

# **The impact of capital flows on exchange rates: Evidence from Sub-Saharan Africa**

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## ABSTRACT

With the low levels of domestic savings, capital flows can narrow the financing gap and contribute to economic growth and development. However, capital flows can also lead to negative, possibly unintended, consequences. As such, the study sought to ascertain the relationship between capital flows and the exchange rate.

The objective of this study was to analyse the impact of capital flows on exchange rates, specifically in Sub-Saharan Africa, using the system-generalised method-of-moments (GMM) estimator and panel data of 45 countries from 1990 to 2019. The study is particularly important considering the wave of reforms in the 1980s, advocated for by the International Monetary Fund (IMF), which led to a substantial increase in capital inflows in the region.

This study found that a relationship between capital flows and the exchange rate does exist and that capital flows do cause the exchange rate to appreciate when controlling for endogeneity. In addition, the findings of the study also confirmed that while both portfolio flows and foreign direct investment cause the exchange rate to appreciate, the impact of portfolio flows on the exchange rate is much more significant than that of foreign direct investment.

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## **LIST OF ACRONYMS**

SSA: Sub-Saharan Africa

FDI: Foreign Direct Investment

NPF: Net Portfolio Flows

NCF: Net Capital Flows

ODA: Official Development Assistance

IMF: International Monetary Fund

MDRI: Multilateral Debt Relief Initiative

UNCTAD: United National Conference on Trade and Development

REER: Real Effective Exchange Rate(s)

CPI: Consumer Price Index

GMM: Generalised Method of Moments

CA: Current Account(s)

GDP: Gross Domestic Product

LIDCs: Low-Income and Developing Countries

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Firstly, all praise, glory and honour be unto the Lord, God almighty.

To my family and loved ones, thank you for the love and support. My late Mom, who singlehandedly raised me and so graciously provided for me and my siblings, words are never enough to express how grateful I am for all your sacrifices and unwavering love. This one is for you, Mama, my biggest fan and constant cheerleader. I love you!

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## CHAPTER ONE

### INTRODUCTION

#### 1.1 Background

An acute challenge for policymaking is maintaining a balance between attracting and mobilising the much-needed capital to finance the development needs while maintaining macroeconomic stability and mitigating against associated risks. While capital inflow can be beneficial, especially when domestic savings are insufficient, surges and reversals can also bring about severe consequences and vulnerabilities. More specifically, capital flows seem to cause even more severe challenges for authorities and policymakers during times of heightened global uncertainty (De Beer, 2015).

In addition, the composition of development finance sources has changed over recent years in many developing countries. According to the IMF's Regional Economic Outlook (IMF, 2018), private capital flows to Sub-Saharan Africa (SSA) reached historically high levels for the period 1980-2017 and surpassed Official Development Assistance (ODA), subsequently becoming a major source of financing for development (Opperman, 2016). The recently-ended boom in global financial markets saw capital flows accounting for 10 per cent of GDP in SSA, which is two-fold the volume of ODA (Deléchat, Ramirez, Wagh & Wakeman, Linn, 2010).

A surge of capital inflows has been proven to overheat the economy through various channels; exchange rate, asset prices, excess liquidity, and credit extensions (IMF, 2018; Comber, Kinda & Plane, 2010). An issue of concern is not only the episodes of capital flow surges but also whether SSA countries have the capacity to deal with volatile pro-cyclical capital inflows, which are usually followed by reversals (Opperman, 2016).

Nyang (2017) concludes that the impact of capital flows varies depending on the type of capital flows being considered. Long-term FDI tends to be less risky and harmful than short-term debt and portfolio inflow (IMF, 2018; Guichard, 2017). The effects of capital flow on the domestic economy are also explained by the level of financial development of a particular country (Opperman, 2016; Nyang, 2017; Rashid & Husain, 2013). Guichard (2017) argues that not only

should countries be at a sufficient level of financial and institutional development, but they ought to have policies in place to foster financial stability as well as avoid resource misallocations.

Guichard (2017) suggests key macroeconomic policy levers to manage capital inflow and outflow; (i) allowing the exchange rate to appreciate (under a floating exchange rate regime), (ii) tightening fiscal policy to manage the magnitude of credit cycles during inflow surges and (iii) maintaining adequate levels of reserves which will act as a buffer during a financial crisis caused by outflows. Of course, these are contingent on the macroeconomic framework employed by a specific country.

The policy trilemma explained by the Mundell-Fleming model of choosing two of the three policy options within the macroeconomic framework, i.e. capital flow mobility, exchange rate stability and monetary autonomy, has been proven to be a valid and sustainable framework (Aizenman & Pinto, 2013; Guichard, 2017). This policy trilemma suggests that only two of the three macroeconomic policy options are possible simultaneously. Therefore, regulating capital flows is a trade-off for a flexible exchange rate regime and an independent monetary policy.

The model is not accidentally termed the “impossible trinity” or the “trilemma”, as many policymakers continue to be challenged by balancing the policy objectives of increasing output by mobilising the necessary capital to finance development while maintaining financial stability and managing macroeconomic risks. According to Alberola, Erce & Serena (2012), sustaining this balance is even more challenging during financial crises, when so-called “sudden stops typically follow high levels of capital inflows”.

Managing macroeconomic risks that emanate from capital flow volatility, particularly in countries where domestic financial markets are not deep and developed, tends to be challenging. Well-developed financial markets are important not only to supplement domestic savings and fund investment for sustainable development, but they could also provide stability in the financial system (Grigorian, 2019). Unfortunately, this may not be the case for most developing and SSA countries.

Historically, SSA countries were not attractive destinations for external private investment except for Foreign Direct Investment (FDI); however, this changed drastically with excess global liquidity caused by unconventional monetary policies in advanced economies as well as improved policies and the implementation of the Multilateral Debt Relief Initiative (MDRI) in some LIDCs (Deléchat et al., 2010; Nyang 2017). López Mejía (1999) deduces that the improved creditworthiness in developing countries was a function of structural reforms.

In addition, to encourage capital flows, a wave of reforms in the 1980s, led by the IMF, saw many African countries opening up exchange rate markets, liberalising capital accounts and relaxing import and export restrictions (Kodongo & Ojah, 2012; Adeola, 2017). Therefore, capital flows increased in many developing countries following these market-orientated reforms (Adhiambo, 2012; Agénor, 2001).

According to Opperman (2016), net private capital flows to developing countries increased rapidly in the 1990s. The annual average of inflow observed around the mid-90s was five times larger than during the 1980s (Khan & Khan, 1999). Whether these countries were ready to deal with the impact of high volumes of capital flows due to financial openness is arguable. Sharp capital flow reversals during financial crises leave these small open economies exposed to macroeconomic and financial distress and perhaps worse off than before the capital inflows surges.

## **1.2 Research problem**

Due to the insufficient levels of domestic savings, many developing countries are heavily reliant on external private capital flows to close the financing gap. The need for external financing is even more significant for SSA, given its developmental needs and limited resources (UNCTAD, 2000). Unfortunately, foreign capital inflows do not come as pure blessings. A surge in external capital flows to developing countries have acerbated the so-called “transfer problem”, which essentially refers to the impact of capital inflows or outflows on the domestic economy, observed through the real effective exchange rate channel (Combes, Kinda & Plane, 2011).

In order to attract this much-needed capital flows into the region, many SSA countries liberalised financial systems in the 1980s (Adeola, 2017). The SSA region thereafter experienced an influx of capital flows, which many countries did not have the capacity to deal with and subsequent reversals (Opperman, 2016).

While flows from capital-rich countries to capital-poor can complement domestic savings and yield high returns to capital, they can also be detrimental by causing negative spillovers into the macroeconomy. Khan & Khan (1999) suggest that foreign financing can positively affect the domestic economy for some countries, but for others, it can lead to adverse macroeconomic effects. In line with this, Calderón, Loayza & Schmidt-Hebbel (2005) acknowledge that while there may be some benefits to financial openness and increased capital inflows, it could lead to heightened external exposure, especially for small countries as a result of their production specialisation, non-diversified sources of income, unstable policies, incomplete financial market, and weak institutions.

Opperman (2016) concurs with the above findings that financial openness and increased capital mobility increases output volatility. Choi, Sharma & Strömquist (2009) found that financial integration, as a result of increased openness, creates a dependence on foreign capital, which then requires policies that can foster prudent sovereign liquidity management considering the volatile nature of capital flows.

In addition to the impact of volatile capital flows on output, large capital inflows can also cause macroeconomic overheating, i.e. rapid expansion of aggregate demand, which will be reflected in inflationary pressures, real exchange rate appreciation, and widening current account deficits (Ralhan, 2006; Yan, 2007). Calvo, Leiderman & Reinhart (1993) explored the impact of capital inflows on the macroeconomic environment stating that large capital inflows tend to cause inflation pressures in addition to the real effective exchange rate appreciation. The secondary effects on inflation will also be contingent on the exchange rate regime employed by that particular country and reserves accumulation (Khan & Khan, 1999).

The same holds for the widening of the current account deficit; if the real exchange rate appreciates, the traded goods sector will be negatively affected. Another channel through which capital inflows can affect the current account balance is through consumption and monetary expansion, which drives demand. Yan (2007) states that inflowing capital can cause domestic investment to increase rapidly in an unsound financial system, followed by consumption and a deterioration of the current account due to the increase in demand for foreign goods, especially where there are supply-side and capacity constraints.

Therefore, the question that this research seeks to answer is how capital inflows have impacted exchange rates as a key macroeconomic variable. The study will endeavour to examine the extent to which capital flows have impacted exchange rates, particularly in SSA countries. This issue is particularly pertinent for SSA, considering the level of capital inflows that have increased substantially over the recent years and more notably after the 2008 Global Financial Crisis (Nyang, 2017). Poor governance and lack of modern financial institutions also render some of these countries vulnerable to volatility in the global financial markets (Edwards, 1998).

Notably, the composition and the type of capital flow that SSA countries have received matters. Nyang (2017) cites that the composition of capital flows has also shifted away from debt instruments to equity instruments, both direct and portfolio investments, with a substantial increase in portfolio flows. The latter being most volatile. The volatility of capital flows portfolio flows being the most volatile has rendered SSA countries susceptible to macroeconomic instabilities through the exchange rate channel.

### **1.3 Research Objective and hypothesis**

The main objective of this study is to;

- examine the effect of capital flows on exchange rates in Sub-Saharan African countries.

#### **Hypothesis testing – Capital flows effect on the real effective exchange rate**

Combes et al. (2011) found that for the observed 42 developing countries, capital inflows led to an appreciation in the real effective exchange rate. The study, therefore, aims to establish whether;

*H<sub>0</sub>: Capital flows have no a significant impact on the real effective exchange rate*

*H<sub>1</sub>: Capital flows have a significant impact on the real effective exchange rate*

#### **1.4 Justification and contribution of the study**

The surge and reversals of capital flows to developing countries, particularly during crisis periods, and the subsequent impact on the exchange rate has sparked interest and brought the so-called “transfer problem” to the fore. Large capital inflows, which has been the case for the SSA region, also tend to trigger macroeconomic challenges such as macroeconomic overheating (i.e. excessive expansion of aggregate demand), which is likely to reflect in inflationary pressures, as well as the widening of current account deficits (López Mejía, 1999; Yan, 2007).

Some studies attempt to explain the relationship between capital inflows and other macroeconomic variables, such as economic growth in Sub-Saharan Africa (Nyang, 2017), but not so much the impact of capital flows on the real exchange rates. Another recent related research points to the extent to which capital flows affects output volatility in different regions, including Africa (Sahoo et al., 2019). Mirdala, Semančíková and Svrčeková, (2015) investigates the effects of international financial integration and the volatility of capital flows on macroeconomic volatility in developed and developing countries. Combes et al. (2010) conducted a similar study; however, the observation was broadly for 42 developing countries and not a specific region. To the best of my knowledge, no study of this nature has been conducted specifically for Sub-Saharan African countries.

#### **1.5 Limitations of study**

The study might not account for country-specific, political and structural dynamics that could exacerbate macroeconomic vulnerabilities that lead to real effective exchange rate movement. In addition, the study did not differentiate between exchange rate regimes, flexible or fixed.

## **1.6 Organisation of study**

This study is organised into five chapters. The first chapter provides the background of the topic, i.e. the recent increase in capital flows into the region due to external and internal factors and the potential impact of capital inflows on the exchange rate as a key macroeconomic variable. The objective of the study and the justification thereof are further outlined in the same chapter. Chapter two will reflect on existing literature and empirical analysis related to key concepts and definitions of the same. The chapter will also elaborate on similar research conducted on capital flows and exchange rates in developing countries and, in some instances, emerging economies. The third chapter outlines the analytical framework and methodology to explore the impact of capital flows on exchange rates. The fourth chapter encapsulates the results derived from the empirical analysis. Finally, chapter five will document a summary of key findings and provide conclusions of the study.

## CHAPTER TWO

### LITERATURE REVIEW

#### 2.1 Introduction

This review will introduce and define the main concepts of this study; capital flows and exchange rate. The next section will show a trend of Capital Flows in Sub-Saharan Africa, followed by the theoretical framework, which outlines relevant exchange rate and capital flows theories.

#### 2.2 Definition of Main Concepts: Capital Flows and Exchange Rates

##### 2.2.1 Capital Flows

Capital flows are known as cross-border financial flows from one country to the other that can, particularly in instances where domestic savings are not sufficient, provide resources to finance development and boost economic growth (IMF, 2018; Combes et al., 2011). Given the downward trend of ODA to the region, private cross-border capital flows provide the much-needed resources to finance development and boost economic growth (IMF, 2018). While the economic benefits of capital flows are inarguable, the adverse ramifications that accompany these flows are a cause for concern. These include rapid monetary expansion, inflationary pressures, real exchange rate appreciation and widening current account deficits (Calvo, Leiderman and Reinhart, 1996). The effect of capital flows on the rest of the economy varies and depends significantly on the development of the financial sector and the type of capital flows (Rodrik and Velasco, 1999).

Capitals flows by nature can be very volatile. López-Mejía (1999) highlights the main sources of volatility as interest rates, stock market and contagion effects. The latter can occur through five channels; (i) trade arrangement and exchange rate pressures, (ii) effects of a collapse of one currency on investor perception about other countries, (iii) herding behaviour of institutional investors, (iv) financial links between countries and finally (v) liquidity management practices of open-end mutual funds (López-Mejía, 1999).

Rashid and Husani (2013) explore the effect of capital flows on domestic price level, monetary expansion and the exchange rate volatility for Pakistan and find that the impact of capital flows on inflation and exchange rate is significant and thus requires management to avoid pressures and volatility. One of the suggested approaches to manage capital flows, assuming that the significant impact comes from portfolio flows and not so much from foreign direct investment, is to carefully liberalise the capital account and restrict portfolio flows in the short run while domestic financial markets are not fully developed (Aghion, Bacchetta and Banerjee, 1999).

### **2.2.2 Real Effective Exchange Rates**

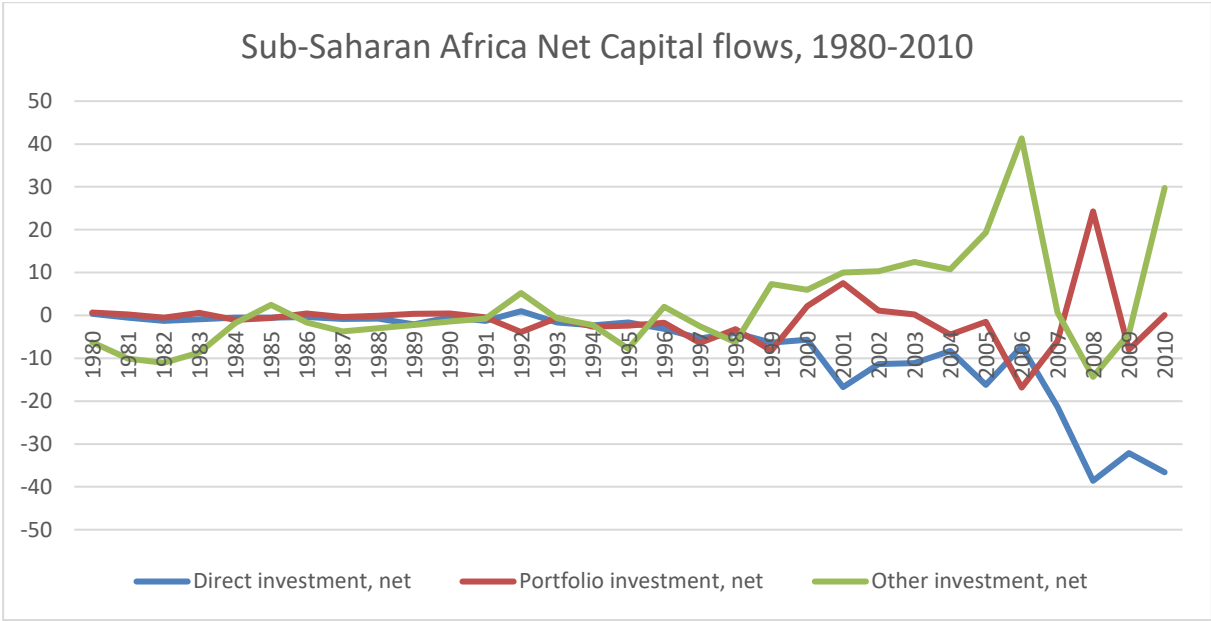
Broadly, the exchange rate can be defined as the value of one currency in relation to another or the rate which a domestic currency can be exchanged for a unit of a foreign currency (Abel, Bernanke & Croushore 2008:477-485), commonly quoted in nominal or real terms (Ellyne & Mbewe, 2015). The real exchange rate refers to the nominal rate adjusted by inflation, i.e. the price level in the foreign country relative to the domestic price level (Ellyne and Mbewe, 2015).

Real exchange rate responds to several variables, one of the crucial variables being capital flows (Jongwanich and Kohpaiboon, 2012). Calvo et al. (1994;1996) further states that the channels through which capital flows can affect real exchange rates are either through movements in the nominal exchange rate or fluctuations in the non-tradable prices.

### **2.3 Overview of Capital Flows in Sub-Saharan Africa**

The landscape of cross-border capital flows has changed significantly in the SSA region and increased notably following the Global Financial Crisis (IMF, 2018). Total capital inflows into SSA increased above \$120 billion in 2012 from only \$20 billion in 1990 (Nyang, 2017). Non-official Net Capital Flows (NCF) increased from \$4 billion during the 1980s and 1990s to \$25 billion in 2007 and \$60 billion in 2017. The region has thus become increasingly integrated globally following the 1980s reforms when many developing countries relaxed financial account restrictions (IMF, 2018).

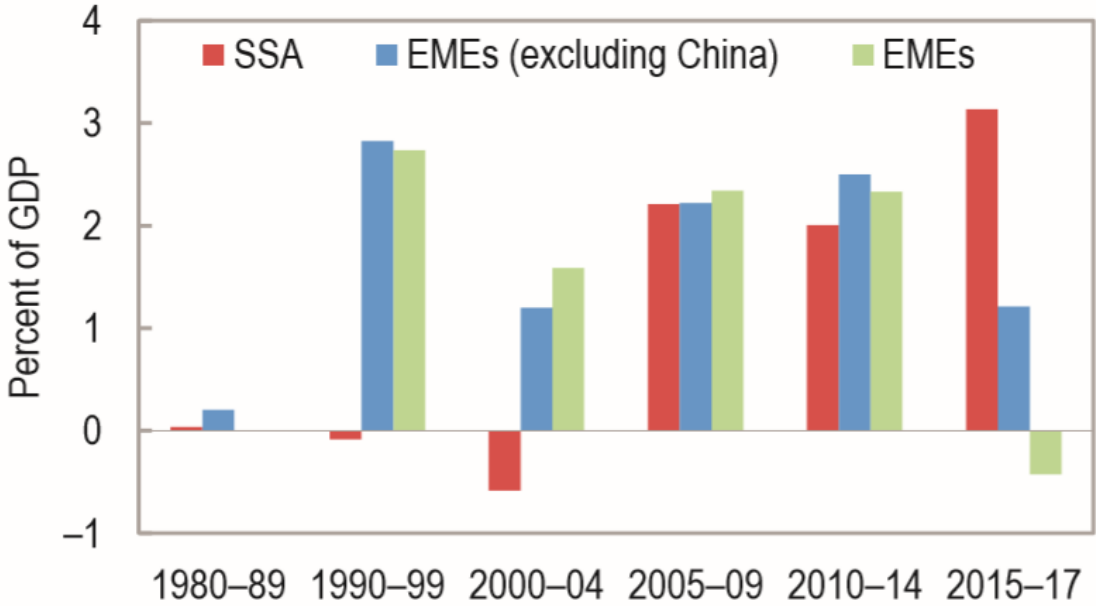
**Figure 1: Sub-Saharan Africa Net Capital flows**



Source: IMF, World Economic Outlook

An interesting trend depicted by graph 1 shows a gradual and then sharp decline of FDI flows coinciding with the Global Financial Crisis and a spike in portfolio investments during the same period.

**Figure 2: Sub-Saharan Africa and Emerging Markets, Net Financial Flows: 1980-2017**



Source: IMF World Economic Outlook database; and IMF staff calculations.

Figure 2 shows the significant change in the entire financial landscape. In the 90s, EMEs were major recipients of capital flows. The early 2000s saw a gradual decline and subsequent moderate recovery in the latter part of the decade. Net Financial Flows into SSA increased substantially in the mid-2000s, from negative levels in the earlier 2000s.

Ahmed & Zlate (2014) attributes this change to a range of factors, including interest rate differentials pre and post-crisis periods which inevitably accounts for the sensitivity of capital flows to interest rates following unconventional monetary policies by advanced economies. In more recent times and particularly during periods leading up to the Global Financial Crisis, also known as the “boom” in global financial markets, private capital inflows into SSA increased significantly. Between 2001 and 2007, private capital flows to SSA increased by 32 percent on average, reaching a high of 44 percent after 2005 (Deléchat et al., 2010).

The improved macroeconomic conditions are factors contributing to the influx of capital flows into most LIDCs, over and above reforms related to financial liberalisation. This significant increase in capital flows has resulted in improved international reserves of SSA countries, but for some countries, they have also been a source of potential vulnerability to the macroeconomy (Deléchat et al., 2010).

Furthermore, the composition of capital flows also changed gradually. FDI and Net Portfolio Investment (NPI) have been on the rise in SSA (Adeola, 2017), the latter being much more volatile than other forms of capital flows. Adeola (2017) cites that portfolio equity net inflows peaked at US \$ 16.79 billion in 2006 but decreased to the negative US \$5.625 billion in 2008. This coincides with the Global Financial Crisis (GFC) and supports the narrative by Macias, Massa & Salois (2010) that the GFC impacted SSA not so much through the primary effects but much more on the secondary effects such as drying up of global liquidity. Against this backdrop, the benefits of capital flows and financial integration were reassessed as the adverse effects of the GFC, associated with sharp capital reversals, were exacerbated through financial

integration and volatile capital flows (Adeola, 2017; Reinhart & Rogoff, 2010; Marcias et al., 2010; Milesi-Ferretti & Tille, 2011)

Much of the research conducted in the area focused on the impact or the relationship between capital flows and economic growth in SSA (Nyang, 2007; Marcias et al., 2010; Egbetude and Akinlo, 2019) but not so much on the extent to which capital flows affected other macroeconomic variables such as exchange rate. Over and above the surge in capital flows as a function of financial liberalisation, the shift in composition, and the substantial increase in portfolio flows in SSA, which tends to be more volatile than FDI, is also concerning (IMF, 2018).

## **2.4. Theoretical Framework**

### **2.4.1. Capital Flows And Exchange Rates**

Researchers have given the linkages between capital flows and the exchange rate much attention in an attempt to establish through which channel(s) capital flows causes real exchange rate movement, and more often than not, excessive volatility to the broader macroeconomy.

One of the established channels through which capital flows causes exchange rate movement is the productivity shock channel. An argument is that an expected productivity shock attracts investment in equities and the likelihood that the exchange rate would appreciate in response to that (Millard, 2005). In line with the latter, capital inflows usually followed by lending booms can cause macroeconomic overheating by accelerating economic growth and causing inflationary pressures (Combes, Kinda and Plane, 2011; Rashid and Husain, 2013). Rashid and Husain (2013) find that capital inflows are also responsible for real effective exchange rate volatility, regardless of the volume of inflow.

More specifically, Plane et al. (2010) analysed the impact of capital inflows (disaggregated) and the exchange rate regime on the real effective exchange rates of a wide range of developing countries and found that public and private inflows cause the real effective exchange rate to appreciate.

The secondary effects of an exchange rate appreciation or depreciation are also of interest for macroeconomic policy-makers given its alleged association with increasing vulnerability which could potentially lead to a financial crisis (Combes et al., 2011). Referred to as the “transfer problem”, capital inflows are often associated with appreciation in the real exchange rate, subsequent inflationary pressures and a deterioration in the current account (Calvo et al., 1994).

#### **2.4.1.1. Macroeconomic implications of Capital Flows**

While capital inflows have brought about positive macroeconomic buttressing, they can potentially cause macroeconomic vulnerabilities and excessive movements of exchange rates. On the basis that many developing countries liberalised financial markets to attract foreign investment, there was a firm belief that cross-border capital flows would somehow yield positive benefits for the economy (Bailliu, 2000). However, many have challenged this theory, given the volatile nature of certain foreign private capital.

Undeniably, there are arguments against traditional wisdom. Kose, Prasad & Terrones (2003) notes that the welfare implications of capital flow volatility in developing countries have been highlighted by episodes of extreme volatility such as crises, particularly in the 1980s and 1990s. Egbetunde & Akinlo (2019) state that many developing countries that are financially integrated that do not have the conducive structural and macroeconomic conditions tend to be more vulnerable.

#### **2.4.3 Surges And Sudden Stops Of Capital Flows**

Sudden reversals of these flows can directly affect macroeconomic stability in financially open economies by inducing or exacerbating boom-bust cycles in countries with no deep financial markets (Egbetunde & Akinlo, 2019). In addition, the reversals of capital flows have also been attributed to several financial crises in emerging markets, notably the Mexican crisis 1994-5, the Asian crisis of 1997, and the Russian crisis in 1998, amongst others (López-Mejía, 1999).

Referring to theoretical presumptions, Egbetunde & Akinlo (2019) suggests that financial sector development can reduce the vulnerability to crises which is not often the case for SSA.

Development and deepening of financial markets, particularly local currency bond markets, could be one option of mitigating against macroeconomic risks as it eliminates currency mismatches, leads to better absorption of exogenous shocks, facilitates management of current account liberalisation and strengthens economic growth (Braasch, 2011).

While there can be great benefits from accessing foreign savings in the form of capital flows, the effects of sudden disruptions can be very detrimental. There are channels through which this can happen; exchange rate misalignments, credit booms (Alberola et al., 2012) and, by extension, the overall increase in prices (Combes et al., 2010). Furthermore, the IMF (2018) also highlights that particular portfolio flows, which have increased substantially in SSA, are more likely to move exchange rate and real output above trend, fuelling credit growth and causing vulnerabilities that are likely to increase the risk of a financial crisis.

#### **2.4.4 Macroeconomic Pass-through Implications Of Capital Flows On The Exchange Rate**

Exchange rate regimes are important to consider, given the difference in how foreign capital affects REER depending on the regime adopted by that particular country. For instance, a country with a fixed exchange rate regime will most likely experience a potential increase in inflation due to capital inflows following an increase in money supply (Combes et al., 2011). Additionally, where the regime is a floating exchange rate, capital inflows can potentially lead to an appreciation of the nominal exchange rate (Plane et al., 2010).

Combes et al. (2010) adds to the extensive literature on the impact of capital inflows on the real effective exchange rate (REER) – known as the “transfer problem” and finds that private and public capital inflows contribute to the appreciation of the REER. Combes et al. (2010) further state that the impact of capital inflows on the exchange rate is highly contingent on the exchange rate regime.

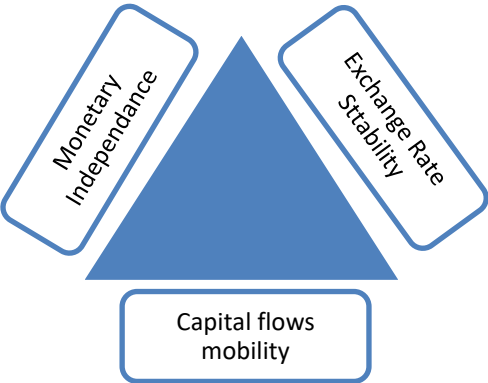
**2.4.5 Capital Flows And Exchange Rate Regimes**

According to Combes et al. (2011), the interaction between capital flows and exchange rate depends on the exchange rate regime. In the context of the Mundell- Fleming model, the exchange rate regime that a country chooses to adopt depends on the other two policy options; capital flow mobility and monetary independence. This is also referred to by Rangarajan and Prasad (2007) as the macroeconomic dilemma which occurs when there is tension among monetary policy autonomy, the openness of the capital account, and the exchange rate stability.

A country that maintains monetary autonomy and a fixed exchange rate (or exchange rate stability) will forego capital flow mobility. However, a country that allows increased capital mobility and a fixed exchange rate will not be able to set its policy rate in ways that influence domestic policy goals (Aizeman, 2018).

When considering the Mundell-Fleming impossible trinity model; which Stanley (2018) explains as the impossibility of simultaneously achieving the triple contradictory, but desirable goals of sustaining an independent monetary policy and fixed exchange rate while liberalising capital flows; one can deduce that many developing countries, including SSA, had to forego one of the other two macroeconomic objectives in pursuit of increased capital flows in order to stimulate output capacity and increase development.

**Figure 3: The Impossible Trinity**



Thus, there are theoretical and practical implications of increased capital mobility (Mundell, 1963). The direct implication for a small open economy in pursuit of increased capital flows would be to compromise either domestic monetary policy goals (monetary independence) or a stable (fixed) exchange rate.

#### **2.4.5.1 Impact of capital flows: Fixed and floating exchange rate regimes**

Furthermore, the impact of capital flows on real exchange rates depend on the exchange rate regime; in the case of a flexible exchange rate regime, the impact is seen through an appreciation of nominal exchange rate, whereas a country with the fixed exchange rate could experience high inflation rates as a result of the increase in money supply as well as the demand and price of non-tradables.

A fixed exchange rate is beneficial not only for inflation anchoring purposes and keeping inflationary pressures under control but also provides some stability to trade and relief for foreign borrowing, which would otherwise be exposed to currency mismatch (Stanley, 2018). In the context of a fixed exchange rate regime, the intervention of monetary policy authorities will lead to an increase in money supply, lower domestic interest rates, and higher domestic asset prices (López-Mejía, 1999). Stanley (2018) argues that under such a regime, traditional monetary policy tools become futile to affect money supply or output, but other monetary policy tools such as sterilisation can be effective to manage the exchange rate appreciation and insulate money supply from the effects of capital inflows (Calvo, Leiderman & Reinhart, 1996).

In an earlier study, Calvo, Leiderman & Reinhart (1993) distinguish clearly between the effectiveness of sterilisation and non-sterilisation on either fixed or exchange rates, which is an important consideration when assessing the relationship between capital inflows and the exchange rates.

Under a floating exchange rate regime, a positive shock to the capital account will create or widen the current account deficit through the exchange rate appreciation channel. Thus,

monetary effects resulting from capital inflows are highly contingent on the exchange rate regime (López-Mejía, 1999).

#### **2.4.6 Consequences Of Capital Flows**

As stated before, capital flows are associated with macroeconomic overheating, inflationary pressures and real exchange rate appreciation, whether through the nominal exchange rate channel or the inflation channel. Of the 20 observed countries, Lopez-Mejia (1999) found that the real exchange rate appreciated due to capital flows. Of course, the effects of capital flows largely depend on the exchange rate regime.

In another study, Combes et al. (2010) found that private and public capital inflows stimulate the appreciation of the real effective exchange rate and that this effect is well observed when capital flows are disaggregated to show effect by type of flow. The study further establishes that portfolio flows have the highest impact while FDI and bank loans have the least impact.

In line with previous studies, Aghion et al. (1999) find that FDI does not destabilize the macroeconomy as much as portfolio flows, even at a low level of financial development. According to their study, FDI is less likely to affect price fluctuations significantly, albeit possibly through profit distribution.

#### **2.4.7 Benefits Of Capital Flows**

Theoretically, economists agree that the benefits of increased capital inflows can be substantial. It can allow risk-sharing, consumption smoothing, and efficient capital allocation (Schularick, 2006; Kose et al., 2003; Agènor, 2001). However, some regions, including Africa, have not benefited as much as Asia and Latin America from large capital inflows (Khan & Khan, 1999).

### **2.5 Empirical Evidence**

Due to increasing movements of capital flows and deliberate efforts by developing countries to attract foreign capital to finance investment, significant attention has been given to the

relationship between capital flows and exchange rates. These studies are particularly important considering that the exchange rate has become a significant channel through which capital flows can affect macroeconomic stability (Karahan & Çolak, 2019). Existing empirical evidence shows that there is a statistically significant relationship between capital flows and exchange rates.

A study by Siourounis (2004) investigates the same relationship for five countries. Of the five countries, three showed that a positive shock to net purchases of US equities has a significant effect on exchange rates, while bond purchases had an immaterial impact on exchange rate movements. Gautam, Chadha & Malik (2020) also find a statistically significant relationship between real effective exchange rate and foreign portfolio investment and not so much for foreign direct investment.

The type, and more often than not, the magnitude of capital flows, has been a point of interest and consideration in many studies. Similarly, Bukovšak, Čardić & Ranilović (2017) finds that while an increase in total capital inflows leads to an appreciation of the domestic currency in Croatia, this is largely attributable to debt capital inflows. The study concluded that the sensitivity of the domestic currency varied amongst the different types of capital inflows into Croatia.

Combes et al. (2011) found that for the 42 observed developing countries, public and private capital flows are associated with real exchange rate appreciation. More specifically, the study further establishes that portfolio flows have the highest appreciation effect. Combes et al. (2011) also argue that the impact of capital flows on the real exchange rate is also largely contingent on how they are used.

Another study by Dua & Sen (2013) examined both the magnitude and variability of capital flow trends in South Asia as well as the impact of capital flows specifically on the Indian exchange rate following a policy direction of liberalisation and diversification from traditional sources of development finance in the form of multilateral and concessional finance. The study found that the increasing integration with the rest of the world and the subsequent increase in

capital inflows have led to the appreciation in the real exchange rate due to a higher demand for Indian rupees (Dua & Sen, 2013).

The above is consistent with the findings of Saradhi & Goel (2018), which confirms that net capital flows causes appreciation of the Real Exchange Rate in India while acknowledging that there are other contributing factors and that the anchor for real exchange rate is found in the real productive sector of an economy.

Edwards (1998) studied the two-way relationship between capital flows and exchange rate, i.e. whether capital inflows cause real exchange rate appreciation and visa-versa. The study found that for 6 of the 7 countries observed, capital inflows cause real exchange rate appreciation, and the inverse relationship results were mixed.

Besides this causal relationship between capital inflows and exchange rate appreciation, there are also arguments that capital inflows also cause exchange rate volatility. Rashid & Husain (2013) find that persistent capital inflows cause exchange rate volatility regardless of whether these flows are smooth or during a “bonanza” period when capital flows are unconventionally high.

The impact of capital flows on the real exchange rate has other implications on the domestic economy and affects other macroeconomic variables in some way or the other through the exchange rate channel, often referred to as the “transfer problem”. In addition to these concerns, capital reversals also pose some threat to the health of the economy, especially if these reversals are sudden.

Monetary policy tools such as sterilisation tend to become an option to curb the impact of capital flow surges and sudden reversals on exchange rates. While acknowledging that there could be challenges with this intervention, if done effectively, Calvo et al. (1993) claim that sterilisation can alleviate macroeconomic challenges associated with the effects of capital flows on the domestic economy. Aghion et al. (1999) also suggest that to avoid a possible financial

crisis, sterilisation of capital flows while maintaining a fixed exchange rate could be an option to manage the impact of capital flows on the macroeconomy and keep the prices of non-tradables low.

## CHAPTER THREE

### METHODOLOGY

#### 3.1 Introduction

The chapter empirically investigates how capital flows can impact the exchange rate. More specifically, the chapter outlines the methodological approach of this study, i.e. research approach and design, population and sample, and data source and period. Furthermore, the chapter will explain the empirical model and the variables that are included.

#### 3.2 Research Design

##### 3.2.1 Population, Sample, Data Sources And Period

The research approach that this study employed is quantitative, using secondary data. The sample size consists of 45 Sub-Saharan African countries listed in Annexure A. Furthermore, the study used panel data from 1990-2019 to capture the period before financial integration and episodes of the financial crisis, including the 2008 Global Financial Crisis.

##### 3.2.2 Empirical Model

The estimation equation was derived from the work of Arellano & Bover (1995), which builds on the initially developed estimator by Arellano and Bond (1991).

$$Y_{it} = \alpha_{i,t-1} + \beta X_{it} + \varepsilon_{(i,t)}$$
$$\varepsilon_{i,t} = \mu_i + \vartheta_{it}$$

*Equation 1*

$Y_{it}$  is the dependant variable of  $i$  (individual) in  $t$  (period of time)

$X_{it}$  is the independent variable of  $i$  (individual) in  $t$  (period of time)

The error term denoted above consists of two orthogonal components; fixed effects ( $\mu_i$ ) and idiosyncratic shocks  $\vartheta_{it}$ . In examining the relationship between capital flows and real exchange in Sub-Saharan Africa, this research adopts the model of Combes et al. (2010).

Similarly, the selection of independent variables is based on the study and macroeconomic considerations and theories of determines the exchange rate.

$$REER_{i,t} = \beta_0 + \beta_1 FDI_{i,t} + \beta_2 NPF_{i,t} + \beta_3 INF_{i,t} + \beta_4 CA_{i,t} + \beta_5 DBT_{i,t} + \beta_6 GDP_{i,t} + \varepsilon_{(i,t)}$$

Equation 2

**REER** denotes *the* real effective exchange rate and refers to the value of a country's currency in relation to other currencies. REER is the inflation-adjusted nominal exchange rate, which is of particular interest for this study, given the pass-through impact of capital flows on inflation. Capital flows are disaggregated into FDI and portfolio investments (PI) to clearly establish the impact of each on the REER. **INF**, **CA**, **DBT** and **GDP**, denotes inflation, current account, net government debt and economic growth, respectively.

### 3.2.3 Definition And Measurement Of Key Variables

**Real Effective Exchange Rate (REER)** is defined by the IMF as the measure of the value of a currency against a weighted average of several foreign currencies (in this study, the US dollar will be the base currency). The empirical analysis is based on bilateral exchange rates of local currencies against the US dollar. An increase in the local currency against the dollar reflects a depreciation in the value of that currency, and a decrease in the local currency against the dollar reflects an appreciation in the value of that particular currency.

In the regression equation, REER is the dependant variable, measured against other independent variables, i.e., net portfolio flows, foreign direct investment, inflation, current account balance, net government debt and GDP.

**Capital flows** are defined as the flow or movement of money across the border, typically for the purpose of trade as well as investing in equities, bonds and cooperates. Capital flows are disaggregated in the model as Net Portfolio Flows (**NPF**) and (**FDI**). A study by Ng'ambi (2005) defines the types of capital flows as follows; Portfolio investments comprises of the sale and purchases of bonds (short-term) and equity securities; FDI refers to an investment into a business that accounts for 10% (or more) ownership and voting rights; and another investment

refers to currency, foreign loans, bank deposits between companies and governments. Combes et al. (2011), in their study, show that aggregated capital inflows are associated with real exchange rate appreciation. Moreover, there is a consensus on the impact of capital flows on the domestic economy observed mainly through the real exchange rate known as the “transfer problem” (Calvo et al., 1994; Combes et al., 2011)

**Inflation (*INF*)** is the percentage change of the average increase of the consumer price index or simply referred to as the increase in the price level. Capital inflows have been proven to cause inflationary pressures through the consumption channel (Yan, 2007; Rashid & Husian, 2013) and subsequently cause a movement in the real effective exchange rate as a deflator of the nominal exchange rate.

**Current account (*CA*)** is the difference between imports and exports and is often financed by the capital account of a country. Deterioration of the current account balance can be a direct function of high levels of capital inflows and demand for the domestic currency accompanied by an unsound financial system commonly seen in developing and emerging market economies (Yan, 2007).

Furthermore, a current account which is also understood to be the balance of trade influences the exchange rate through the supply and demand for foreign exchange. Henceforth, a current account surplus is consistent with exchange rate appreciation (Engel & Flood, 1985; Dornbusch & Fisher, 1980), given the increase in demand for the local currency to finance exports. However, without the necessary intervention in the foreign exchange market, excess demand for the domestic currency can lead to an appreciation of the domestic currency relative to foreign currencies, thus making exports more expensive and less competitive (Dua & Sen, 2013).

**Net government debt (*DBT*)**, or net public debt, is an important driver of the exchange rate. According to Nwanne & Eze (2015), external debt receipts of the public sector increase capital inflows, which is generally associated with the appreciation of the value and exchange rate of the borrowing country in the short run.

**Gross Domestic Product (*GDP*)** is defined by the IMF as the measure of the monetary value of final goods and services that are bought by the final user and produced in a country in a given

period (IMF WEO, 2021). GDP is one of the key macroeconomic variables that cause variations in the exchange rate (Medura 2006; Fatima, 2019; Rangasamy and Abar, 2015). Furthermore, productivity in the tradable sector has a more direct and significant impact on the exchange rate (Combes et al., 2011).

**Table 3.1: Description of variables**

Variable	Symbol	Measurement	Expected sign
<b>Dependent Variable</b>			
<b>Real Effective Exchange Rate</b>	REER	The weighted average of domestic currency	
<b>Independent Variable</b>			
<b>Net Portfolio Flows</b>	NPF	Net portfolio flows	+
<b>Foreign Direct Investment</b>	FDI	Foreign Direct Investment	+
<b>Control Variables</b>			
<b>Inflation</b>	INF	Percentage change in CPI	+
<b>Current Account</b>	CA	As a Percentage of GDP	-
<b>Gross Domestic Product</b>	GDP	Percentage change in GDP	-
<b>Net Government Debt</b>	DBT	As a Percentage of GDP	+

### 3.2.5 Estimation Approach

A panel analysis was conducted in order to establish the relationship between capital flows and the exchange rate. The model used in the study was a fixed effects panel regression model to analyse the effects of capital flows on the exchange rate. The Hausman specification test was done to detect endogeneity of the data and distinguish and make a selection between Random Effect and Fixed Effect. Fixed and random-effects models are generally adopted to establish the impact of variables that vary over time, whether constantly or randomly. Unlike the OLS model, fixed and random effect models account for the unique features of individuals. To estimate the impact of Capital Flows on exchange rates in Sub-Saharan African countries with panel data of 45 countries ranging from 1990 to 2019, the GMM estimator was used. In particular, the system-GMM was adopted in order to control for endogeneity problems amongst variables.

While both the first-differenced and system-GMM estimators are appropriate for a large number of variables or parameters and fewer periods, independent variables that are not entirely

exogenous, fixed effects with heteroskedasticity and autocorrelation within individuals (Roodman, 2009; Blundell & Bond, 1998), the system-GMM has been preferred by studies that test the relationship between variables and in order to deal particularly with the challenge of identification and potential endogeneity amongst variables which could lead to biased estimates (Acheampong, 2019; Mofokeng, 2018; Oseni, 2016).

Lensink, Morrissey & Osei (1999) suggests that while the system-GMM is most appropriate in that it combines the differenced equation and that in under certain conditions provides more efficient estimators than a regression in first differences, it does present weak sample properties, which are that the standard errors are biased downwards particularly when the number of cross-section units is small in relation to the number of instruments. Many instruments lead to overidentification of the model and instrument proliferation (Mofokeng, 2018).

Thus, the reliability of the system-GMM estimation is primarily contingent on the validity of the instruments. The Sargan and Hansen tests are necessary to test the validity of instruments (Roodman, 2009; Lensink et al., 1999). According to Acheampong (2019), the within estimator test ascertains the state of autocorrelation in the idiosyncratic error term ( $\epsilon_{i,t}$ ).

### **3.2.6. Data Transformation**

The data collected ranged over several orders of magnitude. In order to stabilise the variances and normalise the data, the log transformation was used. However, some of the variables also contained negative variables, so the log transformation could not be applied immediately. Before applying the log transformation, a constant value was added to the data to ensure that the smallest negative value for each variable becomes 1. The transformation applied to each value  $Y$  was  $\log_{10}(Y+a)$ , whereby  $a$  is constant that ensures that the smallest value of  $(Y+a)$  is equal to 1, thereby ensuring there are no negative values in the data.

The first important prerequisite was to check whether the data is balanced before running any test and diagnostics, using the STATA command called `xtset`. Then the magnitude of the Pearson correlation ( $r$ ) was used to determine the strength of the correlation and the statistical significance of the correlation.

The Hausman test is done to detect endogeneity of the data and distinguish between Random Effect and Fixed Effect. A p-value of less than 0.05 thus implies that the null hypothesis of the preferred random-effects model ought to be rejected, and thus the fixed effects model is accepted.

## CHAPTER FOUR

### DISCUSSION OF FINDINGS

#### 4.1 Introduction

The objective of this chapter is to outline and interpret the results estimated by the model. The chapter is structured as follows;

- 4.2. Descriptive statistics
- 4.3. Correlation results
- 4.4. Regression results

#### 4.2 Descriptive Statistics

Table 4.1 is a summary of the descriptive statistics of variables that are used in the model. The number of observations are well balanced; however, observations for NPF and FDI seem to be slightly fewer amongst all other variables. This could be due to poor data reporting, a common challenge in LIDCs.

The variation within individual variables appears to be very minimal, with the highest standard deviation being the foreign exchange rate. This is realistic considering the difference in exchange rate from one country to another and the different exchange rate regimes or monetary policy tools that differ from one country to another.

**Table 4.1: Summary of Descriptive Statistics**

	<i>Mean</i>	<i>Median</i>	<i>Std. dev</i>	<i>P75</i>	<i>Min</i>	<i>Max</i>	<i>N</i>
<i>LN (REER)</i>	1.983	2.424	0.999	2.746	0.000	9.828	1289
<i>LN(NPF)</i>	10.270	10.293	0.388	10.293	0.000	10.531	727
<i>LN(FDI)</i>	10.380	10.398	0.331	10.399	0.000	10.530	999
<i>LN(CA)</i>	2.077	2.083	0.072	2.097	0.000	2.221	1288
<i>LN(DEBT)</i>	2.741	2.745	0.086	2.747	0.000	2.835	1150
<i>LN(GDP)</i>	1.755	1.759	0.071	1.776	0.000	2.304	1348
<i>LN(CPI)</i>	1.922	1.900	0.128	1.930	0.000	3.625	1343

Source: Author's calculation; Note: LN (REER)= Natural logarithm of real effective exchange rate; LN(NPF)= Natural logarithm of net portfolio flows; LN(FDI)= Natural logarithm of FDI; LN(CA)= Natural logarithm of current accounts; LN(DEBT)= Natural logarithm of net government debt; LN(GDP)= Natural logarithm of GDP; LN(CPI)= Natural logarithm of CPI

### 4.3. Correlation Results

Table 4.2. illustrates the correlation results, which explains the strength of the relationship between variables. The implication is that when one variable changes, the other also tends to change in a particular direction. The higher the correlation coefficient, the stronger the relationship and the lower the correlation coefficient, the weaker the relationship between those particular variables. The following interpretation of the Pearson correlation was applied, as recommended by Cohen (1988):

<b>Correlation Coefficient (<math>r =</math> )</b>	<b>Strength of association</b>
$0.1 <  r  < 0.3$	Low/small correlation
$0.3 <  r  < 0.5$	Medium/moderate correlation
$ r  > 0.5$	Large/strong correlation

The estimated correlation coefficients below depict low correlation amongst all variables except for current account and net lending, which seem to have a medium to moderate correlation. Furthermore, not more than two variables are highly correlated; therefore, there is no presence of multicollinearity.

**Table 4.2: Correlation matrix**

	<i>REER</i>	<i>NPF</i>	<i>FDI</i>	<i>CA</i>	<i>DBT</i>	<i>GDP</i>	<i>CPI</i>
<b>1. LN (REER)</b>	1.000						
<b>2. LN(NPF)</b>	0.139 (0.000)	1.000					
<b>3. LN(FDI)</b>	0.104 (0.001)	0.248 (0.000)	1.000				
<b>4. LN(CA)</b>	-0.142 (0.000)	-0.013 (0.727)	0.082 (0.012)	1.000			
<b>5. LN(DEBT)</b>	0.096 (0.001)	0.120 (0.002)	0.024 (0.481)	0.321 (0.000)	1.000		
<b>6. LN(GDP)</b>	0.071 (0.012)	0.044 (0.239)	-0.192 (0.000)	-0.078 (0.005)	0.130 (0.000)	1.000	
<b>7. LN(CPI)</b>	-0.272 (0.000)	-0.009 (0.804)	-0.045 (0.158)	-0.046 (0.097)	-0.041 (0.167)	-0.040 (0.144)	1.000

Note: LN (REER)= Natural logarithm of real effective exchange rate; LN(NPF)= Natural logarithm of net portfolio flows; LN(FDI)= Natural logarithm of FDI; LN(CA)= Natural logarithm of current accounts; LN(DBT)= Natural logarithm of net government debt; LN(GDP)= Natural logarithm of GDP; LN(CPI)= Natural logarithm of CPI. P-values in parentheses.

#### **4.4. Regression Results**

Table 4.3. below illustrates the regression results of the predictive equation with an R-squared of 0.542. This means that the seven independent variables explain 54.2% of variations in foreign exchange rate variables, and 45.8% is not explained within the model. Furthermore, the coefficients listed in the output represents the nature of the relationship between variables.

##### **Overidentification of restrictions test results**

The validity of the instruments was tested using the Sargan test, also referred to as the test of overidentification. This was particularly important considering the number of instruments in the model due to the period and the number of countries considered for the study. The model passed the Sargan test with a p-value greater than 5%.

##### **Heteroskedasticity test results**

In order to establish whether there is any heteroskedasticity, the Breusch-Pagan/Cook-Weisberg test was done. The null hypothesis tests whether there is a constant variance of the residuals; that is, data were homoscedastic. The test produced a p-value of 0.3719 (37.19%), which is higher than the test significance level, therefore, concluding that there is no evidence for the presence of heteroscedasticity.

##### **Serial correlation test results**

In order to test serial correlation, the Wooldridge test was done. The null hypothesis stated that there was no first-order autocorrelation between the dependent variable and independent variables. The p-value is less than 1% significance level, which means the null hypothesis was rejected, denoting the presence of serial correlation.

##### **Arellano-Bond tests for first and second-order autocorrelation**

Both tests for serial correlation, AB(1) and AB(2), have p-values above the test significance level, 0.629 and 0.944, respectively, suggesting no sign of first-order serial correlation.

**Table 4.3: Random-effects and GMM regression results**

<i>Dependent variable: LN(Foreign exchange rate(FXL))</i>						
	<b>FEM</b>			<b>SYSTEM-GMM</b>		
	<i>Coef.</i>	<i>Std. Err.</i>	<i>t</i>	<i>Coef.</i>	<i>Std. Err.</i>	<i>z</i>
<i>Constant</i>	50.217***	9.354	5.37	13.569***	4.212	3.22
<b><i>LN (REER).LI</i></b>				0.898***	0.015	59.93
<b><i>LN(NPF)</i></b>	-3.161***	0.661	-4.78	-0.650**	0.311	-2.09
<b><i>LN(FDI)</i></b>	-2.078***	0.478	-4.35	-0.081	0.223	-0.37
<b><i>LN(CA)</i></b>	0.323	0.243	1.33	-0.077	0.115	-0.66
<b><i>LN(DBT)</i></b>	1.156	1.792	0.65	-2.430***	0.803	-3.03
<b><i>LN(GDP)</i></b>	0.043	0.198	0.22	-0.037	0.095	-0.39
<b><i>LN(CPI)</i></b>	0.897***	0.162	5.52	0.576***	0.076	7.54
<i>F/Wald <math>\chi^2</math></i>	19.35***			3996.94***		
<i>R-squared</i>	0.5420					
<i>Hausman <math>\chi^2</math></i>	15.776**					
<i>Prob &gt; <math>\chi^2</math></i>	0.0272					
<i>WAR(1):F</i>	235.348***					
<i>Hetest <math>\chi^2</math> (p-value)</i>	0.8 (0.3719)					
<i>Sargan <math>\chi^2</math> (p-value)</i>	3.16 (0.675)					
<i>AB(1): F (p-value)</i>	-0.48 (0.629)					
<i>AB(2): F (p-value)</i>	-0.07 (0.944)					
<i>Countries</i>	36			36		
<i>Observations</i>	626			620		

Note: LN (REER)= Natural logarithm of real effective exchange rate; LN(NPF)= Natural logarithm of net portfolio flows; LN(FDI)= Natural logarithm of FDI; LN(CA)= Natural logarithm of current accounts ; LN(DEBT)= Natural logarithm of net government debt; LN(GDP)= Natural logarithm of GDP; LN(CPI)= Natural logarithm of CPI; WAR(1)= Wooldridge of autocorrelation; Hetest= Breusch-Pagan/ Cook-Weisberg test for heteroskedasticity; Sargan= Sargan test of overidentifying restrictions; AB(1)=Arellano-Bond test for first-order autocorrelation; AB(2)=Arellano-Bond test for second-order autocorrelation. \*\*\*, \*\* and \* denote significance at 1%, 5% and 10% respectively.

The results in Table 4.3 shows a negative effect of net portfolio flows on the real exchange rate at 1% and 5% significance in the fixed effects (FEM) and GMM models, respectively, which indicates that increases in net portfolio flow result in the appreciation of the real exchange rates of SSA countries because the local currency units required to purchase a single dollar would be decreasing. This is consistent with previous studies by Combes et al. (2011), Bukovšak (2017), Dua & Sen (2013), and Saradhi & Goel (2018) that an increase in capital flows tend to cause an appreciation of the domestic currency.

The results also show a negative effect of FDI on the real exchange rate in the FEM and GMM models, with significance only observed in the FEM model at 1%. Concerning portfolio flows, the effect of FDI on the exchange rate is not as significant. These results are consistent with the studies of Combes et al. (2011) and those of Dua & Sen (2013), which found that portfolio flows have a more significant impact on the exchange rate, in some instances seven times that of FDI or bank loans.

The effect of inflation or consumer price index denoted as CPI on the exchange rate is observed to be positive at a significance level of 1%, which indicates that an increase in inflation leads to an increase in the local currency required to purchase the US dollar, thus causing the exchange rate or the value of the local currency to depreciate. While many factors affect the real exchange rate, the fundamental principle of macroeconomics is that the real exchange rate is based on the consumer price index (Abel, Bernanke & Croushore, 2008: 477-485). In addition, the real exchange rate is the nominal exchange rate adjusted by inflation (Ellyne and Mbewe, 2015). In the case of a fixed change rate regime, Combes et al. (2011) state that an observed appreciation of the real exchange rate is often a result of an increase in inflation. One of the limitations of the study is that exchange rate regimes were not factored in.

Finally, the effect of government net lending/borrowing on the exchange rate appears to be negative, with significance only observed in the GMM at 1%. This, therefore, means that an increase in net lending/borrowing, expressed as a percentage of GDP, leads to a decrease in the local currency units required to purchase a US dollar, thus causing the value of the domestic currency to appreciate. The basic principle of lending and borrowing is that it has implications on the exchange rate by somewhat causing demand and supply of the domestic currency. This is, of course, a result of capital movement across borders (Nwanne & Eze, 2015).

## CHAPTER FIVE

### CONCLUSION AND RECOMMENDATION

#### 5.1. Introduction

The following chapter summarises the key findings of the study and highlights the implications of these outcomes. It will also provide recommendations and highlight opportunities for future studies that are similar in nature. Section 5.2. summarises the entire study, and the final sections will provide a recommendation based on the key outcomes.

#### 5.2. Summary of the Study

Due to the lack of domestic savings and the subsequent funding gap, developing economies consistently need external capital to fund developmental objectives. In addition, many countries in the region have made deliberate and significant efforts to implement key structural and market-orientated reforms to attract capital flows (Kodongo & Ojah, 2012; Adeola, 2017; Adhiambo, 2012; Agénor, 2001).

According to a report by the IMF (2018), the reforms of the 1980s witnessed large flows of capital into Africa. The study's objective was to determine the relationship between capital flows and the exchange rate in Sub-Saharan Africa. A review of previous empirical studies and literature provided similar outcomes on how capital flows impact exchange rates, specifically how different types of capital flows affect the exchange rate.

The exchange rate referred to in this study is the unit value of each domestic currency against the US dollar. Therefore, an increase in the amounts of the unit of domestic currency against the dollar essentially means that the value of the domestic currency is depreciating because more units of the domestic currency are required to purchase a single unit of the US dollar. The opposite of this is true. A decrease in the number of local currency units required to purchase a single US dollar signifies an appreciation of the value of the local currency.

Consistent with previous studies that found that an increase in capital flows cause the exchange rate to appreciate, the study also found that foreign direct investment and portfolio flows negatively correlate with the exchange rate. This means that when capital flows increase, the units of the domestic currency required to purchase a dollar decreases. This implies an appreciation of the value of the domestic currency.

However, it is worth noting that the magnitude of the relationship differs between the two types of capital flows. The results show that the relationship between exchange rate and foreign direct investment is not as strong as between the exchange rate and portfolio flows. This is consistent with studies showing that foreign direct investment tends to have an immaterial impact on exchange rate relative to other types of capital flows (Gautam et al., 2020; Bukovšak et al., 2017).

### **5.3. Findings and Implications**

The results in this study show that a relationship between capital flows and the exchange rate does exist. When controlling for endogeneity, it is clear that an increase in capital flows does cause an appreciation of the exchange rate. Due to the so-called “transfer problem,” an increase in capital flows can also impact other elements of the domestic economy through the real effective exchange rate channel (Combes et al., 2011).

Thus, an increase in capital flows can also cause inflationary pressures and deteriorate the current account. (López Mejía, 1999; Ralhan, 2006). Apart from the exchange rate channel, capital inflows are also likely to cause macroeconomic overheating by creating excessive expansion of aggregate demand (López Mejía, 1999).

Another implication of increased capital flows and an exchange rate appreciation is a deterioration in trade competitiveness and a potential decrease in exports. As Dua & Sen (2013) explains, when the demand for domestic currency increases without the necessary intervention in the foreign exchange market, the domestic currency appreciates, thus making exports more expensive and less competitive.

#### **5.4. Policy Recommendations of the Findings**

Without appropriate interventions and sound financial systems, capital flows can often do more harm than good to the recipient country. In addition to the effect of capital flows on the exchange rate, a surge in capital flows can also cause domestic investment to increase rapidly, causing overheating due to excessive demand and a deterioration of the current account, especially when there are supply-side constraints.

While many developing countries endeavour to attract foreign capital to supplement domestic savings, it is very important to ensure that financial systems are sound and well developed to handle episodes of capital flow surges. Another policy consideration, which was not a key focus of the study, is the sharp reversals of capital flows, which tend to cause macroeconomic volatility through various channels.

#### **5.5. Limitations of the Study and Opportunities for Future Research**

Exchange rates are typically volatile, particularly for economies with floating exchange rate regimes that are naturally responsive to market forces. Of course, some countries have pegged exchange rates to other currencies such as the Euro, US dollar or the South African rand. Thus, under the pegged system, the domestic currency fluctuates according to other external factors. The study did not individually consider the different exchange rate regimes of each country.

In addition, exchange rates are also sensitive to certain structural and country-specific factors that are not considered in this study. For instance, some African countries are major oil exporters and, in most cases, also single commodity economies. The dynamics and structure of these economies are also not considered in this study. Data reporting in many low-income and developing economies contributed to the study's limitations, especially regarding portfolio investments and exchange rates.

Future research opportunities include classifying countries according to exchange rate regimes and considering major oil-exporting economies separately. Finally, further assessing the secondary effects of capital flows on the domestic economy through the exchange rate channel known as the “transfer problem” could also be a valuable study to ascertain the extent of negative “spillovers” into the economy.

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**Annexure A: List of Sub-Saharan Countries (IMF, World Economic Outlook)**

1. Angola
2. Benin
3. Botswana
4. Burkina Faso
5. Burundi
6. Cabo Verde
7. Cameroon
8. Central African Republic
9. Chad
10. Comoros
11. Democratic Republic of the Congo
12. Republic of Congo
13. Côte d'Ivoire
14. Equatorial Guinea
15. Eritrea
16. Eswatini
17. Ethiopia
18. Gabon
19. The Gambia
20. Ghana
21. Guinea
22. Guinea-Bissau
23. Kenya
24. Lesotho
25. Liberia
26. Madagascar
27. Malawi
28. Mali
29. Mauritius
30. Mozambique
31. Namibia
32. Niger
33. Nigeria
34. Rwanda
35. São Tomé and Príncipe
36. Senegal
37. Seychelles
38. Sierra Leone
39. South Africa
40. South Sudan
41. Tanzania
42. Togo
43. Uganda
44. Zambia
45. Zimbabwe