ECONOMICS – WORKING PAPERS 2022/11

A structural analysis of foreign exchange markets in sub-Saharan Africa

European Investment Bank
The EU bank

A structural analysis of foreign exchange markets in sub-Saharan Africa

September 2022

European Investment Bank
The EU bank

A structural analysis of foreign exchange markets in sub-Saharan Africa

EIB Working Paper 2022/11
September 2022

Authors
Annina Kaltenbrunner (Leeds University Business School)
Daniel Perez Ruiz (Leeds University Business School)
Anjelo Okot (Leeds University Business School and Central Bank of Uganda)

EIB Mentors
Jean-Philippe Stijns (EIB)
Sanne Zwart (EIB)

This is a publication of the EIB Economics Department.
economics@eib.org
www.eib.org/economics

About the Economics Department
The mission of the EIB Economics Department is to provide economic analyses and studies to support the Bank in its operations and in the definition of its positioning, strategy and policy. The department, a team of 40 economists, is headed by Director Debora Revoltella.

Published by the European Investment Bank.
Printed on FSC® Paper.

pdf: QH-BK-22-011-EN-N ISBN 978-92-861-5372-3 ISSN 2599-736X doi: 10.2867/598448

A Structural Analysis of Foreign Exchange Markets in sub-Saharan Africa

Authors:

Annina Kaltenbrunner, Leeds University Business School, a.kaltenbrunner@leeds.ac.uk

Daniel Perez Ruiz, Leeds University Business School, bndapr@leeds.ac.uk

Anjelo Okot, Leeds University Business School and Central Bank of Uganda[1], bn15ao@leeds.ac.uk

EIB Mentors:

Jean-Philippe Stijns, j.stijns@eib.org,

Sanne Zwart, s.zwart@eib.org

Abstract

This paper presents detailed insights into the microstructural characteristics of several African Lower and Lower-Middle Income Countries (LLMICs) foreign exchange markets and the implications of these characteristics for macroeconomic management. It draws on 13 semi-structured interviews with 17 foreign exchange experts in central banks, banks, non-bank financial institutions, and research institutions in selected case studies (Ghana, Kenya, Malawi, Sierra Leone, Uganda, and Zambia) and the City of London. The results show that whilst most case study countries have functioning foreign exchange interbank markets, these markets are oftentimes characterised by low, volatile and "lumpy" liquidity. These liquidity dynamics and uncertainty about future foreign exchange flows can lead to FX hoarding among foreign exchange market participants, further depriving the official foreign exchange market of liquidity. Moreover, they provide those with access to FX liquidity with significant market power and the potential to affect price dynamics. These microstructural characteristics, in turn have meant that central banks in African LLMICs remain key agents in foreign exchange markets to manage scarce and volatile liquidity patterns. At the same time though, these microstructural weaknesses complicate central banks' ability to deal

[1] The views expressed in this document are the author's only and do not reflect the views of the Central Bank of Uganda.

The authors would like to thank the valuable and constructive comments provided by Emmanouil Davradakis that substantially improved this paper.

with volatile foreign exchange availability and structural depreciation pressures. Whereas hoarding behaviour reduces the central bank's access to foreign exchange, low trust in domestic currencies puts serious limits on the extent of nominal depreciations central banks will be able and willing to tolerate. Overall, the results show the difficulties of moving towards floating exchange rates in the context of African LLMICs, characterised by concentrated export structures, low trust in their currencies, and shallow domestic financial markets.

1 Introduction

Foreign exchange markets in Low and Lower-Middle-Income Countries (LLMICs) in Sub Saharan Africa (SSA) have undergone important changes in the last decades. Many countries have liberalised their foreign exchange markets and capital accounts and have moved to more flexible exchange rates. Moreover, several countries have shifted to monetary regimes which give priority to controlling inflation and use the interest rate as the main policy instrument. These changes have had potentially important implications for the structure of foreign exchange markets and exchange rate dynamics. For example, in some foreign exchange markets, non-resident investors have acquired rising prominence and conditions on global financial markets have increased their importance for exchange rate dynamics. These changes interact with traditional export structures which remain mostly concentrated in a few agricultural and mining commodities. These interactions create the risk of destabilising exchange rate dynamics and further complications for macroeconomic management. Indeed, recent evidence shows that central banks in the region have been rather reluctant to leave exchange rate determination to the market and have intervened actively despite their official floating exchange rate regimes.

The microstructure literature on the foreign exchange market has highlighted the crucial importance of analysing the institutional characteristics of those markets, both for understanding price dynamics and the effectiveness of central bank operations (Lyons 2001, Sarno and Taylor 2001). This literature highlights the key role of agents in the foreign exchange markets, which transmit these institutional characteristics (e.g. the organisation of the market, trading platforms, and/or specific regulations), and indeed macroeconomic fundamentals, into observed price dynamics. These agents are considered non-homogenous and oftentimes non-

rational, making an analysis of their behaviour and interaction key for understanding exchange rate dynamics (De Grauwe and Grimaldi 2006). Importantly, the impact of these microstructural factors are not just ephemeral, but can be long-lasting and affect exchange rates even in the medium to long-term. Moreover, they can impact fundamentally on the nature and effectiveness of macroeconomic policy, in particular central bank interventions. So far though studies on the microstructure of foreign exchange markets in LLMICs, and even more so in SSA, are very scarce. This lack of studies is due to data availability, but also the implicit assumption that institutional structures and agents are similar across countries and time. Microstructural studies in economics have largely focused on observable price behaviour and simulations, rather than concrete case studies of specific foreign exchange market structures.

Two exceptions are the detailed survey study by Kriljenko-Canales (2004) and the book by Azam (2007). The authors show the very distinct microstructure of foreign exchange markets in LLMICs, such as the dominance of the US Dollar spot market, a high degree of concentration, and the crucial role of the central bank to manage liquidity. However, these studies are by now relatively outdated and do not yet consider the more recent institutional and macroeconomic changes in LLMICs foreign exchange markets. Moreover, Kriljenko-Canales (2004)' study focuses on a wide range of low, and indeed upper-middle-income countries, whose microstructures might differ from those in SSA. Most importantly for our purposes though, these papers largely focus on the structures of foreign exchange markets in isolation, rather than conceptualising the crucial interdependencies between these microstructures and the macrostructural characteristics of these countries. These macrostructural characteristics include: (i) on the productive side, SSA LLMCs' near exclusive dependence on a limited set of highly volatile export commodities; and (ii) on the monetary/financial side SSA LLMIC currencies' weak position in the international monetary system and potential vulnerability to volatile foreign financial flows in thin domestic financial markets. Moreover, they pay little attention to the implications these microstructural characteristics have for macroeconomic management, in particular of the exchange rate.

This paper aims to fill these gaps. Using insights from 13 semi-structured interviews with 17 foreign exchange experts in central banks, banks, non-bank financial institutions, and research institutions in selected SSA case studies (Ghana, Kenya, Malawi, Sierra Leone, Uganda, and Zambia) and the City of London, it presents detailed insights into the microstructural characteristics of particular SSA foreign exchange markets and their implications for

macroeconomic management. In contrast to the study by Kriljenko-Canales it does not draw on general survey results, but aims to unearth the peculiar and most important institutional characteristic of selected case study foreign exchange markets based on the expertise and experience of SSA LLMICs foreign exchange market experts. Thus, the emphasis is less on testing existing hypotheses about foreign exchange market microstructures conceived in the context of developed markets and generalizable results for all SSA LLMICs. Rather, the objective is to provide an in-depth, contextual picture of key issues and characteristics in selected SSA LLMICs foreign exchange markets, and their crucial interdependence with those countries' fragile macrostructures. These insights are important not only to gain a better understanding and conceptualise exchange rate dynamics in these countries, but also to show the difficulties SSA LLMICs central banks face in transitioning to more market-determined, i.e. floating exchange rate regimes.

The paper shows that whilst most case study countries have functioning foreign exchange interbank markets, these markets are oftentimes characterised by seasonal, volatile and "lumpy" liquidity. These liquidity dynamics and uncertainty about future foreign exchange flows, in turn, can lead to FX hoarding among foreign exchange market participants, further depriving the official foreign exchange market of liquidity. Moreover, it provides those with access to FX liquidity with significant market power and the potential to affect price dynamics. Access to yield-seeking private financial flows does not necessarily improve these structural weaknesses, given the low trust in domestic currencies and pro-cyclical nature of these flows. These microstructural characteristics, however, have meant that central banks remain key agents in foreign exchange markets to manage scarce and volatile liquidity patterns. At the same time, these microstructural weaknesses have complicated central banks' ability to deal with volatile foreign exchange availability and structural depreciation pressures. Whereas hoarding reduces the central bank's access to foreign exchange (e.g. to build reserves), low trust in domestic currencies – and the political manifestations that come with it – put serious limits on the extent of nominal depreciations central banks will be able and willing to tolerate. SSA LLMICs' commodity dependence, on the other hand, has meant that central banks' have been less concerned with intervening during appreciation, leading to a distinct asymmetry in foreign exchange interventions and the risk of structural real overvaluations. Overall, the results show the difficulties of moving towards floating exchange rates in the context of SSA LLMIC economies, characterised by concentrated export structures, low trust in their currencies, and shallow domestic financial markets.

The paper is structured as follows. Section 2 gives a brief overview of the existing microstructure literature, both in general and the few studies which have focused specifically on LLMICs. Section 3 presents the methodology and data. Section 4 gives a brief overview of the macrostructural context of SSA foreign exchange markets. Section 5 presents the interview results and Section 6 concludes.

2 The Microstructure Approach to the Exchange Rate: The Role of Institutional Structure and Heterogeneous Agents

2.1 Theoretical Literature Review

The foreign exchange market microstructure literature acknowledges that rather than adjusting to permanent, underlying macroeconomic fundamentals to restore market equilibrium, at least in the short-term exchange rates are determined by the buying and selling decisions of heterogeneous foreign exchange market actors (Lyons 2001, Evans and Lyons 2002, Sarno 2005, Baccetta and van Wincoop 2006, De Grauwe and Grimaldi 2006). In addition to macroeconomic fundamentals, the institutional structures and behaviour of agents in the foreign exchange market are key factors which shape exchange rate dynamics. For our purposes, three literatures are of particular relevance[2]: First, an older literature which emphases the institutional organisation of foreign exchange markets, the key actors, instruments, and potential inefficiencies interfering with price formation. Second, the order flow approach which focuses specifically on the buying and selling decisions of foreign exchange market participants and the way these transmit information to foreign exchange trading banks. And finally, the behavioural approach to exchange rate determination which highlights the interaction of heterogeneous agents in the foreign exchange market and the way this interaction impacts price formation. In these models, some of these agents might not act "rationally", in the sense of forming their expectations in line with underlying exchange rate models and all the information available, which can deviate exchange rate from their (market-equilibrating) fundamentals for a significant amount of time.

Though, as will be discussed in more detail below, these models focus largely on short-term exchange rate movements (in particular the order flow model), they are still important for our

[2] Of course, views might differ as to an appropriate classification of the microstructure literature which is wide and sprawling. We have chosen a classification which highlights the key aspects of the microstructure approach which are useful for this paper: the importance of institutional structure and the impact of heterogeneous agency on exchange rate dynamics.

purposes for three reasons: First, even temporary price distortions can have important implications for those seeking to buy and sell at that point in time. This is particularly the case in the moment of crisis and severe lack of liquidity and when these distortions become very large. Second, microstructural characteristics are crucial to explain both the relevance and effectiveness of central bank foreign exchange market operations. Third, we hold that the assumption that the exchange rate is not a market equilibrating price, but is determined by the specific buying and selling decisions of key agents in the foreign exchange market (flows), also holds over longer horizons. This is important insofar as it shows that rather than permanent and general underlying fundamentals (as in traditional exchange rate theory), exchange rates are determined by the context and time specific demand and supply of foreign exchange. This foreign exchange demand and supply might differ fundamentally in LLMICs from that in high-income and upper-middle-income countries, depending – among other things - on the type of actors operating in the market, the way this market is organised, and the type of instruments available.

2.1.1 Institutional Features of the Foreign Exchange Market

Early microstructure literature focuses on the institutional features of the foreign exchange market. According to this literature (e.g. Sarno and Taylor, 2001), the two main features distinguishing the foreign exchange market from other financial markets are that it is a decentralised markets, and that trading takes place mainly between market makers (banks which buy and sell currencies for customers charging a bid and ask spread). According to data from the Bank for International Settlements (BIS), around 90% of foreign exchange trading is done between those market makers (either directly or through brokers) and only 5% of trading is with final customers engaged in the trade of goods and services (BIS, 1998). Whereas market-makers profit from the spread they receive on buying and selling orders, broker charge a fee for their services.

In contrast to a centralised market, where trade is conducted at a publicly announced price and all traders face the same trading opportunities, in a decentralised market, prices are quoted and transactions executed in private meetings. In addition to customers and market-makers, developed foreign exchange markets also boast brokers which acts on behalf of clients and collect a sub-set of market-makers' limit orders (Sarno and Taylor, 2001). According to this literature, these quasi-centralised broker markets use time more efficiently, eliminate significant arbitrage opportunities, and ensure that dealers that orders are executed according

to price priority (Garbade 1978). In general, the literature on market organisation shows that the decentralised nature of the foreign exchange market might increase the crash risk (Perraudin and Vitale 1996), and significantly reduces transparency as trades are not observable. Moreover, whereas in centralised market, a clearing house assumes credit risk and nets out positions, in a decentralised market, the credit risk remains with each individual market maker. This might explain both the large amount of inter-dealer trading in the foreign exchange market and the often significant spreads dealers are able to earn. More recently, this literature has also discussed the increased adoption of electronic trading and brokering systems (e.g. Reuters, Bloomberg) which has increased the transparency of quoted bid-ask spreads and has allowed for a certain degree of virtual centralisation. As highlighted by Sarno and Taylor (2001), these electronic platforms also allow for a credit and counterparty pre-screening which substantially increases the speed and efficiency of transactions.

With regards to the instruments traded, the literature has highlighted a continuous increase in derivatives at the expense of direct spot operations. Whereas traditionally forward contracts have been important, most recently foreign exchange swaps (mostly including the US Dollar) have become key instruments, both for international hedging and funding operations (Borio, McCauley et al. 2017). Finally, though of a lesser analytical focus, the microstructure literature highlights the role of central banks as other key agents in the foreign exchange market, either to complete their own transactions or to intervene to influence exchange rate movements.

2.1.2 The Order Flow Model: The Role of Private Information and Foreign Exchange Dealers

Insights from the institutionally sensitive literature have been incorporated into the order flow approach pioneered by authors like Richard Lyons and Lucio Sarno (e.g. Lyons, 2001; Sarno, 2005). The key argument in this literature is that rather than macroeconomic fundamentals, it is net demand or supply in the foreign exchange market – or order flows – which determine exchange rates. As such, the order flow approach focuses on the real trading mechanism and the actual operation of actors in the foreign exchange market and how flows of information are translated into prices by these actors. Based on the institutional observation in developed foreign exchange markets that the majority of trading takes place between dealers, its primary focus is on how information received by those actors – in the form of client order flows – is transmitted into prices. As Lyons (2001: 12) puts it: “Whether we like it or not, it is a stubborn fact that in the major currency markets, there is no exchange rate other than the price these people set “.

More specifically, the order flow relaxes three assumptions of the market-equilibrating approach to the exchange rate: First, it recognises that some information relevant to exchange rates is not publicly available. Second, it acknowledges that markets participants differ in ways that affect prices; and finally, it appreciates that trading mechanisms vary in ways that affect prices. It starts from the institutional structure of the foreign exchange market as a decentralised, now mainly electronic, broker-dealer market, where trading takes place in a continuous way, that is orders are processes as they arrive (Sarno and Taylor, 2001). There are three main kinds of players: customers, dealers, and brokers. Customers are composed of non-financial institutions, leveraged financial institutions, and unleveraged financial institutions. Dealers are mainly from the financial division of the commercial banks. Brokers facilitate that customers and dealers carry out the transaction (Lyons 2001, Vitale 2007).

It then goes on to show that rather than macroeconomic fundamentals, order flows that measure the net of buyer-initiated orders and seller-initiated orders provide a higher explanatory power for exchange rate movements (g, 2005; Evans and Lyons, 2002). These orders are not public information but can be seen only by the individual traders/dealers, which highlights the importance of private information and how that information is aggregated into the price. Different traders might interpret information differently or act upon it in a different way, depending on their role in the market (e.g. as hedgers or speculators) or the institutional organisation of the market (e.g. the degree of centralisation). And not all order flows have the same price impact: the price impact of foreign exchange (FX) orders from financial institutions (e.g. mutual funds and hedge funds) is significantly higher than the price impact or orders from nonfinancial corporations (Lyons, 2001).

Whereas a large part of the empirical order flow literature has focused on the specific way client selling and buying orders are transmitted into observed prices by dealers, what matters most for us is the bigger point that exchange rates are not determined by long-run underlying fundamentals, but actual foreign exchange flows and the way these flows are intermediated by heterogeneous actors in differently organised foreign exchange markets. Moreover, flows are qualitatively different – depending on their source (clients) and dynamics – and will have different impacts on intermediating agents and ultimately exchange rates.

2.1.3 Behavioural Finance: The Role of Heterogeneous Agency

The final strand of literature, which is of interest to this paper, is one that highlights the heterogeneity of agents in the foreign exchange market and their differential price impact. Moreover, this approach recognises that agents are not rational and/or are limited in their ability to obtain and process all relevant information. This leads them to use simple rules based on past price behaviour, such as Chartism, momentum, feedback trading and hedging, to guide their behaviour. As a result, prolonged periods of exchange rate misalignment can occur, and profitable opportunities for rational speculators arise, affecting financial sector prices (Shleifer and Summers 1990, Shiller 2003). This behavioural or noise trader approach to the exchange rate comprises a vast literature, including survey studies (Oberlechner 2001), econometric studies of past price behaviour (Allen and Taylor 1992), analysis of exchange rate expectations (Menkhoff, Rebitzky et al. 2009), and simulations (De Grauwe and Grimaldi 2006).

One of the most prominent behavioural finance models in the exchange rate literature are the chartist-fundamentalist models (De Grauwe and Grimaldi 2006). These models aim to account for some of the empirical features of currency trading, such as the simple trading rules based on past price behaviour, and the existence of heterogeneous agents. On the one hand, the so-called chartists base their decisions on trading strategies (technical analysis) and base their analysis on past price behaviour and have a destabilising effect. On the other hand, the fundamentalists know the exchange rate's fundamental value and thus act stabilising.

The exchange rate is determined by the interaction of these two foreign exchange market participants, formally written as:

$$(1.1)\ \Delta e_{t+1} = -\omega_{f,t}\psi(e_t - e_t^*) + \omega_{c,t}\beta\Delta e_t + \varepsilon_{t+1}$$

Where e_t is the exchange rate, e_t^* is the equilibrium exchange rate, β is the extrapolation parameter of the chartist trading, $\omega_{f,t}$ is the share of fundamentalists and $\omega_{c,t}$ is the chartist share. The above equation has two main components. The first component stands for the fundamentalists' stabilising trading, whereas the second component stands for chartists' destabilising trading behaviour. One interesting thing to note is that chartists and fundamentalist can be combined in one agent and predominate according to market conditions and the time. The weight put on each of both sides of the equation is a function of ex-post risk-return considerations. For example, if a shock in the exchange rate raises the profitability of

extrapolative forecasting, it will imply that more trades will rely on this rule. The main insight generated by this approach is that depending on the prominence of a trading rule (type of agent), exchange rates can either be aligned to their fundamentals or subject to volatility and deviation from those fundamentals.

2.1.4 Assessment Microstructural, Order Flow, and Behavioural Models

The microstructural approach to the exchange rate is a crucial starting point for this paper. Rather than focusing exclusively on the role of macroeconomic factors for exchange rate determination, it highlights the importance of foreign exchange buying and selling decisions and that those macroeconomic factors are mediated through the operations of agents in the foreign exchange market. This means the type of foreign exchange flow, actors, and the institutional structures within which they operate, matter fundamentally for exchange rate dynamics. In contrast to general perceptions, the impact of these microstructural factors are not ephemeral, but can have a long-lasting impact on the exchange rate.

However, so far, the literature on the microstructure of foreign exchange markets focuses largely on developed foreign exchange markets, with deep and liquid financial markets, currencies which are generally accepted as international medium of exchange, unit of account, and store of value, and endogenously and historically grown domestic institutions. Given the assumption that institutional structures are similar everywhere, recent empirical studies have mainly focused on investigating observable price behaviour, rather than the specific, and dynamic, microstructures underlying them. Arguably, though, these microstructures might look very different in LLMICs given these countries' lower degree of financial development, differential - often externally imposed - institutional development, and structural position and integration in the global economy. Indeed, a recent literature on emerging market currencies has shown how these currencies' weaker position in the international monetary system, that is their inability to fulfil all international money functions, has led to a preponderance of short-term speculative carry trade operations and a high share of fickle financial investors in their foreign exchange markets (Heath, Galati et al. 2007, Kohler 2010, Kaltenbrunner 2015). So far, we know very little about these microstructural features – and their interaction with these countries' macrostructures – in LLMICs. The next section discusses two exceptions, which form the basis for this paper.

2.2 Empirical Literature: The Microstructure of LLMIC Foreign Exchange Markets

As discussed above, so far we know very little about the specific microstructure of LLMICs foreign exchange markets. Existing studies focus either on the highly liquid markets of high-income countries and/or on observable price dynamics, rather than the specific institutional structures in LLMICs. Two exceptions are the by now somewhat outdated studies by Kriljenko-Canales (2004) and Azam (2007). Using information from the 2001 International Monetary Fund's Survey on Foreign Exchange Market Organisation, Canales-Kriljenko (2004) provides a detailed characterisation of LLMICs foreign exchange markets at that time. He shows the continued dominance of US Dollar spot markets in these countries and the crucial role of bank-customer trades. In contrast to what has been observed for developed countries (see e.g. the order flow literature above), interbank markets remained relatively small. This – according to Canales-Kriljenko (2004) - gives limited opportunity for price discovery, but provides the central bank with a good understanding of the order flow in the market.

According to the author, the scope for market-making activities are often limited by regulations and/or capital requirements on net-open foreign exchange positions aimed at reducing exchange rate speculation and exchange rate risk in the banking sector. Offshore trading of the domestic currency and its import and export remained restricted in most countries. In these cases, access to domestic currencies was facilitated by foreign bank branches. Although officially illegal, many of the surveyed countries tolerated parallel foreign exchange markets. Derivatives markets remained underdeveloped, among other reasons, because of the absence of a yield curve and/or weak money markets.

A key characteristic of foreign exchange markets in LLMICs highlighted by Canales-Kriljenko (2004) is a large degree of market concentration. This is true for small economies, where only a few banks operate the foreign exchange market, but also countries with a large banking system as few banks control most of the foreign exchange transactions and financial intermediation. Exchange bureaus bring some additional competition in the market. According to Canales-Kriljenko (2004)' results, foreign exchange bureaus can exceed the banks in number, but remain less significant with regards to the volume intermediated. Other microstructural issues highlighted by Canales-Kriljenko (2004) include a low degree of market transparency and risky price settlement systems.

Finally, Canales-Kriljenko's survey showed the importance of foreign exchange regulation and central bank interventions in developing and transition foreign exchange markets. The active role of the central bank was frequently given by the existing exchange rate regime (either fully fixed or officially managed). However, regardless of that regime, respondents identified a strong presence of central banks in the market. Moreover, (Canales-Kriljenko 2003; 2004) showed that central banks enjoyed a wider information advantage than recognized in the literature, partially arising from their ability to require confidential information from main market participants and sometimes exercise moral suasion to influence pricing decisions of foreign exchange intermediaries. According to Azam (2006), in most of the African countries, the government - as the owner of a significant portion of the share of strategic export sectors - remained a major provider of currency. Two other significant sources of foreign currency generation were the imposition of taxes on the agricultural export sector and foreign aid, which represented for some countries above 10% of GDP.

In sum, above studies show the very distinct nature of developing and transition economies' foreign exchange markets, characterised by less liquid interbank markets and lower role of inter-dealer trading, the continued dominance of spot markets, highly concentrated banking sectors, and the crucial role of central banks in providing access to foreign currency. However, Canales-Kriljenko's survey comprises both developing and transition economies, rather than focusing specifically on SSA LLMICs. Also, it is by now quite outdated and many SSA foreign exchange markets have undergone important transformations, not least the increased move towards floating exchange rates and continued capital account liberalization. Finally, as indicated above, it fails to conceptualise the important interaction between those microstructures and SSA LLMICs' distinct macrostructural characteristics, both with regards to productive (export) and monetary/financial characteristic. Investigating these issues is what we turn to next. In contrast to Canales-Kriljenko's quantitative study, which draws on comprehensive survey results across a large range of LLMICs, we apply a qualitative, comparative case study approach based on in-depth semi-structured interviews with 17 SSA and international foreign exchange market experts.

3 Methodology and Data

Most economic research on foreign exchange markets and their microstructures is based either on econometric studies of observed price behaviour (e.g. Allen and Taylor 1992), or surveys which test pre-existing hypotheses about those market structures (Oberlechner 2001). These quantitative studies have the advantage that they produce broadly representative and comparable results. Moreover, they allow estimating the economic and statistical significance of these results. However, representativeness and generalisability come at the expense of uncovering institutional and structural specificities and uniqueness. Moreover, quantitative methods are less conducive to unearthing new and differing realities across varying contexts. They are useful to test pre-existing hypotheses, rather than creating knowledge, concepts, and theories from the concrete and lived realities of economic actors.

Given our limited knowledge of SSA African foreign exchange market microstructures – both in the academic and grey literature[3], - this study takes a different route and conducts a qualitative study of selected foreign exchange markets in sub-Saharan Africa. Rather than creating statistically significant, and generalizable results across a large number of SSA LLMICs, our aim is to unearth the unique and specific institutional and structural features of selected SSA foreign exchange markets based on the expertise of local and international foreign exchange market participants. In line with "grounded theory" (Glaser and Strauss, 1967) and "retroduction" (Olsen, 2011)[4], the aim is to identify key issues and themes, develop concepts, and theorize based on the concrete realities of economic agents in an iterative and self-reflective way. In the same way, quantitative research seeks precision in measurement, qualitative research seeks "precision in description and stringency in meaning interpretation." (Kvale, 1996, p.32).

[3] In the course of this research, we also conducted an extensive survey of the existing grey literature such as policy reports and publications by national central banks and found very little information on foreign exchange market microstructures in SSA. This lack of existing literature and indeed secondary data, further justifies a qualitative study in this context. In addition, a survey study was unfeasible given the resources and time available for this study. Generating a response rate which allows for statistically significant results is very difficult without pre-existing institutional networks as was the case of Canales-Kriljenko' IMF study. Of course, future research could conduct a survey to test some of the concepts and hypotheses emerging from this research.

[4] In a nutshell, *retroduction* means 'asking why' (Olsen, 2011). It involves conceptual and theoretical development based on an iterative process between concrete empirical observations and conceptual and theory formation. *Grounded theory* is known as "a set of systematic inductive methods for conducting qualitative research aimed toward theory development. The term *grounded theory* denotes dual referents: (a) a *method* consisting of flexible methodological strategies and (b) the *products* of this type of inquiry (Charmaz, 2003).

Scientific rigour is achieved through ensuring credibility (confidence in the findings), transferability (to other contexts), dependability (stability of findings across time), confirmability (the extent to which findings can be confirmed by other peers) and reflexivity (the process follows a critical self-reflection) (Lincoln and Guba, 1985; Korstjens and Moser, 2018). Credibility was ensured through data triangulation (using multiple data sources) and investigator triangulation (two researchers coding, analysing, and making interpretation decisions). Transferability was met through thick descriptions, which focuses not only on behaviour and experiences, but also on the context which makes then differentiable. Dependability and confirmability were ensured through the audit trail (transparency regarding the description of the steps taken through the research). Moreover, reflexivity was ensured through the self-reflection of the conceptual framework used for this paper.

We conducted 13 semi-structured interviews with 17 foreign exchange experts in six case study countries (Ghana, Kenya, Malawi, Sierra Leone, Uganda, and Zambia) and the City of London. Following the general principles of case study selection (see e.g. Powner, 2015), the case studies were chosen to create a relatively varied sample with regards to income/capita, geographical location, and degree of integration into global financial markets. At the same time, all countries have seen a recent move to more flexible nominal exchange rate regimes and are characterised by concentrated, commodity dependent export structures. This constitution of case studies allows us to investigate the variation – and indeed commonalities – of different foreign exchange market structures in SSA LLMICs, as well as their interdependencies with the attempted move towards more floating exchange rate regimes.

Interviewees were selected based on non-random case selection methods known as maximum variation sampling (interview people from various backgrounds and different geographical areas) and snowball sampling (extend the network outside the known experts using contacts offered by the existing sample) (Byrne, 2001; Olsen, 2011). Thus, several strategic, initial decisions were made with regards to potential interviewees, including the geographic area, the desired cases, and the type of foreign exchange market expertise of the interviewees. Initial interview participants were approached based on existing contacts and publicly available contact information. Later interviews were organised via snowballing techniques. The final list of interviewees included eight representatives from central banks, three representatives from commercial banks, one asset manager, and three experts from research institutions and development agencies in SSA LLMICs, and one frontier market asset manager and one chief

economist at a major international bank specialising in frontier markets in the City of London (see Appendix A for details).

In line with our research questions, the interviews covered three main areas. First, we inquired into what respondents thought were the fundamentals and key drivers of exchange rates in SSA LLMICs/their respective country. Second, the microstructure of the market, including its organisation, the instruments traded, the actors, and any inefficiencies and key issues which impacted the normal functioning of those markets and exchange rate formation. This set of questions also included sub-questions with regards to any dominant actors in the market, and the rising importance of non-resident investors. Finally, the third set of questions investigated specifically the importance and operations of central banks, including their official exchange rate regime, their actual operations in the market, the instruments used to do so, the reasons for these interventions, and their perceived effectiveness. Whereas the first area was designed to further investigate key macrostructural aspects of these countries' integration into the global economy and related balance of payments dynamics, the last two areas aimed at uncovering the microstructural aspects of SSA LLMICs foreign exchange markets and their interaction with macroeconomic management and the exchange rate regime. Interview results were complemented with information from the IMF Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER), BIS working papers, and – where available – with information from domestic policy reports and technical documents from the respective central bank (see also footnote 6).

The interviews were conducted in a semi-structured manner, meaning that a structured set of questions were followed; however, deviations from the exact order of questions and indeed sometimes from the exact wording of questions were tolerated. A main set of questions was asked to all interviewees. More detailed or follow-up questions were posed depending on the time available and the interviewees' prior response. Given that the focus was on the expertise of our interview partners, all questions were open ended (Foddy 1993). All interviews were conducted virtually on Zoom and lasted approximately 45-60 minutes. Interviews were transcribed, coded, and analysed using NVivo. The main questionnaire can be found in Appendix B. Interview transcripts cannot be made available due to anonymity and confidentiality reasons.

4 The Macrostructure of SSA Foreign Exchange Markets

A key argument of this paper is that the microstructure of SSA foreign exchange markets is fundamentally shaped by their specific integration into the global economy, both with regards to their export structure and their specific insertion into global monetary and financial markets (their macrostructure). With regards to the former, SSA production structures remain highly concentrated in a few – often quite volatile - export commodities. With regards to their financial structure, over recent years financial and foreign exchange markets have undergone substantial transformations as the region has become more integrated into the world economy, both through trade and financial channels (Thomas 2012, Kvangraven 2016, Bonizzi, Laskaridis et al. 2019). As a result, several SSA countries have seen an increased presence of non-resident investors in domestic financial markets, mainly in sovereign bonds (Christensen 2005, Dafe, Essers et al. 2018, Kaltenbrunner, Kvangraven et al. 2020). Evidence for emerging markets shows that these foreign financial flows can be very volatile and have substantial repercussions on domestic asset prices and exchange rates in thin financial markets and low trust in domestic currencies (e.g. Kaltenbrunner and Painceira, 2015). Moreover, as the recent literature on the global financial cycle (e.g. Rey, 2015) and experience from the global financial crisis (GFC) and the Covid shock shows, these adjustments can be largely driven by conditions on international financial markets (mainly the US). Concurrent to capital account liberalization, many SSA countries have moved from exchange rate pegs to increased exchange rate flexibility, frequently accompanied by monetary regimes which give more prominence to the short-term interest rate as main policy instruments.

Table 1 summarizes some key aspects of these macrostructural characteristics for our six case study countries for four time periods: 2000-2003; 2004-2008; 2009-2013; and 2014-2018. These time periods coincide roughly with different conditions on international financial markets (Enron crisis; pre- GFC boom; post GFC and high commodity prices; lower commodity prices).

Table 1: Key Macrostructural Indicators

Country	*2000-2003*	*2004-2008*	*2009-2013*	*2014-2018*
		Trade Openness Index		
Ghana	43.9	46.5	60.9	71
Kenya	46	55.2	55.3	41.3
Uganda	34.3	42.7	50.2	47
Zambia	65.5	62.8	73.3	78.7
Sierra Leone	32	39.3	77.7	70.5
Malawi	41.6	56.3	60.1	72.3
		Financial Development Index		
Ghana	0.1	0.1	0.11	0.13
Kenya	0.12	0.16	0.17	0.19
Uganda	0.09	0.1	0.11	0.12
Zambia	0.07	0.1	0.11	0.12
Sierra Leone	0.07	0.06	0.07	0.09
Malawi	0.07	0.08	0.09	0.09
		Export Diversification Index		
Ghana	3.7	3.9	4.1	
Kenya	2.8	2.6	2.8	
Uganda	3.4	2.8	2.7	
Zambia	3.9	4.5	4.7	
Sierra Leone	3.3	3.3	4.3	
Malawi	4.8	4.6	4.7	
		Overseas Development Aid % GDP		
Ghana	11.5	8.5	4.6	2.4
Kenya	3.3	4	5.2	3.5
Uganda	13.4	14.4	6.3	5.9
Zambia	18.6	12.4	5.2	4.1
Sierra Leone	25.7	21.3	13.9	18.2
Malawi	20.8	16.7	15.7	19.9
		Remittances % GDP		
Ghana	0.7	0.7	2.9	6.2
Kenya	2	2.1	2.1	2.6
Uganda	5.1	4.1	3.1	3.5
Zambia	0.7	0.5	0.2	0.3
Sierra Leone	1.7	1.1	1.7	1.3
Malawi	0.1	0.5	0.4	1.2
		External debt % GDP		
Ghana	50.8	23.3	19.7	32.9
Kenya	37.1	25.2	29.9	42.7
Uganda	65.2	34.6	26.6	39.5
Zambia	172	34.7	18.4	66.8

Sierra Leone	128.1	71.4	27.6	34.3
Malawi	87.6	44.4	20	32.7
Share of Foreign Investors in Domestic Bond Markets				
Ghana				~80% (Feb 2020)
Kenya				<1% in 2013
Uganda				average 6.3% in 2018
Zambia				~70% (Feb 2020)
Sierra Leone				Not available
Malawi				Not available
Reserves % GDP				
Ghana	10	12.9	13.7	10.9
Kenya	7.9	9.4	10.9	10.9
Uganda	15	17.3	11	10.5
Zambia	6.1	6.3	10.8	10.1
Sierra Leone	6	9.5	14.1	13.2
Malawi	9.8	4.4	4.4	11
Net Foreign Assets (Stocks) % GDP				
Ghana	-86.1	-34.3	-50	
Kenya	-22.3	-12.8	-13.4	
Uganda	-44.8	-25.7	-30.7	
Zambia	-233	-83.7	-8.2	
Sierra Leone	-106	-76.5	-42.9	
Malawi	-92.1	-54	-44	

Source: Own elaboration with data from the World Bank and the International Monetary Fund; Data on the share of foreign investors in domestic bond markets for Ghana and Zambia are from the April 2020 IMF Global Financial Stability Report; Data for Uganda and Kenya are from (Dafe, Essers et al. 2018).

Notes: Trade Openness Index is a metric constructed using the total trade (i.e. the sum of exports and imports of goods and services) to the country's gross domestic product.

Financial Development Index covers the depth, access, and efficiency of their financial institutions and financial markets. It is an aggregate of the Financial Institutions Index and the Financial Markets Index.

Export Diversification Index is a Theil index, and therefore higher values indicate lower export diversification. It is an aggregate of the Extensive Margin Index (which measures the number of different export sectors) and Intensive Margin Index (which represents the diversification of export volumes across active sectors).

Overseas Development Aid (ODA) is the internationally agreed criteria for funds provided to developing countries or multilateral institutions to fight poverty and promote development. ODA flows are defined as those flows that

promote the economic development and welfare of developing countries as their main objective and transactions that are concessional in character. Loans whose terms are not consistent with the IMF Debt Limits Policy and/or the World Bank's Non-Concessional Borrowing Policy are not reportable as ODA. ODA flows are reported as a share of GDP.

External Debt is debt owed to non-residents repayable in currency, goods, or services. Total external debt is the sum of public, publicly guaranteed, and private nonguaranteed long-term debt, use of IMF credit, and short-term debt. Short-term debt includes all debt having an original maturity of one year or less and interest in arrears on long-term debt. The external debt is reported as a share of GDP.

Net foreign assets are defined as the sum of the stock of foreign assets held by monetary authorities and deposit money banks minus their stock of foreign liabilities. The data is reported as a share of GDP.

Table 1 confirms the general progression towards increased trade and financial liberalization across the case study countries, though with some variation and recent declines in Kenya, Uganda and Sierra Leone. All countries are characterised by a significant degree of export concentration, led by Malawi and Sierra Leone. Moreover, with the exception of Uganda, all countries have seen either an increase or a stagnation in this export concentration. Table 2 shows the top five exports for all countries. It confirms that these are dominated either by agricultural commodities and/or mining and petroleum products.

Table 2: Top Five Exports

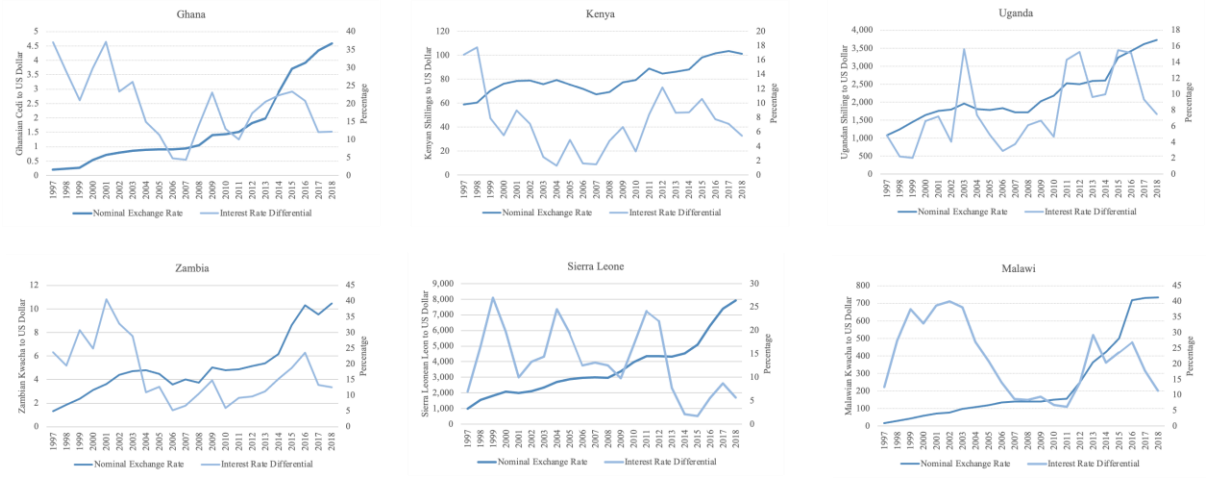
Country	*Products Exports*				
Ghana	Gold, other semi manufactured forms	Petroleum	Cocoa Beans	Gold in unwrought forms	Cashew Nuts
Kenya	Black Tea	Fresh Cut Flowers	Petroleum Oils	Coffee	Titanium
Malawi	Tobacco, partly or wholly stemmed/stripped	Tobacco, not stemmed/stripped	Black tea (fermented) and partly fermented tea	Oil-cake and other solid residues, of soya-bean	Raw cane sugar, in solid form
Sierra Leone	Cocoa beans	Dump trucks designed for off-highway use	Cocoa shells	Coniferous wood sawn or chipped lengthwise	Diesel powered trucks
Uganda	Gold in other semi-manufactured forms	Coffee, not roasted	Petroleum oils	Maize seed	Cane or beet sugar
Zambia	Copper unrefined, copper anodes	Copper cathodes and sections of cathodes	New stamps; stamp-impressed paper	Copper alloys, unwrought	Sulphuric acid

Source: World Integrated Trade Solution, World Bank

With regards to the nature of capital flows, Table 1 shows the substantial decline in Overseas Development Aid, in particular to lower-middle income countries such as Ghana, Uganda, and Zambia. This fall in public, concessional flows were partly compensated for by an increase in remittances (in Ghana) and, more recently, a substantial increase in external debt as a share of GDP. Zambia, Ghana, and to some extent Uganda have also experienced an increase in non-resident investments in domestic sovereign bond markets. According to our interviews, foreign investors held around 30% of the total outstanding stock of government securities in Uganda around the Covid Shock. As a result, reserves have fluctuated around 10% of GDP in most countries.

Figures 1 to 3 give a more dynamic insight into the exchange rate and some key macroeconomic indicators for the six countries. Figure 1 shows the nominal exchange rate (local currency to US Dollar) and the differential between local and US treasury bills as in indicator for financial returns.

Figure 1. Nominal Exchange Rate and Interest Rate Differential

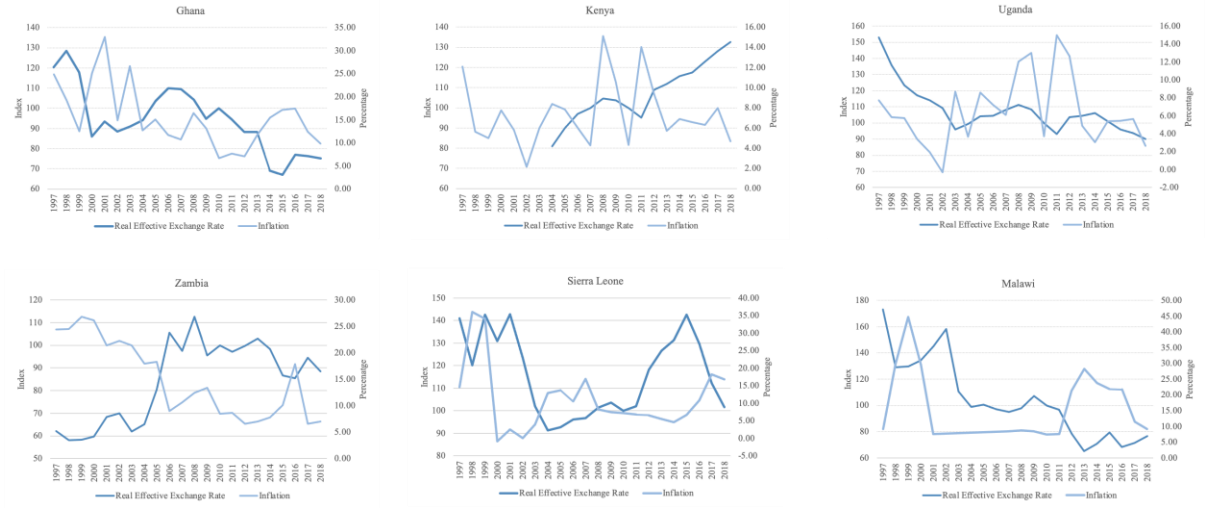


Source: International Monetary Fund

One can observe the sustained depreciation trends in nominal exchange rates across all case study countries; a trend which has accelerated over recent years. Whereas interest differentials declined in the mid-2000s, they have increased again more recently.

Figure 2 shows the real effective exchange rate (REER) and the inflation rate.

Figure 2. Real Effective Exchange Rate and Inflation Rate



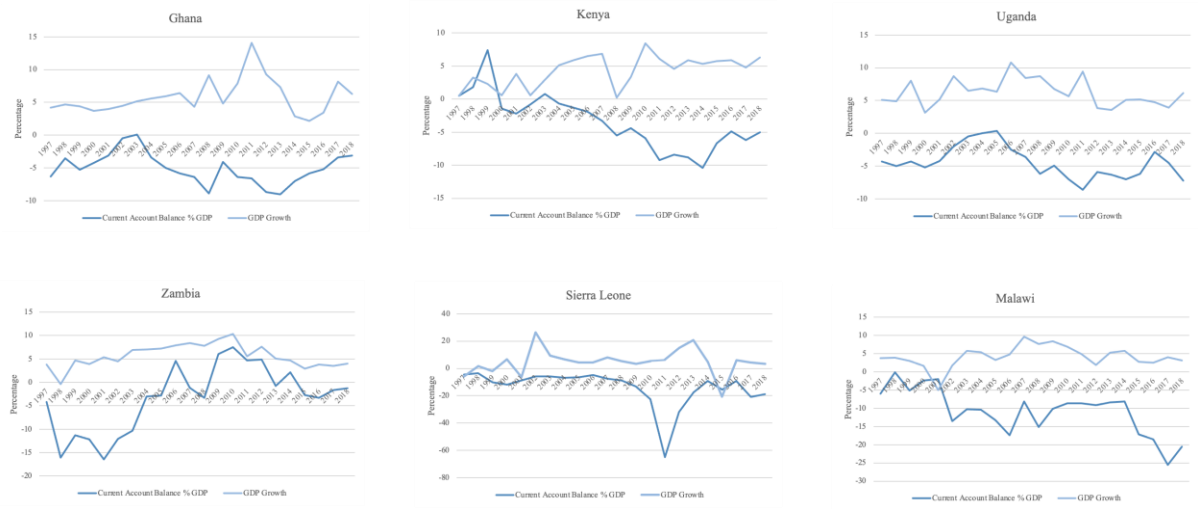
Source: International Monetary Fund

It shows that the nominal depreciations have translated into gains in trade competitiveness in Ghana, Malawi and more recently Zambia (reflected in depreciations also in the real effective exchange rate). Whereas the real effective exchange rate has remained relatively stable in

Uganda and is characterized by significant volatility in Sierra Leone, it has appreciated in Kenya. Though inflation rates have reduced significantly in most countries, they remain at double-digit levels in Ghana, Malawi and Sierra Leone.

Figure 3 shows respective current account balances and GDP growth. With the exception of Zambia and Sierra Leone (which is subject to idiosyncratic shocks), most current accounts started deteriorating from around 2003 with a slight recovery over more recent years. GDP growth is volatile but seems to fluctuate around 5% in most countries.

Figure 3. Current Account Balance as a Share of GDP and GDP Growth



Source: International Monetary Fund

Figure 4 shows the three most important categories of private financial flows: foreign direct investment, portfolio investment, and other investment (mainly banking flows) in net terms.

Figure 4. Net Foreign Financial Flows

Source: International Monetary Fund

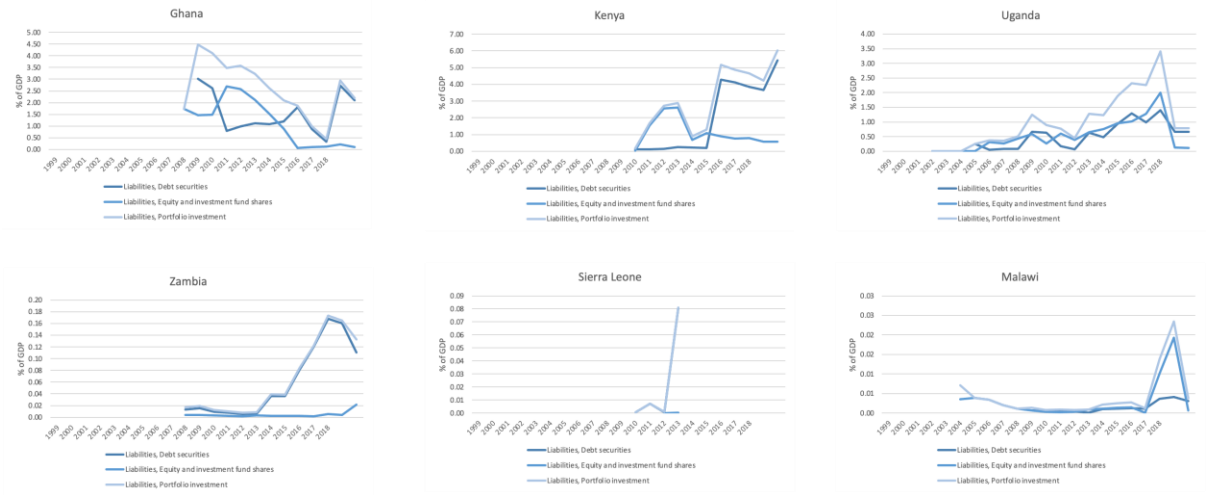
Notes: Financial flows are presented net, financial assets of residents of an economy minus liabilities of residents of an economy to non-residents.

One can observe the still dominant role of foreign direct investment for all economies, but also the volatility of these flows (in particular in Zambia and Malawi). Most countries have seen an increase of these flows in the mid-2000s (concurrent with worsening current account deficits) and a deceleration more recently. With regards to more short-term financial flows, whereas Ghana and Zambia have experienced significant inflows of other investment (mainly banking), Kenya and Uganda have been characterised by persistent outflows. According to these data, portfolio flows (non-resident investments in domestic equity and bond markets) still remain small in absolute terms. As our interview results show though, they can still have a significant influence on market structures and exchange rate dynamics, in particular in the presence of rather low and concentrated liquidity.

Figure 5 gives a more detailed analysis of different types of foreign portfolio investments in gross terms (total, debt securities and equity and investment fund shares).[5]

[5] A recent literature shows that rather than net flows, what matters for financial stability are gross flows which can be liquidated suddenly and quickly (e.g. Bluedorn et al. 2013).

Figure 5. Gross Financial Flows



Source: International Monetary Fund

As one can observe, in gross terms, portfolio flows represent a significant share of the economy of several case study countries, in particular in Ghana, Kenya and Uganda. In most of them, debt securities are the main component (though there seems to be some foreign equity investment in Uganda). On the other hand, in Zambia, Sierra Leone and Malawi, despite showing an upward trend, the size of gross portfolio flows remains relatively insignificant as a share of the GDP.

Finally, Table 3 summarizes the official exchange rate regime, the exchange rate classification by the IMF, the existing monetary policy framework, and the degree of capital account openness for the six case study countries.

Table 3: Official Exchange Rate Regime, IMF Classification, Monetary Policy Framework, and Capital Account Openness

Country	*Official Exchange Rate Regime*	*Exchange Rate Classification by the IMF*	*Monetary Policy Framework*	*Capital Account Openness (1=fully liberalised)*
Ghana	Floating	Floating	Inflation-targeting framework	0.64
Kenya	Free-Floating	Other managed arrangement	Transition from targeting monetary aggregates toward an inflation-targeting framework.	0.57
Malawi	Floating	Stabilized arrangement	Monetary aggregate target	0.14
Sierra Leone	Floating	Other managed arrangement	Monetary aggregate target	0.21
Uganda	Free-Floating	Floating	Inflation-targeting framework	1
Zambia	Floating	Floating	Policy rate as a key policy instrument to signal the monetary policy stance	1

Source: AREAER International Monetary Fund; IMF Capital Account Openness; The capital account index was published in April 2016 (with information from 1996 to 2013).

Notes: According to the IMF a free-floating regime is one where foreign exchange interventions only occurs exceptionally to address disorderly market conditions. Authorities need to provide information that confirms that such interventions were limited to "at most six instances in the previous six months, each lasting no more than three business days". In case that such information is not available the IMF classifies the exchange rate as floating.

One can observe that despite their official floating exchange rate regimes, most countries are still characterised by the IMF as some form of managed or even crawl-like arrangement. Whereas several countries still target monetary aggregates, a few countries have moved to inflation targeting regimes (Ghana, Kenya, Uganda)[6] and/or a regime which uses the policy

[6] An inflation targeting regime comprises the institutional commitment to price stability as the primary goal of monetary policy, the public announcement of medium-term numerical targets for inflation, the short-term interest rate as the main policy instrument, monetary policy independence, and finally full policy transparency, credibility, and accountability to be assured by an independent central bank (Mishkin and Schmidt-Hebbel 2001,

rate as key policy instrument to signal the monetary policy stance (Zambia). In line with the impossible trinity, this move has been particularly strong in countries with open capital accounts and a significant presence of foreign financial investors in their domestic markets. The degree of capital account liberalization varies from a completely open capital account in Uganda, and Zambia, to a still quite closed capital account in Malawi and Sierra Leone.

In sum, above section has shown SSA LLMICs' specific integration in the world economy, characterised by highly concentrated and commodity dependent exports and, in some cases, an increased exposure to private non-resident financial flows. At the same time, nominal and real effective exchange rates have tended to depreciate in several countries. Both exchange rates have been characterised by some volatility. Concerning the exchange rate regime, evidence shows that whilst all countries have moved officially to a floating exchange rate regime, only half of them have followed their official regime according to the IMF's de-facto classification. The next section sheds light on how these macrostructural characteristics of our six case study countries have both shaped and been perpetuated by the microstructural characteristics of their foreign exchange markets.

5 The Microstructure of selected SSA LLMICs Foreign Exchange Markets

As discussed above, the results in this section are based on 13 semi-structured interviews with 17 foreign exchange market experts in the six case study countries and the City of London. These are complemented with the IMF AREAER and – where available – domestic grey literature, such as policy reports and technical reports from respective central banks. Three main areas were covered in the interviews: foreign exchange flows and exchange rate fundamentals; market microstructure; and central bank operations. Results for these three areas are summarized and systematized in the next three sections and Tables 4, 5, and 6 respectively.

5.1 Foreign Exchange Flows, Fundamentals, and Other Exchange Rate Determinants

Table 4 summarises the main foreign exchange flows, fundamentals, and other exchange rate determinants identified as relevant for their respective countries by the interviewees.

Kaltenbrunner and Painceira 2017). This means officially the exchange rate should not be a monetary policy target.

Table 4: Main Flows, Main Fundamentals and Other Exchange Rate Determinants

Fundamentals/Countries	*Ghana*	*Kenya*	*Malawi*	*Sierra Leone*	*Uganda*	*Zambia*

Main Flows	• Remittances
	• Foreign Direct Investment
	• Portfolio investors
	• Oil revenues
		• Dividend payments by multinationals
		• Remittances
		• Tourism
			• Commodities (e.g. sugar, tobacco) **
			• Imports (farm inputs)**
			• Remittances*
				• Foreign assistance
				• Foreign Direct Investment
				• in mining companies
					• Portfolio investors
					• Cyclical and seasonal factors:
					  ○ Coffee seasons
					  ○ Dividends paid by multinationals, international banks and telecoms
						• Debt service

Main Fundamentals	• Agent's interpretation of foreign exchange liquidity • Monetary policy • Fiscal policy • Current account • Inflation • Global factors	• Current account • Corporate behaviour • Monetary policy • Fiscal policy • Foreign currency debt	• Foreign assistance • Economic structure • Weather • Slippages in governances • Political cycle • Fiscal policy • News	• Imports • Exports (few mineral and commodities, in particular diamonds, gold, iron ore, cocoa, ginger and palm oil)	• Imports • Exports • Inflation • Fiscal policy • Global factors • Monetary policy • Market sentiment	• Imports of oil • Exports of copper • Seasonal factors (maise season)
Other Determinants	• Aggregate demand policies • Seasonal factors • Global tensions • Geopolitical factors	• Expectations • Market sentiment		• Government debt • Political cycle	• Speculative forces • Political factors • Market development • Monetary policy • News • Market sentiment	• Political risks • Health risks

*Source: Semi-structured interviews with foreign exchange market experts, World Development Indicators World Bank denoted with * and National Bank of Malawi plc denoted with ***

Regarding the most important foreign exchange flows, in countries like Ghana and Uganda, offshore players such as portfolio investors, foreign multinationals, and international banks have an active role. According to our interviews, this is particularly the case for Ghana, where non-resident investors and institutional investors are active in the Eurobond and the local currency bond market. As one central bank official in Ghana pointed out: *"maybe about 10 years ago, we did not have as much non-resident investors in our market and the first bond we issued was in 2007… since that time, we are depending so much on foreign investors, the dynamics, we have become more sensitive to things happening globally"* (Interviewee 3 and 4). However, interviewees also noted that there have been recent efforts to dilute the share of offshore players in the local currency bond market. Similarly, in Uganda, offshore investors play a key role in the local bond market.

In countries with a lower level of financial integration, seasonal and cyclical export commodities remain a key determinant of foreign exchange inflows. For example, the weather (Malawi), exports of minerals (gold, iron, ore, diamonds) and commodities (cocoa, ginger and palm oil) (Sierra Leone), and imports of oil, exports of coper and the maise season are important factors setting the exchange rate (Zambia) according to local foreign exchange experts. These seasonal and cyclical factors, however, also remain important exchange rate determinants in countries with higher financial flows. For example, as seen in Table 4 and also confirmed in the interviews, exports in Ghana and Uganda remain highly concentrated in a few export commodities, such as oil and gold in Ghana and coffee in Uganda. The only country with a slightly more diversified export base is Kenya where tourism and horticultural exports also play an important role. Furthermore, in lower-middle income countries flows such as remittances (Ghana and Kenya) and debt service (Zambia)[7] play a significant role in exchange rate determination. Flows such as donor disbursements are characteristic of low-income countries such as Sierra Leone. In addition, economic policy was identified as a dominant driver of exchange rates in the sample. According to our interviewees, in Ghana, Kenya, Malawi, and Uganda fiscal policy was considered important, whereas monetary policy mattered particularly in Ghana, Kenya, and Uganda.

Other important exchange rate drivers mentioned by the interviewees included the political cycle, (potentially destabilizing) foreign exchange market expectations, and market sentiment.

[7] Overall, interviews with Zambian representatives have been shaped significantly by the ongoing debt crisis.

The latter two were considered particularly relevant for countries with a higher degree of financial liberalisation and participation of non-resident investors such as Ghana and Uganda. In these countries, global factors, such as international risk aversion or the interest rate in the US, were also considered important drivers of the exchange rate. As one central bank official pointed out: "*because most of our investors are in developed markets so things that are happening to the global economy quickly affects us"* (Interviewee 3 and 4).

In sum, above section has shown that in all case study countries foreign exchange flows and exchange rate fundamentals remain dominated by a few cyclical and seasonal export commodities. In some countries, in particular Ghana and Uganda, non-resident investors have gained a higher share in local currency bond markets which has increased the importance of speculative and global market factors for exchange rate determination. Political uncertainty remains a concern for many case study countries.

5.2 The Microstructure of Foreign Exchange Markets: Organization, Instruments, Actors, and Inefficiencies

Table 5 summarizes and systematizes our main results with regards to the microstructure of the six case study foreign exchange markets.

Table 5: Foreign Exchange Market Microstructure

FX Market Structure/Country	*Ghana*	*Kenya*	*Malawi*	*Sierra Leone*	*Uganda*	*Zambia*
Organisation						
Interbank vs. Auction market *	Functioning OTC interbank market	Functioning OTC interbank market.	Thin OTC interbank market	Dysfunctional OTC interbank market.	Functioning OTC interbank market.	Functioning OTC interbank market
Dealer system*	Dealer system	No dealer system	Dealer system	Dealer system	Dealer system	Dealer System
Electronic trading*	Banks may trade among themselves at freely determined rates on the interbank Reuters dealing platform.	There has been a strong uptake of electronic dealer platforms rather than voice or merchant trading.	Trading is conducted via Reuters and in some cases through phone, and evidence is provided by e-mail.	Trading is conducted via Thomson Reuters dealing platform.	Foreign exchange market is still manual; Customers continuously interact with authorized banks to settle transactions. Commercial banks post their quotes on the Reuters Dealing System	N/A
Role of brokers*	No brokerage	Emergent presence of brokers. Authorised dealers may carry out interbank transactions via approved brokers.	No brokerage	No brokerage	No brokerage	No brokerage
Regulation*	The bid-ask spread has a maximum of 25 basis points, and dealers must reveal two-way quotes.	Authorised Dealers freely determine their bid-ask spreads and foreign exchange commissions in transactions with their clients	Maximum spreads between buying and selling exchange rates are set at 2% for Telegraphic Transfer (TT) and 3% for cash.	There are no limits on the bid-ask spread or commissions of market participants.	Central Bank regulations limit the bid-ask spread to 10 shillings; anything beyond that is penalised	The bid-ask spread may not exceed K 0.05. For amounts outside the market lot, the two-way quotes provided are subject to negotiation.

Foreign Exchange Market Liquidity:						
*Size***	*Monthly turnover on trades excluding central bank in the most liquid currency 500 USD millions.*	*Monthly turnover on trades excluding central bank in the most liquid currency 400 USD millions.*	*Monthly turnover on trades excluding central bank in the most liquid currency 264 USD millions.*	*Total turnover in 2020 was between US$ 5-7 million.*	*Monthly turnover on trades excluding central bank in the most liquid currency 1200 USD millions.*	*Monthly turnover on trades excluding central bank in the most liquid currency 1276.5 USD millions.*
*Nature****	*Seasonal*		*Seasonal*	*Seasonal*		*Lumpy/seasonal*
Instruments:						
Spot vs. Derivatives Market *	Spot trades, forward contracts, swaps and currency swaps.	Commercial banks may conduct forward foreign exchange transactions with their customers at market-determined exchange rates. And also several derivatives, including FX options and swaps.	There are controls on derivatives and other instruments. Occasional forward and swap transactions. The forward market is underdeveloped, and trade is insignificant.	Spot operations (95-98%), forward transactions are limited to imports and exports undertaken with a commercial bank by an institution dealing in the underlying imports or exports.	Mainly a spot market. The forward and swap markets have been developing over recent years. The forward market has been mainly used for risk hedging in the oil and agricultural sector.	Spot transactions are dominant in the market. In addition, derivatives, such as forward contracts, are used mainly by the mining and energy sectors as a risk management product for both industries and banks, and swap transactions.
Dominant Currency***	US Dollar remains dominant	US Dollar remains dominant	The dominant currency is the US Dollar	The dominant currency is the US Dollar	The dominant currency is the US Dollar	The major currencies are the US Dollar and the South African Rand
Actors:						
Dominant actors***	Non-resident investors in the Eurobond market and institutional investors in local currency bond market. Oil and mineral exporters. Commercial	Commercial banks. Exporting companies (tea and coffee)	The Reserve Bank of Malawi, commercial banks and tobacco exporters.	Commercial banks, diamond and gold exporters, petroleum, rice, and sugar	Commercial banks, offshore investors in the local bond market, hedge funds and pension funds. Exporters, which are	International commercial banks. On the supply side mining companies, and, on the demand

	banks, and the central bank.			importers, and the central bank.	mainly agricultural players (coffee, tobacco, tea, cotton, horticulture, and fish exporters),	side, energy companies.
Other actors***	Foreign exchange bureaus, cocoa exporters (Cocoa Board), foreign-owned telecommunication companies, money transfer service providers, non-governmental organisations, offshore investors (portfolio investors and foreign direct investments), and the Central Bank	Mortgage finance company, foreign exchange bureaus, money remittance providers, and importing companies	Foreign exchange bureaus, donors, non-governmental organisations, and major importers (multinationals, fertiliser importers, government and income repatriation)	Foreign exchange bureaus, and donors.	Multinationals, retailers, non-governmental organisations, tourism, importers (oil, clothing, footwear, furniture) and on occasions the Bank of Uganda.	Foreign exchange bureaus, international investors operate through foreign banks as intermediaries to invest in the government securities market. and goods importers.

Key issues and "inefficiencies" ***:	Approximately 70% of the trading activities occur among five major commercial banks. These commercial banks are custodian banks and interact with offshore investors when interested in local currency bonds. Given that these major banks get most of the foreign exchange through this process, their pricing power is significant. To address some of the market inefficiencies, the central bank has incentivised the use of platforms such as Reuters and Infinity, helping price discovery.	Market distorting policies such as the central bank interventions and uncertainty about the central banks' objectives with regards to the exchange rate movements. Particularly, the central banks' control over exchange rate policy and their concern of exchange rate movements affecting external debt sustainability.	Lack of central bank transparency with regards to the foreign exchange deals in the market and strict penalties towards speculation. In addition, the private export sector is paid offshore that leads to a loss of export revenues.	There is a significant parallel market where owners of foreign assets trade for a premium. The relatively small size of the foreign exchange market allows a single participant to drive the market.	The market is highly concentrated among international commercial banks in Uganda with an increasing tendency. Three big commercial banks could account for 80 per cent or 90 per cent of the profitability of the sector. These banks have the advantage of having access to international funds and constantly trade among themselves.	Central bank regulation on main flows providers of FX that have deprived FX liquidity in the market. Insufficient level of reserves driven by the scarcity of FX. To this is added the recent debt default.

*Source: 17 semi-structured interviews with foreign exchange experts denoted with ***; Schanz (2019)**, and IMF AREAER information denoted with an *,.*

According to the interviews, most countries have functioning interbank foreign exchange markets, to the exception of Sierra Leone (and Malawi to some extent). In Sierra Leone, the scarcity and seasonality of foreign exchange inflows means that banks lack access to foreign currency themselves and/or are reluctant to sell it to other banks. Most countries (to the exception of Kenya) have dedicated dealer systems which only allow selected commercial banks access to central bank liquidity in foreign exchange. The interviews pointed to the development of electronic trading in most countries, though again with some variation (e.g. Uganda seems to be lagging behind his peers in this respect). In contrast to developed foreign exchange markets, the existence of brokers is still very limited. The only exception is Kenya where the interviewees observed some emergence of brokerage activities. All case study countries (to the exception of Kenya and Sierra Leone) continue to regulate the bid-ask spread to limit speculative behaviour and undue pricing power.

Although most countries have functioning interbank markets, in many the liquidity of those markets is characterised by significant seasonality and "lumpiness" in line with the price developments of their main export commodities, investments, and loan disbursements (interviews and Schanz, 2019). As one international foreign exchange expert noted: *"…the biggest corporate problem we face, as I said, is that you get these periods of intense FX illiquidity where you just cannot get dollars out of the country"* (Interviewee 1).

This seasonality and volatility of foreign exchange inflows and periods of intense FX illiquidity is exacerbated by the behaviour of agents in possession of foreign exchange (in particular banks and export companies). Given the uncertainty about future access to foreign exchange, these agents tend to hoard some parts of their foreign exchange revenues rather than selling them to the official foreign exchange market. This is also the case for banks who are loath to sell their foreign exchange to competitors, thus stifling the development of a functioning interbank market. Moreover, foreign exchange might remain in the parallel market which trades at a premium. Whereas in Ghana, Kenya, and Uganda the parallel market was not considered significant, it is very important in the case of Sierra Leone and relevant in the case of Malawi and Zambia.

With regards to the instruments traded, foreign exchange markets continue to be dominated by US Dollar spot transactions in particular in less liquid and highly import ones, such as Sierra Leone and Malawi. Given the dominance of commodity exports (which are priced in dollars), limited regional trade, and US Dollar-denominated external debt, the US Dollar remains *the*

currency in the region. The lack of bilateral exchange rates for regional currencies, means that even regional transactions continue to create an indirect demand for the US Dollar as the main vehicle currency. Some countries have sought to develop their derivatives markets, including forwards, swaps, and options. For example, interview participants in Uganda mentioned the significant increase of turnover in FX swaps which increased by around 65% since 2011. Swaps provide increased liquidity and hedging opportunities to locals and foreign investors. Indeed, offshore investors have both been attracted by the ability to hedge the FX risk cheaply and have played an important role in establishing these products through their expertise and knowledge (at times, e.g. in Nigeria, actively supported by the central bank). However, there is also some evidence that they are used for speculative behaviour. Moreover, local banks get higher yields in the swap markets making it more attractive for these players.

With regards to the main actors in foreign exchange markets, as with developed foreign exchange markets, banks are key. In contrast to developed markets though, with the exception of Kenya, most countries are characterised by a strong presence of foreign banks (here Uganda and Zambia are noteworthy) and a significant degree of concentration. For example, Ugandan participants mentioned the dominance of three international banks which control nearly 90% of the foreign exchange market. Global banks are key points of access and information for foreign institutional investors, act as primary dealers for government securities, and often invest for their clients across the African continent. They have access to international funding markets which makes them less dependent on local foreign exchange market liquidity. This access to global funding markets, however, also makes them potential transmitters of international market conditions to domestic foreign exchange markets. This having been said, the global decline in correspondent banking has particularly affected Africa, which has seen a significant reduction in the activities of international banks. Whereas the reduction in correspondent banking services has been a global phenomenon, smaller countries with less demand, trade, or relative growth and countries with apparently weaker governance and/or deficient controls to prevent illicit financing have been particularly affected (Rice, von Peter et al. 2020). At the same time, large African banks, for example from Nigeria, Morocco, and South Africa, and pan-African regional banks (e.g. Ecobank) have expanded in the region to offer banking services in other African countries.

Another distinguishing characteristic of SSA LLMICs foreign exchange markets already noted by Canales-Kriljenko (2003) is the importance of non-bank customer flows vis-à-vis the

importance of interbank trading. Whereas the microstructure literature on developed foreign exchange markets largely focuses on the activities of dealer banks, low and erratic interbank liquidity, as well as the relatively large size and lumpiness of client flows, makes these flows relatively more important in LLMICs foreign exchange markets. According to our interviews, big export and import companies, service companies, and inter-governmental organizations are key sources of supply and demand for foreign exchange.

In some countries, foreign financial investors have become important players in the domestic foreign exchange market through their demand for domestic sovereign bonds. [8] As discussed in the previous section, this has become particularly important in LLMICs where concessional financing has declined and/or private finance has offered less complex and conditional financing (Ghana and Uganda and until its recent default Zambia). According to our interviews, these foreign investors, largely institutional investors and dedicated frontier market funds, are attracted by the high nominal yields and potentially favourable exchange rate dynamics in (managed) floating exchange regimes. Moreover, infrastructural development, such as the reduction in capital account restrictions and development of platforms, and the inclusion of some of these countries in major financial indices (e.g. the JP Morgan index), have contributed to the attractiveness of SSA debt markets. As noted in the previous section, though providing foreign exchange markets with additional liquidity, these investors also have brought new challenges, such as their pro-cyclical behaviour and the rising importance of international market and US monetary conditions for exchange rate dynamics.

Another key agent in all case study foreign exchange markets are foreign exchange bureaus, which provide access to spot/cash foreign exchange to the local population. FX bureaus do not have access to central bank liquidity and in most cases are not allowed to hold accounts abroad. They source their FX either from banks or the parallel market. In the latter case, one could argue that FX bureaus are a further reflection of the microstructural weaknesses discussed above and the reluctance of private agents to relinquish foreign exchange to the official banking system.

[8] This result is somewhat at odds with the portfolio data in the previous section, which showed a negligible importance of portfolio flows. This discrepancy could be due to the fact that whilst still small as a percentage of GDP, non-resident flows are still significant relative to thin foreign exchange markets. Moreover, evidence for emerging markets shows that rather than necessarily through their volume, non-resident investors matter because of the type of positions they take (Kaltenbrunner 2017)

The relatively low liquidity in domestic foreign exchange markets, and relative size of foreign exchange revenues, also means that agents with access to foreign exchange can exert market power and potentially influence price dynamics. For example, our interviewee in Sierra Leone noted:

"…if you have foreign exchange you are powerful. You can move the market with $1 million, $2 million, you can move the market….$8 million, imagine me sitting on $6 million in Sierra Leone, I can determine whatever price I want to sell it because there is always a buyer" (Interviewee 9) Whereas in the countries with low level of financial integration (Malawi, Sierra Leone, and to some extent Zambia), this refers primarily to large commodity and mineral exporters, in markets with a high participation of foreign investors (Ghana, Uganda), the foreign players can have significant impact on exchange rate movements. In this context, participants thought that the increased presence of foreign investors in local currency bonds (rather than Eurobonds) had increased their impact on exchange rate movements. Given the more diversified export base and lower participation of foreign investors, this problem is less acute for Kenya. The relative size and importance of client flows, and the concentrated nature of domestic banking systems, also means that those banks which have access to those flows can exert a certain degree of market power. Though bid-ask spreads are regulated in all countries in the sample (to the exception of Kenya and Sierra Leone), this can translate into significant spreads for final customers. Moreover, speculative gains through betting on future exchange rate movements can be made through access to a significant amount of client flows. According to participants in Ghana, this is particularly the case for international, custodian banks, which intermediate most of institutional investments into domestic bond markets.

In sum, above discussion has shown that whilst most countries have developed functioning interbank FX markets, liquidity continues to be characterized by significant volatility, seasonality, and "lumpiness". This is particularly the case for countries dependent on a few, (volatile) export commodities. These liquidity dynamics, in turn, affect the behaviour of those with access to FX, who might be reluctant to relinquish it to the official banking system and create a peculiar microstructure reflected in the importance of foreign exchange bureaus. Moreover, it potentially furnishes significant market power to those with access to foreign exchange and the ability to influence price dynamics. These microstructural characteristics, however, make the move to floating exchange rates extremely difficult and mean that central banks remain key actors in foreign exchange markets. At the same time though, they can

complicate central banks' ability to manage the exchange rate through reduced interbank market liquidity. This is what we turn to next.

5.3 Central Bank Operations and Exchange Rate Management

As indicated in Table 2, most of our case study countries have moved to a de-jure floating exchange rate regime. This has been accompanied by a shift in the monetary regime from one which targets monetary aggregates to one which gives more primacy to the inflation and uses the short-term interest rate as main monetary policy instruments.

Table 6 summarises our results with regards to exchange rate management and foreign exchange intervention in the six case study countries.

Table 6: Central Bank Operations and Exchange Rate Management

Central Bank Behaviour /Country	*Ghana*	*Kenya*	*Malawi*	*Sierra Leone*	*Uganda*	*Zambia*
Actual Exchange Rate Regime*	Floating	Free Floating	Floating	Floating	Free floating	Floating
De-facto Exchange Rate Regime*:	Floating	Other Managed	Stabilized	Other managed	Floating	Floating
Timing, Size, and Nature of Interventions**	Interventions are carried out periodically. The central bank provides Balance of Payments support by providing liquidity to the system and, as such, avoiding sharp movements in the currency while ensuring that it maintains a sound buffer to deal with shocks in the future.	The central bank of Kenya is an active player in the foreign exchange market and aims to influence exchange rate dynamics. This influence, though, is not directed towards a specific exchange rate value or at changing the direction of exchange rate movements, but is mainly aimed at smoothing the volatility of the exchange rate and avoid large and fast exchange rate adjustments.	The exchange rate regime is managed. Previous to 2020, exchange rate management was carried out through borrowing US Dollars from commercial banks by using foreign exchange instruments with high yields and IMF facilities, an overall process that was not transparent.	The central bank primarily intervenes in the market in the case of a supply shock and periods of severe foreign exchange scarcity (e.g. during the rainy season).	The concern is more about domestic price stability than defending a particular level of the exchange rate. The price stability ensures that when involved in foreign currency transactions (investor, producer, or manufacturer), agents have some certainty of what exchange rate will apply when settling the transactions.	Interventions are carried out when volatility is judged to be temporary and driven by non-structural factors (expectations; political issues). One way of assessing market conditions is the behaviour of both local and foreign currency deposits. If foreign currency deposits exceed local currency deposits, this could be indicative that expectations are driven by temporal factors (expectations around elections), and, therefore, it might be appropriate to intervene. However, if the movement is judged to be permanent (for example, due to the closing of a company that is a source of foreign exchange), the central bank opts to stay out or intervenes just to smooth out volatility.

Reasons for Interventions**	Central bank interventions take place in case of significant volatilities that can jeopardize the short and medium run outlook for inflation.	Central bank interventions aim to stem a more structural exchange rate depreciation. The reasons can be found in the external debt situation. Kenya has borrowed significantly on Eurobond markets (in US Dollar) which means exchange rate depreciations directly feed into the government's debt servicing requirements.	The central bank intervenes in the foreign exchange market to reduce volatility and to build foreign reserves.	The central intervenes in the market to smooth excess volatility. In addition to the above mentioned factors.	Central Bank's interventions aimed at stemming short-term volatility in the foreign exchange market without having a level in mind. Active interventions are spike determined and when fundamentals do not support the exchange rate movements. Another reason for interventions is reserve accumulation.	The central bank of Zambia intervenes in the spot market to reduce exchange rate volatility.

Instruments of Interventions**	The Central Bank intervenes, largely selling US Dollars to the market players identified above. Both the nature of an open economy and the increase in non-resident investors have led the central bank to take various measures. Among these stand out: the increase in the frequency that macroeconomic data is published (to help offshore investors assess their portfolios), transparency, and market discipline. For example, the Central Bank has also implemented foreign auctions and publishes the results to increase transparency.	The central bank of Kenya uses market-based foreign exchange intervention, in the sense that it buys and sells foreign exchange from the dealer banks. This process is done through three main channels. First, foreign exchange auctions when the central bank considers appropriate doing so. Second, direct purchases and sales via Reuters Dealing System or Bloomberg in order to smooth fluctuations in the trading level. Third, by purchases through mutual agreement with commercial banks in case dealers have an excess of foreign exchange. Given the structural pressures on foreign exchange reserves, the bank also engages in what	The central bank managed the exchange rate through their influence on the commercial banks and the introduction in 2019 of stricter foreign exchange regulations. Authorities set out heavy penalties to speculation of around USD 100,000, that laid out clear bands within which commercial banks and foreign exchange bureaus could trade.	The central bank conducts selected wholesale foreign exchange auctions via Reuters to allocate the foreign exchange to importers of essential commodities. During periods of strong foreign exchange inflows from mining (e.g. during the 2014-2017) period, it buys the foreign exchange from the market to build reserves.	Foreign exchange interventions are carried out through a foreign exchange auction process. The Central Bank has a daily auction known by the market. The Central Bank opens bids for a specific window and accepts whether these are deemed with the market trend. However, depending on the market pressures, if volatility is observed, the central bank tends to stay out. Interventions in the foreign exchange market have a precise time and structure following the foreign exchange market desk's advice. That is interventions are carried out when needed to smooth out the excess of volatility. It follows a transparent consultation process within the central bank, given that	One of the main forms of interventions is the targeted sector intervention that guarantees foreign currency supply to a specific sector experiencing issues to avoid disruptions to the market. The second form of intervention consists of directly speaking to commercial banks showing abnormal foreign exchange demand levels above the mean. Interventions are also carried out in the local currency. That is, in case that the central bank notices that there is an abundance of local currency, it forces the authorities to go to the money market and implement repurchase agreements (repos).

		interviewees call strong “moral suasion”. That is, the central bank is in close contact with the banks and tries to convince them of the appropriate exchange rate value. The interviewees also thought monetary policy, i.e. interest rate movements, might be used to influence exchange rate movements.	some depreciation episodes are likely to reverse and can lead to unnecessary interventions. The respondents declared that there is a division between interventions and reserve accumulation. The central bank accumulates reserves regularly and remains careful to do so when conditions in the market are favourable. One interesting mechanism of building up international reserves is by speaking with a player who represents a significant inflow of funds. In this case, the central bank deals directly with this player, especially when reserves are deviating from the target.

Effectiveness **	Interventions are effective in such a way that it provides investors with certainty about exchange rate stability. As such, the Central Bank acts optimally to ensure that the exchange rate moves in line with fundamentals.	Interventions have been successful though pressures on the exchange rate persist.	NA	Extensive interventions during depreciation are impossible due to the low level of reserves and are only aimed at mitigating serious foreign exchange scarcity and securing essential imports.	The effectiveness of exchange rate interventions differs when movements are driven by actual demand and when movements are driven by speculation. When volatility is driven by actual demand, interventions will be effective supplying higher amounts of foreign exchange into the market. On the other hand, when movements are driven by speculation, interventions are effective when supplying small amounts of foreign currency.	N.A.

*Source: 17 semi-structured interviews with foreign exchange experts denoted with **; IMF AREAER information denoted with an **
Notes: According to the IMF a free-floating regime is one where foreign exchange interventions only occurs exceptionally to address disorderly market conditions. Authorities need to provide information that confirms that such interventions were limited to "at most six instances in the previous six months, each lasting no more than three business days". In case that such information is not available the IMF classifies the exchange rate as floatin

As Table 6 shows, de-facto though all central banks continue to intervene in the foreign exchange market, though at varying degree. Whereas the central bank of Kenya is an active operator in the foreign exchange market, the exchange rate regime is closest to a free float in Uganda. According to one international foreign exchange expert, foreign exchange interventions have intensified over recent years as depreciation pressures on SSA currencies have increased (Interviewee 1).

According to the interviews, interventions are mainly aimed at smoothing exchange rate volatility and avoiding large and sudden changes in foreign exchange liquidity and consequently the exchange rate, rather than targeting a certain exchange rate level (to the exception maybe of Kenya where there was a sense that the central bank was leaning heavily against depreciation pressures). In line with what has been observed in emerging markets (Benlialper and Cömert 2015, Kaltenbrunner and Painceira 2017), interventions seemed to be somewhat asymmetric in the sense that appreciating pressures prompted a lower response from central banks than depreciation pressures. Interventions during times of appreciation were mainly motivated to accumulate reserves, rather than reduce pressures on the exchange rate (with the potential exception of Kenya).

The specific reasons for central bank interventions differed across the case study countries depending on their respective foreign exchange macro and microstructures. In countries with very limited foreign exchange liquidity, a low level of reserves, and dependence on a few seasonal export commodities (in particular Sierra Leone, Malawi and currently Zambia), interventions were limited to dealing with acute periods of foreign exchange illiquidity and securing vital imports, such as food staples and healthcare products. Here, targeted allocations of foreign exchange to strategic sectors were the norm. In addition, interventions are seasonal in the sense that the central bank buys foreign exchange during the export seasons, which it then allocates during periods of lower liquidity. While this is most acute in countries with a very low level of foreign exchange reserves and less developed financial systems that rely heavily on the export of agricultural products, one respondent argued that these targeted interventions also take place in more developed markets. For example, according to the same interviewee, in Nigeria the central bank prioritises visible importers over companies that might have an income or service payment (Interviewee 1).

In countries with more developed foreign exchange markets and a high presence of foreign investors (Uganda and Ghana), interventions were more geared towards managing the cycle of

global liquidity and smoothing the impact of large foreign financial flows on the exchange rate. Indeed, according to one non-resident investor, central bank operations and the willingness and ability of central banks to intervene during periods of reduced liquidity is a key determinant of their investment decisions into domestic bond markets (Interviewee 2). On the side of the SSA respondents, providing the necessary foreign exchange to foreign investors and "securing an exit at a reasonable price" was considered an important element of providing an investor friendly macroeconomic management and attract foreign capital (Interviewees 3,4 and 10-12).

Three more reasons for central banks' reluctance to allow for more significant depreciations at the current conjuncture were mentioned by the respondents. First, as discussed above, the region faces a strong orientation towards the U.S. Dollar and a significant degree (or at least the risk) of currency substitution. The U.S. Dollar is considered the more trustworthy currency and store of value. Periods of strong and sudden depreciations could further undermine the trust in domestic currencies and exacerbate the substitution into the U.S. Dollar. As one international foreign exchange expert put it:

"….I think, policymakers in Africa, especially in Sub Saharan Africa, really favour a stable exchange rate over anything….so they can accept overvaluated exchange rates because what they want to avoid is a big devaluation which creates you know dollarisation or panic or what have you amongst locals" (Interviewee 1).

Second, several respondents also thought that agents in Africa equated the strength of their currencies to the overall strength of the economy. In that sense, depreciating currencies did not fit with the image of Africa rising and turned exchange rate movements into highly political issues, in particular during periods of election. Finally, an issue which was raised particularly in the context of Kenya, are concerns about debt sustainability in the presence of a large stock of foreign currency (US Dollar) denominated debt and the implications a weakening exchange rate could have on the real value of this debt stock.[9]

Interventions during periods of foreign exchange supply, on the other hand, were mainly aimed at building foreign exchange reserves rather than lowering appreciating pressures on the local currency according to our interviewees. Given the countries' concentration on commodity and mining exports, which are priced in US Dollars, and the high reliance on imports, appreciations

[9] Pass-through from the exchange rate to domestic inflation could be another concern for central banks and motivate the interventions though none of our interviewees mentioned those explicitly.

were generally considered less problematic. One interviewee thought that interventions during appreciation were also motivated by an attempt to avoid large and unsustainable appreciations which created the expectations of large future depreciations, which could further accelerate dollarization in the presence of central banks' limited foreign exchange reserves to contain them.

In sum, above discussion showed that given the volatile, seasonal, and "lumpy" nature of foreign exchange flows in Africa central banks remain key agents in the foreign exchange market, finding themselves unable to truly float the domestic currency. At the same time though, the specific microstructure of those markets shapes, and at times, complicates those interventions. Hoarding behaviour deprives the official exchange foreign market of liquidity, and hence the ability the accumulate reserves during periods of foreign exchange inflows. The low trust in domestic currencies and speculative operations by dominant actors in concentrated market structures, in turn, create the risk of exchange rate overshooting and volatility. These adverse exchange rate dynamics limit the central banks' willingness to let these currencies depreciate too much.

These microstructural issues are also reflected in the types of instruments the case study central banks use to conduct their foreign exchange market operations. Whilst mostly market-based, i.e. based on buying and selling in the foreign exchange market, many central banks also use "moral suasion" (attempts to convince banks of an appropriate exchange rate value), and at times direct pressure on the domestic banking system to affect the exchange rate. This is arguably a reflection of both, structural scarcity of foreign exchange and the concentrated market structures which potentially give pricing powers to a few banks (with access to foreign exchange). Although the majority of interventions are still in the spot market, some central bank have also started to intervene in the derivatives market (Ghana) to support the development of these products and reduce the uncertainty regarding the supply of foreign currency. Given the foreign exchange scarcity and potential reluctance of foreign exchange actors to relinquish their foreign exchange, in some countries central banks buy from government owned institutions (e.g. Ghana), have agreements with banks (e.g. Kenya), or approach actors with a significant inflow directly (e.g. Uganda).

6 Conclusions

This paper has provided insights into the specific microstructure of selected SSA LLMICs and the way they interact with central bank behaviour and ultimately exchange rate dynamics. It paid particular attention to the interaction between those countries' macrostructures – in particular their continued dependence on a few, relatively volatile export commodities and their vulnerability to volatile foreign financial flows in the presence of weak currencies and think financial markets – and the way foreign exchange markets are organised. It showed that whilst some countries have seen increased interbank/dealer trading, foreign exchange markets generally remain characterised by volatile and seasonal liquidity, which depends on a few export commodities. These liquidity dynamics affect agents' behaviour, who further withhold foreign exchange from the official foreign exchange markets, and potentially increases the market power of those with access to foreign exchange. This behaviour by foreign exchange market participants could further exacerbate depreciation pressures caused by underlying balance of payments dynamics. Though some countries have seen a significant rise in foreign financial flows, it remains unclear whether these flows can stabilise domestic foreign exchange markets or further exacerbate structural weaknesses in a pro-cyclical process.

In this context, despite their official move towards floating exchange rate regimes, central banks have remained key agents in SSA foreign exchange markets to provide liquidity support and lean against structural depreciation pressures. Our results show that SSA central banks have, at times, intervened significantly to lower pressures on the domestic currency motivated by political and external debt considerations, and fears that exchange rates might overshoot in the presence of low trust in domestic currencies and a significant degree of currency substitution. In combination with non-negligible domestic inflation rates and lower concerns about appreciating exchange rates this creates the risk of overvalued real exchange rates, which further undermines the domestic non-commodity sector and hampers industrial development and economic diversification. On a more general level, our discussion shows the difficulties of conducting floating exchange rates in LLMICs with underdeveloped foreign exchange markets, highly concentrated export structures and commodity dependency, and currencies subject to latest substitution pressures.

Overcoming these hurdles are difficult, but could include developing mechanisms to ensure the transfer of foreign exchange revenues into the official foreign exchange market and attempts to reduce the dependence on the US Dollar through, among other things, the development of

regional payment and settlement mechanisms. Our results also shed critical light on the benefits of "fickle" non-resident investors in market characterised by low and volatile liquidity. While bringing important financial resources, these flows could potentially exacerbate the structural volatility of SSA exchange rates and increase the regions' vulnerability to international financial market conditions. Finally, our results put in doubt the feasibility and appropriateness of floating exchange rates regimes for LLMICs. Rather SSA LLMICs might want to consider pursuing exchange rate regimes which allow maintaining a competitive and favourable environment for domestic production. This could include, for example, managing currencies around a basket of currencies, potentially within a non-rigid band to focus expectations but avoid speculative action. To ensure the sustainability of these regimes, they might have to be accompanied with a careful approach to capital account liberalization

7 References

Allen, H. and M. Taylor (1992). "The Use of Technical Analysis in the Foreign Exchange Market." Journal of International Money and Finance **11**(3): 304-314.

Azam, J.-P. (2007). Trade, Exchange Rate, and Growth in Sub-Saharan Africa, Cambridge University Press.

Baccetta, P. and E. van Wincoop (2006). "Can Information Heterogeneity Explain the Exchange Rate Determination Puzzle." American Economic Review **96**(3): 552-576.

Bank of International Settlements. (1998). "Central Bank Survey of Foreign Exchange and Derivatives Market Activity," Basle, Bank of International Settlements, 1998.

Benlialper, A. and H. Cömert (2015). "Implicit asymmetric exchange rate peg under inflation targeting regimes: the case of Turkey." Cambridge Journal of Economics **40**(6): 1553-1580.

Bonizzi, B., C. Laskaridis and J. Toporowski (2019). "Global Liquidity, the Private Sector and Debt Sustainability in Sub-Saharan Africa." Development and Change **50**(5): 1430-1454.

Bluedorn, M. J. C., Duttagupta, R., Guajardo, J., & Topalova, P. (2013). Capital Flows are Fickle: Anytime, Anywhere. International Monetary Fund.

Borio, C. E., R. N. McCauley and P. McGuire (2017). "FX swaps and forwards: missing global debt?" BIS Quarterly Review September.

Byrne. (2001). Sampling for qualitative research. AORN Journal, *73*(2), 494,497–494,498.

Canales-Kriljenko, J. I. (2003). "Foreign exchange intervention in developing and transition economies: results of a survey." IMF Working Paper **03/95**.

Canales-Kriljenko, J. I. (2004). "Foreign Exchange Market Organization in Selected Developing and Transition Economies: Evidence from a Survey." IMF Working Paper **4**.

Christensen, J. (2005). "Domestic debt markets in sub-Saharan Africa." IMF Staff Papers **52**(3): 518-538.

Charmaz, K. (2003). "Grounded Theory", The SAGE Encyclopedia of Social Science Research Methods. 2003. SAGE Publications.

Dafe, F., D. Essers and U. Volz (2018). "Localising sovereign debt: The rise of local currency bond markets in sub-Saharan Africa." The World Economy **41**(12): 3317-3344.

De Grauwe, P. and M. Grimaldi (2006). The Exchange Rate in a Behavioural Finance Framework. Princeton, Princeton University Press.

Evans, M. and R. Lyons (2002). "Order Flow and Exchange Rate Dynamics." Journal of Political Economy **110**(1): 170-180.

Foddy, W. (1993). Constructing Questions for Interviews and Questionnaires: Theory and Practice in Social Research. Cambridge, Cambridge University Press.
Garbade, K. D. (1978). "The effect of interdealer brokerage on the transactional characteristics of dealer markets." Journal of Business **51**(3): 477-498.
Glaser, B. G. and Strauss, A. (1967). The Discovery of Grounded Theory. New York: Aldine.
Heath, A., G. Galati and P. McGuire (2007). "Evidence of carry trade activity." BIS Quarterly Review, September.
Kaltenbrunner, A. (2015). "A Post Keynesian Framework of Exchange Rate Determination: A Minskyan Approach." Journal of Post Keynesian Economics **38**(3): 426-448.
Kaltenbrunner, A. (2017). "Financialised internationalisation and structural hierarchies: a mixed-method study of exchange rate determination in emerging economies." Cambridge Journal of Economics **42**(5): 1315-1341.
Kaltenbrunner, A., I. H. Kvangraven, C. Metz, A. Okot, M. E. Giraudo and J. Perraton (2020). "The Rise of Domestic Debt Markets in Africa: Who shapes them? Who benefits? ." Unpublished manuscript
Kaltenbrunner, A. and J. P. Painceira (2017). "The impossible trinity: Inflation targeting, exchange rate management and open capital accounts in emerging economies." Development and Change **48**(3): 452-480.
Kohler, M. (2010). "Exchange Rates during Financial Crises." BIS quarterly Review **March 2010**.
Korstjens, I., & Moser, A. (2018). Series: Practical guidance to qualitative research. Part 4: Trustworthiness and publishing. European Journal of General Practice, *24*(1), 120-124.
Kvangraven, I. H. (2016). The changing character of financial flows to sub-Saharan Africa. Financial Deepening and Post-Crisis Development in Emerging Markets. A. Gevorkyan and O. Canuto, Springer**:** 223-245.
Kvale, S. (1994)."Interviews: an introduction to qualitive research interviewing". Sage.
Lincoln, Y. & Guba, E. (1985). "Naturalistic Inquiry". Newbury Park, CA: Sage Publications.
Lyons, R. K. (2001). The Microstructure Approach to Exchange Rates. Cambridge, MA, MIT Press.
Menkhoff, L., R. Rebitzky and M. Schroeder (2009). "Heterogeneity in Exchange Rate Expectations: Evidence on the Chartist-Fundamentalist Approach." Journal of Economic Behaviour&Organization **70**(1-2): 241-252.
Mishkin, F. S. and K. Schmidt-Hebbel (2001). "One Decade of Inflation Targeting in the World: What do we know? What do we need to know?" NBER Working Paper **8397**.
Oberlechner, T. (2001). "Importance of Technical and Fundamental Analysis in the European Foreign Exchange Market." International Journal of Finance and Economics **6**(1): 81-93.
Olsen, W. (2011)."Data collection: Key debates and methods in social research". Sage.
Perraudin, W. and P. Vitale (1996). Interdealer trade and information flows in a decentralized foreign exchange market. The microstructure of foreign exchange markets. J. Frankel, Galli and Giovaninni, University of Chicago Press**:** 73-106.
Powner, L. C. (2015). "Empirical research and writing: A political science student's practical guide". CQ Press.
Rey, H. (2015). "Dilemma not Trilemma: The Global Financial Cycle and Monetary Policy Independence". NBER Working Paper, **21162**(May 2015).
Rice, T., G. von Peter and C. Boar (2020). "On the global retreat of correspondent banks." BIS Quarterly Review, March.
Sarno, L. (2005). "Viewpoint: Towards a Solution to the Puzzles in Exchange Rate Economics: Where do we stand?" Canadian Journal of Economics/Revue canadienne d'économique **38**(3): 673-708.
Sarno, L. and A. Taylor (2001). "The Microstructure of the Foreign Exchange Market: A Selective Survey of the Literature." Princeton Studies in International Economics **89**.
Schanz, J. F. (2019). "Foreign exchange reserves in Africa: benefits, costs and political economy considerations". BIS Paper, **105**.
Shiller, R. J. (2003). "From Efficient Markets Theory to Behavioral Finance." The Journal of Economic Perspectives **17**(1): 83-104.

Shleifer, A. and L. H. Summers (1990). "The Noise Trader Approach to Finance." The Journal of Economic Perspectives **4**(2): 19-33.
Thomas, A. H. (2012). "Exchange rate and foreign interest rate linkages for sub-Saharan Africa floaters." IMF Working Paper **12**.
Vitale, P. (2007). "A Guided Tour of the Market Microstructure Approach to Exchange Rate Determination " Journal of Economic Surveys **21**(5): 903-934.

Appendix A

City of London:

Interviewee 1: African Chief Economist at a Large International Commercial Bank (23/02/2021-Modality: Zoom Videocall)

Interviewee 2: Investment Director at an International Investment fund (16/11/2020-Modality: Zoom Videocall)

SSA LLMICs:

Interviewee 3: Central Bank Official in Ghana (25/01/2021-Modality: Zoom Videocall)

Interviewee 4: Central Bank Official in Ghana (25/01/2021-Modality: Zoom Videocall)

Interviewee 5: Chief Economist of a Commercial Bank in Kenya (02/02/2021-Modality: Zoom Videocall)

Interviewee 6: Director of Credit Markets at a Development Agency in Kenya (27/01/2021-Modality: Zoom Videocall)

Interviewee 7: Country Economist from an International Development Bank in Malawi (23/02/2021-Modality: Zoom Videocall)

Interviewee 8: Academic Country Economist in Malawi (01/02/2021-Modality: Zoom Videocall)

Interviewee 9: Central Bank Official in Sierra Leone (18/02/2021-Modality: Zoom Videocall)

Interviewee 10: Central Bank Official in Uganda (02/12/2020-Modality: Zoom Videocall)

Interviewee 11: Central Bank Official in Uganda (02/12/2020-Modality: Zoom Videocall)

Interviewee 12: Central Bank Official in Uganda (02/12/2020-Modality: Zoom Videocall)

Interviewee 13: Central Bank Official in Uganda (03/11/2020(02/12/2020-Modality: Zoom Videocall)

Interviewee 14: Head of the Financial Markets Department at a Domestic Commercial Bank in Uganda (13/01/2021-Modality: Zoom Videocall)

Interviewee 15: Country Representative & Investment Manager at a Regional Financial Service Provider in Uganda (06/10/2020-Modality: Zoom Videocall)

Interviewee 16: Central Bank Official in Zambia (11/02/2021-Modality: Zoom Videocall)

Interviewee 17: Economist at a Regional Commercial Bank in Zambia (12/02/2021-Modality: Zoom Videocall)

Appendix B

Interview Questions

Depending on the interviewee's expertise these questions will either refer to African foreign exchange markets in general or specific countries. The interviews are semi-structured, which means a general list of questions will be pursued but content and emphasis will be decided by the interviewee's area of expertise.

Part 1: Interviewee Details

Part 2: Market Structure:

1. How would you describe the current structure of African/"Country name" foreign exchange market(s)?
   - **1.1.** How is the foreign exchange market organised?
   - **1.2.** What are the most prevalent domestic-currency/FX assets? Why?
   - **1.3.** Who are the main actors in the foreign exchange market?
   - **1.4.** What is the role of central bank in the market?
   - **1.5.** How has this structure changed over the, say, last 20 years? Why?
   - **1.6.** In your view, does this structure differ from that in developed/emerging economies? How? Why?

1.7. How do you think these features of the FX market affect exchange rate determination (medium term, volatility, crash risk)?

Part 3: Exchange Rate Determinants

2. In your view, who or what drives exchange rates in Africa/"countryname"?

2.1. How has this changed over the last years?

2.2. In your view, do the drivers differ from those in emerging markets/developed countries? How? Why?

2.3. Do the exchange rates always reflect underlying economic factors or are there other factors which influence the exchange rate?

2.4. Do the drivers of exchange rates change? Normal vs. Crisis time? Short-term vs long-term?

2.5. Are there any dominant actors which determine the exchange rate value?

Part 4: Foreign Exchange Market Behaviour

This set of questions is aimed at actors who operate actively in the foreign exchange market and need to take a view on future exchange rate dynamics

3. What is your motivation to participate in the foreign exchange market?

4. How does the exchange rate matter for your operations?

5. What variables do you consider when forming a view of the exchange rate?

6. Are there any factors/inefficiencies which constrain your operations in the foreign exchange market?

ECONOMICS – WORKING PAPERS 2022/11

A structural analysis of foreign exchange markets in sub-Saharan Africa

Economics Department
economics@eib.org
www.eib.org/economics

European Investment Bank
98 -100, boulevard Konrad Adenauer
L-2950 Luxembourg
+352 4379-22000
www.eib.org – info@eib.org

PDF: ISBN 978-92-861-5372-3