISALIGNMENT	-7977.6822	2436.8004	-3.2738	0.0033
0.0569 <= RER_MISALIGNMENT -- 6 obs				
DOMCREDITKSHM	-0.0798	0.0224	-3.5572	0.0016
INFLATION_KEN	-83893.2584	5490.1016	-15.2808	0.0000
NFA_KSHM	-0.1123	0.0092	-12.2034	0.0000
RER_MISALIGNMENT	44306.7318	5964.0276	7.4289	0.0000
Adjusted R-squared	0.9789	S.D. dependent var		19115.8633
F-statistic	103.7031	Durbin-Watson stat		2.2415
Prob(F-statistic)	0.0000			

Source: EViews output of threshold effect of real exchange rate misalignment on direct investment

Table 4.7: Estimation for portfolio investment with threshold analysis

Dependent variable: LOG(PORTFOLIOINV_KSHM) Method: Discrete threshold regression Sample (adjusted): 1981-2023 Threshold variable: RER_MISALIGNMENTV (HPTREND_ARDL)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.*
RER_MISALIGNMENT < -0.6090846 -- 9 obs				
LOG (PORTFOLIOINV_KSHM (-1))	-1.7415	0.5922	-2.9407	0.0059
EXT DEBT SERV CHARGE/GDP	-1.8832	0.7420	-2.5379	0.0160
NFA/GDP CURRPRICES_KSHM	-84.7668	24.2808	-3.4911	0.0013
RER_MIS ALIGNMENT	0.5835	0.1109	5.2605	0.0000
C	65.2427	13.2565	4.9215	0.0000
-0.6090846 <= RER_MISALIGNMENT -- 34 obs				
LOG (PORTFOLIO INV_KSHM (-1))	0.6951	0.1660	4.1867	0.0002
EXT DEBT SERV CHARGE/GDP	0.2107	0.2257	0.9337	0.3571
NFA/GDP CURR PRICES_KSHM	1.5112	6.1890	0.2441	0.8085
RER_MISALIGNMENT	0.0161	0.0132	1.2158	0.2326
C	2.4439	1.4643	1.6689	0.1045
Adjusted R-squared	0.7831	S.D. dependent var		2.6365
F-statistic	17.8536	D-W stat		2.1853
Prob(F-statistic)	0.0000			

Source: EViews output of threshold effect of rer misalignment on portfolio investment

The results in Tables 4.6 and 4.7 show the threshold effects of exchange rate misalignment on Kenya's direct investment and portfolio investment. In the case of direct investment, there are four thresholds at which a RER misalignment affects direct investments: below -0.50 per cent, between -0.50 and -0.07 per cent, between -0.07 and 0.06 per cent, and above 0.06 per cent. RER misalignment negatively affects direct investments at all threshold levels, except for the lowest threshold of below -0.50 per cent where the effect is positive. A 1.0 per cent increase in RER misalignment resulted in a decline in direct investment flows by Ksh 163 million in the first threshold, Ksh 187 million in the second threshold, and Ksh 7,977 million in the third threshold. Overall, RER misalignment adversely affected direct investment flows. These results imply that currency misalignment is detrimental to direct investment flows, with the effects becoming positive only at the extreme threshold level.

Regarding portfolio investments, there are two thresholds at which RER misalignment affects portfolio investments, with a cut-off threshold of -0.61 per cent. RER misalignment had a positive effect on portfolio investments in both thresholds. A 1.0 per cent increase in RER misalignment led to a rise in portfolio investment flows by Ksh 0.58 million in the lower threshold and a rise by Ksh 0.016 million in the upper threshold. This result implies that when misalignment of the RER is low, as demonstrated in the case of Kenya, it does not have a detrimental effect on portfolio investments. This is further evidenced by the relatively small cut-off threshold of -0.61 per cent. However, it can be expected that at higher levels of misalignment, the effect on portfolio investment flows would be negative.

5. Conclusion and Policy Recommendations

5.1 Conclusions

A misaligned or fluctuating exchange rate causes uncertainty in the economy. Consequently, persistent uncertain or misaligned exchange rates negatively influence many macroeconomic variables, including economic growth, welfare, export performance, and capital inflows. Misalignment of the exchange rate also has adverse effects on various sectors of the economy, including the agricultural sector, which is vital for economic activity and a major export source. It can also lead to macroeconomic instability.

Portfolio flows are a form of short-term capital inflows that a country receives from external investors. Foreign portfolio investment (FPI) is a crucial source of financing for growth and development in both developed and developing nations. Kenya implemented the Big Four agenda in 2022 and is currently focusing on the Bottom-Up Economic Transformation Agenda (BETA). The development projects, including ongoing initiatives under Kenya Vision 2030, require substantial capital investments. Additionally, FPI can help countries bridge the gap often observed between domestic savings and investment. However, foreign portfolio flows can also influence the exchange rate, potentially causing currency misalignment.

There is evidence of a certain degree of real exchange rate misalignment for Kenya, estimated at ± 4.0 per cent. To assess the impact of this misalignment on portfolio investment flows to the country, two regression models were employed. The first was based on an ARDL model, while the second utilised an FMOLS model. The results indicated that Kenya's real exchange rate is a stable function of a set of well-defined macroeconomic variables. Therefore, both macroeconomic and structural factors influence the exchange rate.

The HP filter was employed to obtain the equilibrium RER for each of the two regression models. Based on the two series for equilibrium RER derived from the HP filter, two additional series for misalignment were generated as the ratio between the actual RER and the equilibrium RER (ERER). The first regression model based on ARDL offered a better fit for the actual and estimated RER compared to the FMOLS regression model. Consequently, the HP-based misalignment series derived from the ARDL model was adopted as the measure of Kenya's RER misalignment.

The results, without threshold analysis, showed that little to moderate exchange rate misalignment, as has been demonstrated for Kenya, has a beneficial effect on both direct investment and portfolio investment.

Analysis with threshold effects showed that exchange rate misalignment adversely affected direct investments. However, for portfolio investments, the effect was positive, considering that Kenya experienced only small magnitudes of misalignment in the range of ± 4 per cent. A 1.0 per cent increase in RER

misalignment resulted in a decline in direct investment flows by between Ksh 163 million and Ksh 7,977 million, depending on the cut-off level of the misalignment. On the other hand, the cut-off threshold at which misalignment affects portfolio investment flows was small, at -0.61 per cent. Consequently, at such low threshold levels, misalignment yielded a small positive impact on portfolio flows. Specifically, a 1.0 per cent increase in RER misalignment led to a rise in portfolio investment flows of between Ksh 0.016 million and Ksh 0.58 million. Thus, small misalignments appear to be beneficial for portfolio investments.

5.2 Policy Recommendations

- (i) Given that the exchange rate is a function of some macroeconomic fundamentals, which can be categorized as both fiscal and monetary indicators, exchange rate management should ensure that both fiscal and monetary policy are coherent and work towards maintaining a stable exchange rate for Kenya.
- (ii) If the exchange rate misalignment is extreme, it can be detrimental to direct investment and portfolio investment. Thus, the exchange rate should be managed to prevent currency misalignment beyond thresholds that could be detrimental to the country's investment flows and the economy in general.
- (iii) The unstable performance of portfolio and direct investment flows creates uncertainty regarding what flows to expect, which can be leveraged for economic growth and development. This means that the country must work towards ensuring a steady flow of direct and portfolio investments by maintaining macroeconomic stability.

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