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# REMITTANCE INFLOWS AND EXCHANGE RATE IN KENYA: AN EMPIRICAL INVESTIGATION

Mercy T. Musakwa[1] & Nicholas M. Odhiambo

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***Abstract***

*This study investigated the impact of remittances on the nominal exchange rate in Kenya, using annual time series data from 1980 to 2020. The study was motivated by the need to find out how remittances affect the exchange rate in Kenya on the back of an increase in remittance inflows in low- and middle-income countries, including Kenya. This is important as Kenya continues to build a stable macroeconomic environment that supports economic growth and other milestones specified in the Sustainable Development Goals. Using the autoregressive distributed lag approach to cointegration, the study found a positive relationship between remittances and the nominal exchange rate in both the short and long run. This implies that an increase in remittance inflows in Kenya leads to a depreciation of the currency. The study, therefore, concludes that remittance inflows in Kenya are not associated with the Dutch-disease phenomenon.*

***Keywords:*** *Kenya, remittances, exchange rate, autoregressive distributed lag, appreciation, depreciation*

***JEL: F24; F33***

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## 1. Introduction

Remittances are associated with a positive impact on several economic variables, such as poverty reduction, economic growth, and financial development. The studies that have focused on the impact of remittances on macroeconomic indicators show overwhelming evidence of poverty mitigating and economic growth support in different countries. Even the United Nations (UN) has embraced remittances as a source of development finance in most countries, especially in developing countries. Low- and middle-income countries received US$540 billion in 2020 despite the disruptions caused by COVID-19 (World Bank, 2021). Although this was a decline of US$8 billion from remittance inflows in 2019, these inflows remained high and surpassed the overseas development assistance of US$170 billion in 2019 (World Bank, 2021). A surge in remittances was also recorded in sub-Saharan Africa. With the exclusion of Nigeria, remittances increased by 2.3% in 2019 (World Bank, 2021). The surge in remittances has been a welcome development, especially in developing countries that have been relying on development assistance, external borrowing, and foreign direct investment (FDI) as sources of development finance. Remittances are projected to increase to US$565 billion in 2022 as the world recovers from COVID-19 disruptions and effects (World Bank, 2021). The question that this study sought to answer is whether remittance inflows impact the exchange rate.

The studies that investigated the impact of remittances on the nominal exchange rate or real effective exchange rate had inconclusive results. Some of the studies found that remittances caused an appreciation of the exchange rate (for example, Joof & Touray, 2021; Kim, 2019; Dutta & Sengupta, 2018). Others found that remittances caused a depreciation of the exchange (for example, Barrett, 2013), yet others found no effect (for example Adejumo & Ikhide, 2019).

Most of these studies used panel data analysis. The inconclusive results are specific to the countries where they were conducted and cannot be generalised to other countries. This leaves countries in a catch-22 situation. Although remittances are a welcome source of external funding that does not come with conditionalities, they may lead to exchange rate instability that negatively affects macroeconomic stability if they are not properly managed.

This study relooks the relationship between remittances and the exchange rate in Kenya using the autoregressive distributed lag (ARDL) approach. Kenya has been selected for this study because it is one of the signatories to the Sustainable Development Goals (SDGs), which require each country to achieve set targets on the 17 SDGs. Given this pressure, multiple sources of development finance (including remittances) are important to support projects necessary to achieve the SDG targets for Kenya. However, an understanding of the trade-off between remittances as a source of development finance and undesired exchange rate movement is important. Furthermore, Kenya is among the countries that have witnessed an increase in remittance inflows even in the face of economic interruptions like COVID-19. The exchange rate movement is one of the key economic variables that measure macroeconomic stability. The exchange rate movement also reflects a country's ability to maintain the stability that is pertinent to achieving the SDGs. It can also be argued that Kenya has managed to maintain a relatively stable exchange rate compared to some African countries; hence a study investigating the impact of remittances on the exchange rate will add value to the economy in the quest to maintain and support economic growth and stability.

The rest of the paper is structured as follows: Section 2 discusses the literature review. This section is subdivided into two: 2.1 delves into country-based literature, and 2.2 highlights theoretical and empirical literature. Section 3 focuses on the estimation techniques, while section 4 outlines the data analysis and discussion of the results. Section 5 concludes the study.

## 2. Literature Review

### 2.1 Remittances and Real Effective Exchange Rate Dynamics in Kenya

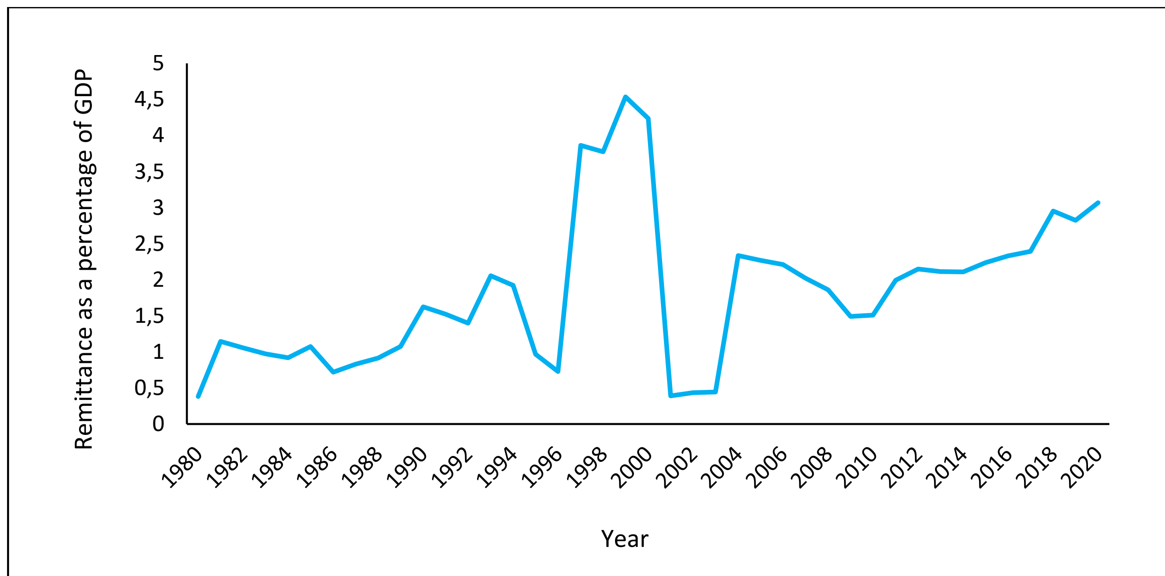
Kenya is one of the signatories to the SDGs, the successor to the Millennium Development Goals that ended in 2015. This put the government under pressure to support remittances in an endeavour to increase much-needed capital inflows to achieve the SDGs. To monitor the remittances, the Central Bank of Kenya (CBK) carries out a monthly survey with formal channels such as commercial banks and other authorised international remittances service providers in Kenya. Although it is widely known that statistics from formal remittances channels underestimate the total remittances that are remitted through informal channels, Kenya has consistently recorded an increase in remittances despite the negative impacts of COVID-19 on employment and wages (IFAD, 2021a). This shows how important remittances are to the country. The consistent increase in remittance inflows is attributed to financial innovation that has opened more convenient channels, such as mobile phones in transactions, allowing families to receive money in the face of the lockdown (IFAD, 2021a). It can also be argued that the increase in remittance inflows could be because of the use of formal channels, compared to previous periods when emigrates were coerced with a ban on travel because of the lockdown.

To encourage remittance inflows, the UN has set the cost of these transactions at 3%. Although Kenya has reduced the cost of remittance transactions from 15 to 8% in the past 10 years, it still has a lot of work to do to see the rate decline to the recommended 3% (IFAD, 2021a). However, compared to other sub-Saharan African countries, Kenya ranks third (IFAD, 2021a). As an initiative of IFAD, the Platform for Remittances, Investment and Migrants' Entrepreneurship (PRIME Africa) has the main objective of reducing remittance transfer costs to Kenya in support of SGD 10.c, enhancing financial inclusion through remittance-linked financial services and reducing informal channels in Kenya (IFAD, 2021b). Apart from initiatives through IFAD, the CBK is in the process of reviewing the National Payment Strategy 2021–2025 by focusing on enhancing digital payments that will hopefully smoothen remittance transactions (IFAD, 2021b). In Kenya, there are 41 commercial banks, 14 microfinance banks, the Post Office Savings Bank (Postbank), and 17 money remittance providers that are licenced to handle inbound and outbound transfers (IFAD, 2021b). This has increased the number of formal channels that can be used to transfer remittances to and from Kenya.

Remittance inflows into Kenya have defied all the odds, especially during the COVID-19 pandemic when remittances were anticipated to decline due to the negative effects of the pandemic on employment (IFAD, 2021a). Remittance inflows increased from US$139,6 million in 1990 (contributing only 1.6% of the gross domestic product – GDP) to US$2838.2 million in 2019 (3% of the GDP), almost double the amount received in 1990 (World Bank, 2022). Remittances fluctuated between 1991 and 2003; thereafter, the inflows grew steadily to an average of 2.2% of GDP or US$1164 million (World Bank, 2022). Kenya experienced a surge in remittance inflows between 1997 and 2000, while major drops were recorded in 1996 and 2001, with 0.7% and 0.3% of GDP registered (World Bank, 2022). In 2020, remittance

inflows exceeded every expectation, with an increase of 0.1% contribution to GDP or US$261 million recorded (World Bank, 2022). Figure 1 shows the trends in remittances from 1980 to 2020.

**Figure 1: Remittance Inflows 1980–2020**




Source: World Bank, 2022

Figure 1 shows a consistent increase in remittance inflows from 2003, although the remittances never reached the levels recorded between 1997 and 2000 (World Bank, 2022).

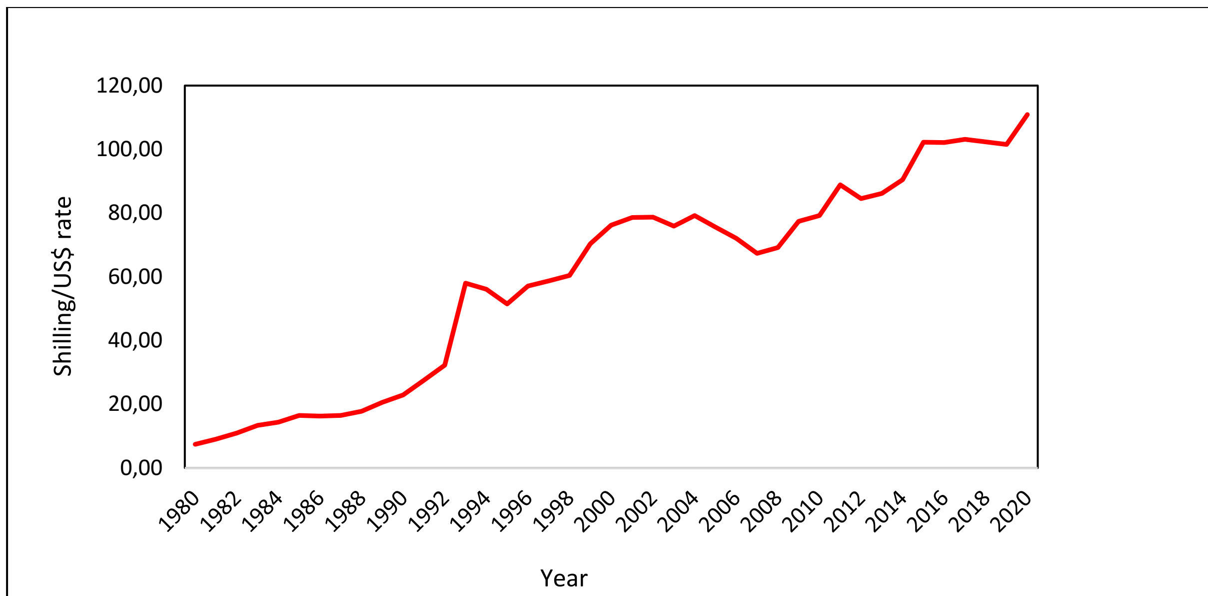
On the real exchange rate front, the Central Bank of Kenya (CBK) is mandated to regulate the foreign exchange space by the Central Bank of Kenya Act Part VI A and Legal Notice No. 23 of 1996 (CBK, 2016). The CBK works closely with authorised dealers to ensure that buying, selling, borrowing, and lending of foreign currency are done by observing set guidelines to ensure transparency and efficiency (CBK, 2016). All transactions that involve foreign

currency, including exports and imports, are, therefore, at the helm of the CBK through licenced dealers (CBK, 2016).

Kenya has a strong engine in domestic consumption that accounts for over 70% of GDP, while exports remain weak (World Bank, 2012). Agriculture remains the major driver of exports (tea, coffee, cut flowers, and vegetables) (Kenyan Government, 2019). The major trading partners of Kenya are Europe, Japan, the United States of America, and low-income countries in Africa. The growth of Kenyan exports in these markets has been both intensive margin (growth of existing products in existing markets) and extensive margin (new products in existing markets and new products in new markets) (World Bank, 2012). Kenya uses the instruments of the Common Market for Eastern and Southern Africa and the East African Community to limit imports of food by charging high tariffs to non-members (Kenyan Government, 2019). It is quite evident that Kenya has not fully explored export performance, which has affected the country's competitiveness (especially with a mismatch between exports and imports and a limited export base that is predominantly merchandise related).

Although Kenya has programmes, initiatives, and policies in the foreign exchange space to support transactions related to foreign exchange, the composition of the exports (which is largely agriculturally based) and a comparably high import demand have put pressure on the country's exchange rate. The real effective exchange rate is the real value of a currency in relation to another currency. The trends in exchange rate are shown in Figure 2.

**Figure 2: Trends in Exchange Rate 1980–2020**




Source: World Bank, 2022

Figure 2 shows that the Kenyan Shilling (KSh) was strong between 1980 and 1992, with an average of KSh 17.2 (World Bank, 2022). The exchange rate deteriorated by KSh 26 in 1993 and never recovered from the trajectory (World Bank, 2022). In 2020, the currency recorded the highest exchange rate of KSh 110.9, the highest ever recorded between 1980 and 2020 (World Bank, 2022). The general upward trend in the exchange rate signified a depreciation of the Kenyan Shilling against the US Dollar.

**2.2 A Review of Related Literature**

Lucas and Stack (1985) propose three motives for migrants to send money home. The first motive is ultraism, which is linked to empathy for the struggling family members left back home. The desire to assist them in their financial struggle causes migrants to send remittances home. The second motive is co-insurance, where migrants invest back home as a fallback when they return home or when they lose their jobs in a foreign land. The third motive is the savings

motive, where migrants endeavour to build up savings back home in case there is a fluctuation in their earnings. Remittances are likely to lead to an increase in demand for non-tradables in response to an increase in domestic demand. This is supported by Adam and Page (2005), who found that remittances result in an increase in human investment – education and cash assets, real estate investment, and starting or expanding small businesses. Remittances also provide a stable and countercyclical income during shocks such as droughts and wars (Kapur, 2004). Although the benefits of remittances are well documented in the literature, the surge in remittance inflows can result in remittance-receiving countries experiencing an appreciation of their currency. This is when the surge in remittances results in a plethora of challenges in the domestic economy, such as the balance of payments challenges as exports become less competitive due to an appreciation of the domestic currency. An upward movement in the exchange rate harms the tradable sectors of the economy if the surge in inflows is not channelled into investment but increases the demand for imports. This puts pressure on the balance of payments.

In the literature, two channels have been proposed that result in the appreciation of the exchange rate, which negatively affects the competitiveness of tradable goods. The first channel is the Salter-Swan-Conder-Dornbusch model, which assumes that prices for tradable goods are exogenously determined. The spending effect (due to higher capital inflows) and the exogenously determined prices cause the price of non-tradable goods to increase. This causes an expansion in the non-tradable sector – and an increase in the price of non-tradable – relative to the tradable sector, resulting in the exchange rate appreciation. The expansion of the non-tradable sector creates a resource movement effect, drawing additional resources toward the sector (Acosta, Baerg & Mandelman, 2009; Corden & Neary, 1982). A second channel is an

increase in household wealth that may result in households substituting labour for leisure (Acosta, Lartey & Mandelman, 2007). This causes a decrease in the supply of labour, leading to a shrink in the labour, putting an upward pressure on wages, and resulting in an increase in production costs. The labour effect and resource reallocation result in an appreciation of the exchange rate.

There is growing literature on the impact of remittances on the real exchange rate, real effective exchange rate, and nominal exchange rate. The surge in remittances that African countries have experienced in the past few years in general, and in Kenya in particular, requires a relook at the relationship between remittances and the exchange rate. The findings of this study provide policy makers in Kenya with policy options to manage the exchange rate. Studies that have investigated the impact of remittances on the exchange rate can be divided into three categories. Some studies found remittances to cause an exchange appreciation (see, for example, Joof & Touray, 2021; Kim, 2019; Dutta & Sengupta, 2018; and Acosta *et al*., 2009). A second set of studies found remittances to cause a depreciation of the exchange rate (see Braihim, Nefzi & Sambo, 2018; and Barrett, 2013). The third category of studies found no impact (see, Mongardini & Rayner, 2009). This section outlines empirical studies that were done on the impact of remittances on exchange rate.

The first category of literature found remittances to cause an appreciation of the exchange rate. Olekslv and Mirzoieva (2022) examined the influence of remittances on the exchange rate on Ukraine using the autoregressive distributed lag approach. The study found remittances to cause an appreciation of the exchange rate. In the same spirit, Joof and Touray (2021)

investigated the impact of remittances on the real effective exchange rate using fully modified ordinary least squares (OLS) and dynamic OLS, using quarterly data from 2009 to 2019 for Gambia, and found remittances to cause an appreciation of the real effective exchange rate. A 15% increase in remittances was found to result in a 1.5% appreciation of the real effective exchange rate. Azizi (2021) investigated the impact of remittances on the exchange using data for 101 developing countries from 1990 to 2015. The study found remittances to lead to real exchange rate appreciation. Hien et al. (2020) examined the impact of remittances on real effective exchange rate for 32 Asian countries using data from 2006 to 2016. Employing the System Generalised Methods of Moments (S-GMM), the study found a 1% increase in remittance per capita lead to 0,103% appreciation in the real effective exchange rate. Kim (2019) investigated the impact of remittances on the exchange rate using data from 114 developing countries spanning 1970 to 2013. Employing a general equilibrium monetary model, the study found remittances to cause an increase in money supply under a fixed exchange rate regime and an appreciation of the nominal exchange rate. However, the degree of openness was found to mitigate the appreciation of the nominal exchange rate. Dutta and Sengupta (2018) investigated the impact of workers' remittances on the real effective exchange rate in India using data from 1980 to 2015. Employing the ARDL approach to cointegration, the study found remittances to cause an appreciation of the exchange rate. A 1% increase in remittances led to a 0.076% appreciation of the exchange rate in the long run, with a rate of adjustment of 51%. In the same spirit, Hassan, and Holmes (2013) examined the long-run relationship between the real exchange rate and remittances for nascent and developing economies. The results confirmed that an increase in remittance inflows lead to an appreciation of the real effective exchange rate. This fining was also confirmed by a panel Error Correction Model (ECM), where unidirectional causal flow was found from remittances to real exchange rate in the short run.

Acosta, Baerg and Mandelman (2009) investigated the impact of remittances on real exchange rate using panel data from 1990 to 2003 for 106 developing and transition countries. The study found results consistent with those of Joof and Touray (2021) and Kim (2019). The study found evidence that remittances put an upward pressure on the real exchange rate, although the effect was weak in deeper and more sophisticated financial markets that could maintain trade competitiveness. Lopez, Molina and Bussolo (2007) investigated the impact of remittances on the real effective exchange rate using cross-country data for 24 Latin American countries. They found a surge in remittance inflows caused an appreciation. Izquierdo and Montiel (2006) found the same results in three out of six Central American countries for the period 1960 to 2004: the Dominican Republic, El Salvador, and Guatemala. Similarly, Amuedo-Dorantes and Pozo (2004) employed a panel data assembled from 13 Latin American and Caribbean countries over the period 1978 to 1998, which validated the conventional view that an increase in remittances leads to an appreciation of the real exchange rate.

The second category of literature found remittances to cause a depreciation of the exchange rate. Adejumo and Ikhide (2019) investigated the impact of remittances on the exchange rate in Nigeria using dynamic OLS and data from 1981 to 2014. The study found remittances to cause the exchange rate to depreciate Braihim, Nefzi and Sambo (2018) investigated the impact of remittances on the real effective exchange rate in nine Middle East and North Africa (MENA) countries using data from 1980 to 2015. Employing panel ARDL, remittances were found to cause a depreciation of the exchange rate. Essayyad, Palamuleni and Satyal (2018) examined the impact of remittances on Nepal's real effective exchange rate using the ARDL approach. The study found the same results as those Adejumi and Ikhide (2019) found for

Nigeria, where remittances caused real effective exchange rate depreciation in the short run, but insignificant in the long run. Khurshid el al. (2017) carried out a study on the effects of workers' remittances on exchange rate volatility in Pakistan. Using annual time series data and the generalised methods of moment approach, the study found that remittances caused exchange rate depreciation but had a positive effect on export competitiveness. The study further revealed that remittance inflows only led to exchange appreciation if it was associated with savings, while remittances channelled towards consumption reduced competitiveness and caused depreciation. Barrett (2013) employed a model with official development assistance, government expenditure and trade terms in Jamaica using data from 1995 to 2010. The study found that remittances caused a depreciation of the exchange rate.

Nketiah et al. (2019) examined the impact of remittances on real exchange rate in Ghana using data from 1970 to 2016. Employing Ordinary Least Squares (OLS) the study found remittances to have no significant impact on real exchange rate. Izquierdo and Montiel (2006) in a study on six Central American countries using data from 1960 to 2004, found consistent results with Nketiah et al. (2019) for Jamaica, Nicaragua, and Honduras. Mongardini and Rayner (2009) carried out a study on the relationship between remittances and the real effective exchange rate in sub-Saharan African countries and found no relationship between remittances and the real effective exchange rate in the long run mainly because of excess capacity in non-tradable sectors of these countries.

The extant literature reveals a need for further research to establish the impact of remittances on the exchange rate. The inconclusive results of different studies reviewed make

generalisation of the result inappropriate. Another study on the nature of the relationship in Kenya will provide more informative information on how to strike a balance between using remittances as a development finance source and stabilising the exchange rate, as well as provide a conducive environment for economic growth.

## 3. Materials and Methods

### 3.1 Estimation Techniques

The ARDL bounds approach was used in this study to investigate the impact of remittances on the exchange rate in Kenya. The ARDL approach was developed by Pesaran and Shin (1999) and later expanded by Pesaran *et al*. (2001). The ARDL approach was selected for this study because of its numerous advantages. The approach does not require all variables to be integrated of the same order. A combination of variables integrated of order I[(1)] and variables integrated of order zero I[(0)] can be used in the analysis. However, it is important to note that the approach falls away if variables are integrated of order two (or higher). The approach is also robust even when the sample is small (see Solarin & Shahbaz, 2013). Furthermore, the approach provides results with long-run and short-run timeframes, which provide relevant informative information to policy makers.

### Variable definitions

The key variables in this study are remittances (REM) and exchange rate (EXR). The remittances are measured by remittance inflows as a percentage of GDP, while the exchange rate is measured by the real exchange rate between the Kenyan Shilling and the US Dollar

using the average period rate. Remittances were expected to cause an appreciation of the nominal exchange rate.

The variable descriptions are given in Table 1.

**Table 1: Variable Descriptions for the Model**

| Variable | Description | Expected Impact on Exchange Rate |
|---|---|---|
| EXR | Shillings/US$ – average period nominal exchange rate | - |
| REM | Remittance inflows as a percentage of GDP | Remittances are expected to cause an appreciation of the exchange rate. |
| FDI | FDI inflows as a percentage of GDP | FDI is expected to cause an appreciation of the exchange rate. |
| TOP | Exports and imports as a percentage of GDP | Trade openness is expected to cause an exchange rate appreciation if exports outweigh imports. |
| BM | Broad money as a percentage of GDP | Broad money is expected to cause an exchange rate depreciation. |
| GFE | Final government consumption expenditure as a percentage of GDP | Final government consumption expenditure is expected to cause exchange rate depreciation. |
| GDPG | GDP growth rate | Economic growth is expected to cause exchange rate appreciation. |
| PL | Price level | High prices are expected to cause exchange rate depreciation. |

**Model Specification**

**The ARDL bounds model specification is given in Equation 1 below.**

$$\Delta EXR = \varphi_0 + \sum_{i=1}^{p} \varphi_{1i}\, \Delta EXR_{t-i} + \sum_{i=0}^{q} \varphi_{2i} \Delta\, REM_{t-i} + \sum_{i=0}^{q} \varphi_{2i} \Delta\, FDI_{t-i} + \sum_{i=0}^{q} \varphi_{3i}\, \Delta TOP_{t-i} + \sum_{i=0}^{q} \varphi_{4i}\, \Delta BM_{t-i} + \sum_{i=0}^{q} \varphi_{5i}\, \Delta GFE_{t-i} + \sum_{i=0}^{q} \varphi_{6i}\, \Delta GDPG_{t-i} + \sum_{i=0}^{q} \varphi_{7i}\, \Delta GDPC_{t-i} + \pi_1 EXR_{t-1} + \pi_2 FDI + \pi_3 TOP + \pi_4 BM_{t-1} + \pi_5 GFE_{t-1} + \pi_6 GDPG_{t-1} + \pi_7 GDPC_{t-1} + \mu_{1t} \ldots \ldots \ldots (1)$$

**Where:**

EXR – exchange rate;

REM – remittances;

FDI – foreign direct investment;

TOP – trade openness;

BM – broad money;

GFE – Final government consumption expenditure;

GDPG – GDP growth rate;

PL – price level

$\varphi_0$ – is a constant; $\varphi_1 - \varphi_7$ $and$ $\pi_1 - \pi_7$ are coefficients; and $\mu_t$ is the error term.

**ECM-based Model Specification**

The ARDL bounds testing approach to cointegration is used to examine whether there is a long-run relationship between the variables in the model. The ARDL bounds test uses a set of critical values: the upper and the lower bound. The calculated statistic is compared to the upper and lower bounds. If the calculated statistic is above the upper bound, cointegration is confirmed at either 1%, 5%, or 10%. If the calculated F-statistic is less than the lower bound, no long-run

relationship is confirmed. However, if the F-statistic is between the lower and the upper bounds, the results are inconclusive. If cointegration is confirmed in the model, the estimation is done in two steps. The first step is the estimation of the long-run relationship and saving the residuals. The residuals are included in the estimation of the short-run equation. In the case of no cointegration, only an estimation of the short-run equation is done.

$$\Delta EXR = \varphi_0 + \sum_{i=1}^{p} \varphi_{1i}\, \Delta EXR_{t-i} + + \sum_{i=1}^{q} \varphi_{2i} \Delta\, REM_{t-i} + \sum_{i=1}^{q} \varphi_{3i} \Delta\, FDI_{t-i} + \sum_{i=1}^{q} \varphi_{4i}\, \Delta TOP_{t-i} + \sum_{i=0}^{q} \varphi_{5i}\, \Delta BM_{t-i} + \sum_{i=1}^{q} \varphi_{6i}\, \Delta GFE_{t-i} + \sum_{i=1}^{q} \varphi_{7i}\, \Delta GDPG_{t-i} + \sum_{i=1}^{q} \varphi_{8i}\, \Delta GDPC_{t-i} + \theta_1 ECM_{t-1} + \mu_{1t} \ldots\ldots (2)$$

Where all the variables are as described in Equation 1, $\varphi_1 - \varphi_7$ and $\theta_1$ are coefficients.

## Data Sources

The data for the study – namely, remittances (REM), exchange rate (EXR), foreign direct investment (FDI), trade openness (TOP), broad money (BM), final government consumption expenditure (GFE), economic growth (GDPG) and price level (GDPC) – were extracted from the World Bank Development Indicators (World Bank, 2022). Exchange rates were retrieved from the CBK (2021).

### 3.2 Empirical Results

**Table 1: Unit Root Test**

| **Panel 1: Dickey-Fuller Generalised Least Squares (DF-GLS)** | | | | |
|---|---|---|---|---|
| **Variable** | **Stationarity of all Variables in Levels** | | **Stationarity of all Variables in First Difference** | |
| | Without Trend | With Trend | Without Trend | With Trend |
| EXR | -0.4398 | -1.9567 | $-5.8439^{***}$ | $-5.8899^{***}$ |
| REM | -2.5237 | -1.5475 | $-5.7422^{***}$ | $-5.2374^{***}$ |
| FDI | $-4.1916^{***}$ | $-5.0704^{***}$ | - | - |
| GDPG | $-3.3326^{***}$ | $-3.7597^{**}$ | - | - |
| GFE | -0.7520 | -2.5972 | $-4.6788^{***}$ | $-5.2664^{***}$ |
| TOP | -1.2875 | -2.2561 | $-6.1704^{***}$ | $-6.2208^{***}$ |
| BM | -1.4462 | -2.3807 | $-7.0370^{***}$ | $-7.2662^{***}$ |
| PL | | | | |
| **Panel 2: Phillips-Perron (PP)** | | | | |
| **Variable** | **Stationarity of all Variables in Levels** | | **Stationarity of all Variables in First Difference** | |
| | Without Trend | With Trend | Without Trend | With Trend |

| | | | | |
|---|---|---|---|---|
| EXR | -0.8370 | -1.8774 | -5.7885*** | -5.7275*** |
| REM | -1.1750 | -2.1522 | -5.6110*** | -5.7712*** |
| FDI | -4.2316*** | -5.3110*** | - | - |
| GDPG | -3.5975** | -3.7362** | - | - |
| GFC | -1.7256 | -2.8067 | -5.5182*** | -5.4182*** |
| TOP | -1.7392 | -2.2942 | -6.1080*** | -6.0735*** |
| BM | -1.7977 | -2.4600 | -7.0791*** | -7.0831*** |
| PL | | | | |

Note: *, ** and *** denote stationarity at 10%, 5% and 1% significance levels respectively.

The results in Table 2 confirm that all the variables are stationary in their levels or in the first difference. Stationarity is when the mean, covariance and variance in a model remain constant over time (Gujarati & Porter, 2010). The next step is the test for cointegration. Cointegration is a test for the existence of a long-run relationship among the variables included in the model. Table 3 shows the cointegration results.

**Table 3: Cointegration Results**

| Dependent Variable | Function | | F-Statistic | | Cointegration Status | |
|---|---|---|---|---|---|---|
| EXR | F(EXD\|REM, FDI, TOP, BM, GFC, GDPG, PL) | | 8.1380$^{***}$ | | Cointegrated | |
| **Asymptotic Critical Values (unrestricted intercept and no trend)** | | | | | | |
| Critical Values | 1% | | 5% | | 10% | |
| | I (0) | I (1) | I (0) | I (1) | I (0) | I (1) |
| | 3.41 | 4.68 | 2.62 | 3.79 | 2.26 | 3.35 |

Note: *, ** and *** denote stationarity at 10%, 5% and 1% significance levels respectively.

**Coefficient Estimation**

The confirmation of cointegration in the model implies an estimation of the long-run equation and saving the residuals as the first step. The second step is the estimation of the short-run equation, including the residuals. The selection of appropriate lags for the variables in the model was done using the Schwarz Bayesian Information Criteria (SIC). The criterion was selected because it gave the most parsimonious equation. The optimal lag length selection for the model is 1, 2, 0, 1, 0, 1, 2, 0 (REM, FDI, TOP, GFC, GDPG, BM and PL respectively). The long-run and the short-run results are reported in Table 4.

**Table 4: Long-Run and Short-Run Results with the Exchange Rate as the Dependent Variable**

| Regressors | Coefficient | T-ratio |
|---|---|---|
| **Panel A - Long run Results** | | |
| C | -59.7807 | 0.7690 |
| REM | 0.9761*** | 2.9392 |
| FDI | 0.8784*** | 2.9099 |
| TOP | -0.6655 | -1.1674 |
| GFC | 0.5942 | 0.2227 |
| GDPG | -0.7364* | -1.9469 |
| BM | 0.6752*** | 3.6037 |
| PL | 0.1045 | 0.7690 |
| **Panel B – Short-Run Coefficients** | | |
| Δrem | 0.2656** | 2.2283 |
| Δrem1 | 0.1604** | 3.1062 |
| ΔFDI | 0.7790** | 2.4393 |
| ΔTOP | 0.2905** | 2.3739 |
| ΔGFC | 0.17982 | 0.2144 |
| ΔGDPG | -0.1761 | -0.5249 |
| ΔBM | 0.1263 | 0.4017 |
| ΔBM1 | 0.7165** | 2.1843 |
| ΔPL | 0.0316 | 0.6408 |

| ECM (-1) | -0.3026*** | -3.3405 |
|---|---|---|
| R-squared – 0.778<br>S.E of Regression – 3.2943<br>Akaike Info Criterion – -107.367<br>R-Bar Squared – 0.6487<br>F-Stat (10, 28) – 8.4183[0.000]<br>Schwarz Bayesian Criterion – 119.8433 | | |

Note: *, ** and *** denote stationarity at 10%, 5% and 1% significance levels respectively.

The results in Table 4, Panel A and Panel B, show the positive impact of remittances on the nominal exchange rate. This is reflected by a coefficient that is positive and significant at 1% level of significance in the long run and 5% level of significance in the short run. The findings point to the fact that remittances cause a depreciation of the exchange rate in Kenya. The findings of this study are not unique to Kenya alone. Adejumo and Ikhide (2019) in a study on Nigeria; Braihim *et al.* (2018) in a study on nine MENA countries; and Essayyad *et al.* (2018) in a study on Nepal found the same results. The same pattern is exhibited by the trend in remittances and exchange in Figure 1 and Figure 2, respectively. The possible explanation for this relationship is that remittances have an influence on the exchange rate indirectly through the channels households decide to use to remit the funds. If remittances are used for consumption purposes, they result in exchange rate depreciation because they cause exports to be less competitive and possibly cause a surge in import demand. This could be the case for Kenya. Although the financial system is advancing, it is possible that the recipients of

remittances have limited knowledge or access to the financial instruments for investment and savings. This implies that policy makers in Kenya need to complement remittances promoting policies with education on different export competitive promoting channels and vehicles that can be exploited by remittance recipients besides consumption.

Other results reported in Table 4 show that FDI has a positive impact on the exchange rate in the short run and the long run. Thus, FDI causes an increase in the nominal exchange rate – a depreciation. One possible explanation was identified by Khurshid *et al.* (2017), that if FDI is related to acquisition associated with privatisation, it would not cause an appreciation of the exchange rate. Trade openness was found to have no impact on the exchange rate in the long run, but only a positive impact in the short run. This outcome corroborates the depreciation effect of remittances on the exchange rate. The surge in consumption as a result of remittance inflows could account for the positive impact in the short run. However, in the long run, there could be a tendency of exports and imports levelling up, resulting in no impact on the exchange rate. Final government consumption expenditure as a percentage of GDP has no impact on the exchange rate in the short run and in the long run in Kenya. Economic growth was found to have a negative impact in the long run, but not in the short run. The study also found broad money to have a positive impact on the exchange rate in the long run and in the short run. According to the results in Table 4, an increase in the money supply results in an exchange rate depreciation. This is in line with economic theory, where an increase in money supply (especially not matched by production) is inflationary and less favourable for both external and internal investors (Mohr & Associates, 2015). The price level measured by the Consumer Price Index was found to be insignificant irrespective of the time considered.

The error term (ECM) for the model had the right sign, with a coefficient of 0.302. It took slightly more than three years for the Kenyan economy to return to equilibrium when there is disequilibrium. The function is the right fit for the model with an explanatory power of 77%. Diagnostic tests were done on the model, and the results are reported in Table 5.

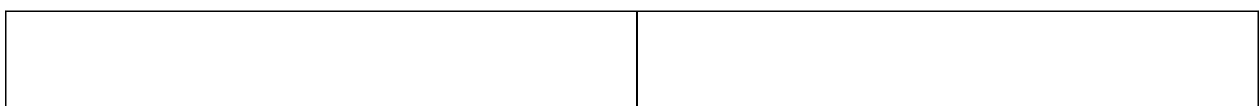
**Table 5: Diagnostic Results**

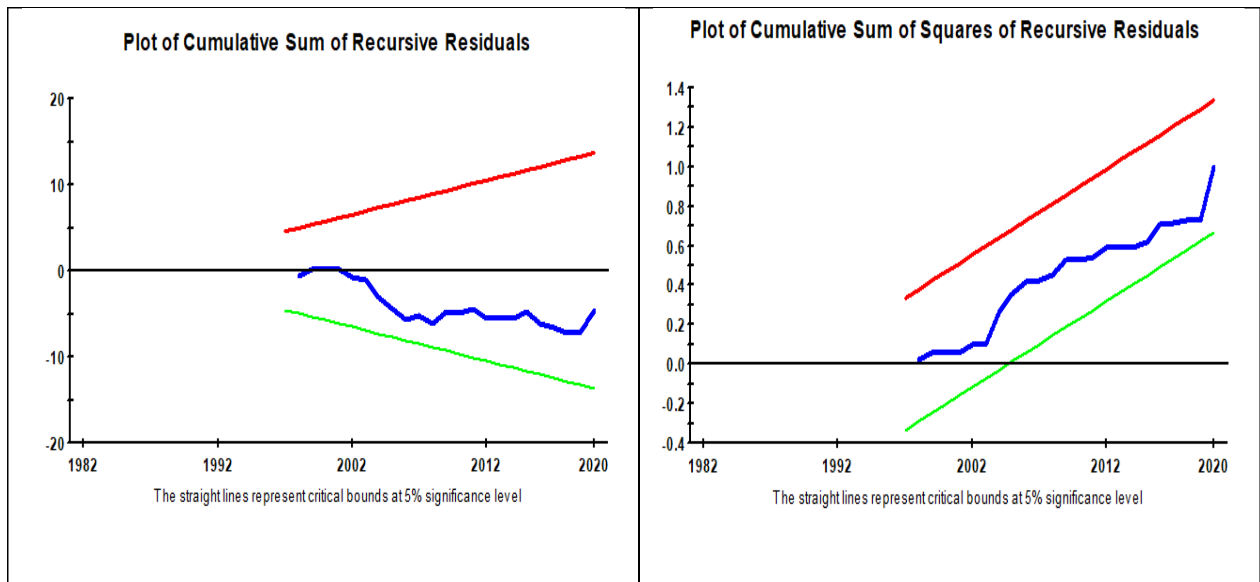
| **LM Test Statistic** | **Results** |
|---|---|
| Serial Correlation (CHSQ 1) | 2.515 [0.113] |
| Functional Form (CHSQ 1) | 1.846 [0.174] |
| Normality (CHSQ 2) | 0.657 [0.720] |
| Heteroscedasticity (CHSQ 2) | 0.514 [0.219] |

According to the results in Table 5, the model does not suffer from serial correlation,

functional form, normality, and heteroscedasticity. The cumulative sum of recursive residuals (CUSUM) and the cumulative sum of square recursive residuals (CUSUMSQ) are reported in Figure 1. The plots show that the model is stable at a 5% significant level.

**Figure 1: CUSUM and CUSUMSQ Plots**






## 5. Conclusion

This study investigated the impact of remittances on the nominal exchange rate in Kenya using annual time series data from 1980 to 2020. The variables of interest were nominal exchange rate and remittance inflows; however, control variables (FDI, trade openness, government consumption expenditure, economic growth, broad money, and price level) were also included to ensure that the model is fully specified. Using the ARDL approach, the findings of this study revealed that remittances had a positive impact on the exchange rate irrespective of the timeframe considered. Thus, remittances lead to nominal exchange rate depreciation according to the findings of this study. The study fails to support the argument that remittance inflows lead to an appreciation of the local currency as opined by some previous studies. The depreciation of the nominal exchange rate causes tradable goods and services in Kenya to be attractive, according to the finding of this study. Thus, remittances help to promote exports in Kenya. Based on the findings of the study, policy makers in Kenya need to avail more channels that remittance-receiving families can use to promote savings rather than consumption. This will ensure that the consistent increase in remittances received by the country is channelled

into productive activities that promote economic stability and growth in line with the SDGs. Promotion of remittances will also promote exports contributing positively to the balance of payments.

## Conflict of interests

The authors declare there is no conflict of interest.

## Reference List


Acosta, P. A., Baerg, N. R., & Mandelman, F. S. 2009. Financial development, remittances, and real exchange rate appreciation. *Economic Review, Federal Reserve Bank of Atlanta*, 94(1), 1–12.

Acosta, P. A., Lartey, E. K. K., & Mandelman, F. S. 2007. Remittances and the Dutch disease. Federal Reserve Bank of Atlanta, Working Paper 2007-8, April.

Adam Jr, R. H., & Page, J. 2005. Do international migration and remittance reduce poverty in developing countries? *World Development* 33(10), 1645–1669.

Adejumo, A. O., & Ikhide, S. I. 2019. The effects of remittance inflows on exchange rates in Nigeria. *Journal of Developing Areas* 53(1), 1–15.

Amuedo-Dorantes, C., & Pozo, S. 2004. Workers' remittances and the real exchange rate: A paradox of gifts. *World Development* 32(8), 1407–1417.

Barrett, K. 2013. Effects of remittances on the real exchange rate: The case of Jamaica. Working Paper, Caribbean Centre for Money and Finance, West Indies. Available from http://ccmfuwi.org/files/publications/working_papers/2013KemeishaBarrett.pdf [Accessed 20 January 2022].

Braihim, M., Nefzi, N., & Sambo, H. 2018. Do remittances impact the equilibrium real exchange rate? The case of MENA countries. *Revue d'economie du development* 26(3), 65–119.

CBK. 2021. Exchange Rates. Available from https://www.centralbank.go.ke/statistics/exchange-rates/ [Accessed 5 December 2021].

Central Bank of Kenya (CBK). 2016. Foreign Exchange Guidelines. Available from https://www.centralbank.go.ke [Accessed 19 January 2022].

Corden, W. M., & Neary, J. P. 1982. Booming sector and de-industrialisation in a small open economy. *Economic Journal* 92(368), 825–848.

Dutta, U. P., & Sengupta, P. P. 2018. Remittances and real effective exchange rate: An empirical exercise with Indian data. *South Asia Economic Journal* 19(1), 124–136.

Essayyad, M., Palamuleni, M., & Satyal, C. 2018. Remittances and real exchange rates in South Asia: A case of Nepal. *Asian Economic and Financial Review* 8(10), 1226–1238.

Gujarati, N., & Porter, D. C. 2010. *Essentials of Econometrics*. 4th Edition. New York: McGraw-Hill/Irwin.

Hassan, G. M., & Holmes, M. J. 2013. Remittances and the real effective exchange rate. *Applied Economics*, 45(35), 4959–4970.

IFAD. 2021b. RemitSCOPE Africa: Kenya Country Diagnostic. Available from https://143163-1013359-1-raikfcquaxqncofqfm.stackpathdns.com/wp-content/uploads/2021/04/IFAD_PRIME-AFRICA_KENYA-Diagnostic_04052021 [Accessed 25 January 2022].

International fund for Agricultural Development (IFAD). 2021a. Remittance flows to Kenya defy the odds during the COVID-19 pandemic. Available from https://www.ifad.org [Accessed 25 January 2022].

Izquierdo, A., & Montiel, P. J. 2006. Remittances and Equilibrium Real Exchange Rates in Six Central American Countries. Draft on 20 March 2006. Washington, DC: International Monetary Fund.

Joof, F., & Touray, S. 2021. The impact of remittance flow on real effective exchange rate: Empirical evidence from The Gambia. MPRA Number 106045. https://mpra.ub.uni_muenchen.de/106045/ [Accessed 10 January 2022].

Kapur, D. 2004. Remittance: The New Development Mantra? G24 Discussion Paper 29. New York & Geneva: United Nations Conference on Trade and Development.

Keefe, H. G. 2014. The impact of remittances on exchange rate volatility and inflation volatility in dollarized economies. Working Papers. Available from https://helenakeefedotcom.files.wordpress.com/2013/10/keefeexremit_oct20141.pdf [Accessed 12 February 2022].

Kenyan Government. 2019. Kenya Country Commercial Guide. [Online] Available from https://www.export.gov [Accessed 29 January 2022].

Khurshid, A., Kedong, Y., Calin, A. C., & Khan, K. 2017. The effects of workers' remittances on exchange rate dynamics – New evidence from Pakistan. *The Romanian Economic Journal* 63, 29–52.

Kim, J. 2019. The impact of remittances on exchange rate and money supply: Does openness matter in developing countries? *Emerging Markets Finance and Trade* 55(15), 3682–3707.

Lopez, H., Molina, L., & Bussolo, M. 2007. Remittances and the real exchange rate. World Bank Policy Research Working Paper 4213. Washington, DC. Available from http://essays.ssrc.org/remittances_anthology/wpcontent/uploads/2009/08/topic_11_Lopez_etal.pdf [Accessed 14 February 2022].

Lucas, R. E., & Stack, O. 1985. Motivations to remit: Evidence from Botswana. *Journal of Political Economy* (93), 901–918.Mohr, P., & Associates. 2015. *Economics for South African Students*. 5th Edition. Pretoria: Van Schaik Publishers.

Mongardini, J., & Rayner, B. 2009. Grants, remittances, and the equilibrium real exchange rate in sub-Saharan African countries. IMF Working Papers 09/75. Washington, DC: International Monetary Fund.

Pesaran, M. H. & Y. Shin 1999, *An autoregressive distributed lag modelling approach to cointegration analysis*, in: S. Storm (Ed.), 'Econometrics and Economic Theory in the

20th Century', The Ragnar Frisch Centennial Symposium, Cambridge University Press, Chapter 11, 1-31.

Pesaran, M. H., Shin, Y & Smith, R. 2001 Bounds testing approaches to the analysis of level relationship. *Journal of Applied Econometrics*, 16(3). 174-189.

World Bank, 2021. Migration and Development Brief 34. Available from https://www.knomad.org/sites/default/files/2021-11/Migration_Brief%2035_1.pdf. [Accessed 8 January 2022].

World Bank, 2022. World Bank Development Indicators. Available from https:/databank.wpordldbank.org. [Accessed. 20 January 2022].

World Bank. 2012. Kenya Export Performance Overview. Washington, DC: World Bank [online]. Available from https://0-openknowledge-worldbank-org [Accessed 19 January 2022].