

Effect of Transaction Costs on International Remittance Flows from Developed Countries: A Sub-Saharan Context

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ABSTRACT

Remittances play a major role both at a household and a macro-level especially in developing countries. They are associated with benefits such as of economic growth and employment opportunities for a country, while at the household level, remittances are a stable source of income in provision of basic needs such as of food, clothing, shelter and education. Remittance costs have been viewed as a major deterrent to higher volumes of remittance inflows to a country and tend to encourage the use of the cheaper informal channels, which have adverse consequences. This study investigates the drivers of remittance transaction costs and the subsequent effect of transaction costs on remittance flows using bilateral data between several countries in Sub-Saharan Africa and the United Kingdom over the period 2011 to 2014. Remittance costs are measured as a percentage of the amount remitted. Using multivariate generalised least squares analysis of panel data, this study tested the first hypothesis that financial development, banking concentration and financial risk of a migrant's home country influence transaction costs. Secondly, the study tested the hypothesis that transaction costs have a negative relationship with remittance inflows into the countries. The specific effect of transaction costs on remittance flows is investigated alongside other variables which have been identified to influence remittance flows. These include; the stock of migrants in the host country and host and home country income levels proxied by gross domestic product per capita.

The results of random effects estimations show that financial development and bank concentration have a positive and statistically significant relationship with transaction costs. That is, a higher level of financial development does not necessarily lower transaction costs but a high banking concentration, which infers lower competition in the banking sector, drives remittance costs up. On the effect of transaction costs on remittance flows into the countries in sub-Saharan Africa, the study found a negative and significant relationship. That is, a higher cost in remitting funds via formal channels reduces the remittance flows and as such, it thus increases the probability of the use of informal channels. The stock of migrants is also found to have a positive and statistically significant effect on remittances, meaning that a higher number of migrants in a developed country leads to higher volumes of remittances to the migrants' home countries. The proxies for incomes were found to be insignificant. The implications of the significance of remittance costs are noteworthy as they add evidence on the need to cut remittance costs by formal channels significantly to three percent of the total amount remitted by global development institutions.

Keywords: Migrant Remittances | Transaction costs | Sub Saharan Africa

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LIST OF ACRONYMS AND ABBREVIATIONS

BIOE	Bureau of Immigration and Overseas Employment
DFID	Department for International Development (UK)
EAC	East African Community
EAP	East Asia Pacific
ECA	Europe and Central Asia
FDI	Foreign Direct Investment
FSD	Financial Sector Deepening
GDP	Gross Domestic Product
GSMA	Groupe Spéciale Mobile Association
IFAD	International Fund for Agricultural Development
LAC	Latin America and Caribbean
MENA	Middle East and North Africa
MNO	Mobile Network Operators
MTO	Money Transfer Operators
ONS	Office for National Statistics
ODA	Official Development Assistance
OECD	Organisation for Economic Co-operation and Development
SAR	South Asia Region
SSA	Sub-Saharan Africa
UK	United Kingdom
UNDESA	United Nations Department of Economic and Social Affairs
US	United States
WDI	World Development Indicators

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1 CHAPTER ONE: INTRODUCTION

1.1 Background of the Study

The issue of international migration has been the subject of much attention by governments and policy makers in recent years, as migrants from poverty-stricken and war-torn countries in Africa, the Middle East and Asia, have flooded to developed countries in Europe, America and Australasia, among others. The burden that these migrants place on the economies of the developed countries usually grabs the headlines, along with the difficulties inherent in integrating the migrants into the host countries. However, the issue of remittances, the funds sent by the migrants to their home countries, is not given due attention, yet strong growth in remittances has been documented with the effects of these inflows on the home countries substantial.

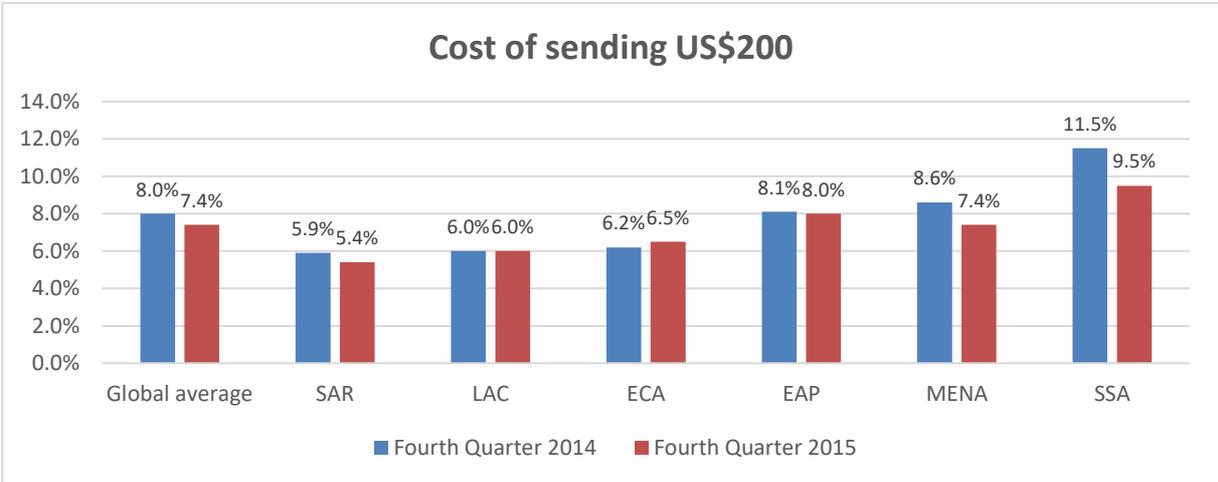
Vasconcelos, Ponsot, Terry and Vásquez (2017) report that about US\$6.5 trillion in remittances will be sent to low and middle-income countries between 2015 and 2030. This is attributed to the millions of migrants globally mainly from developing countries sending money to their home countries. According to the 2017 International Fund for Agricultural Development (IFAD) report approximately 200 million migrants from the low and middle-income countries, send money back to their families, with an estimated 800 million people getting direct support by remittances (Vasconcelos et al., 2017).

According to the World Bank (2016a), remittances via official channels have risen globally reaching about US\$431 billion in 2015, which was a 0.4% growth from the 2014 figures. In 2010, developing country remittance inflows only amounted to U.S. \$331 billion and forecasted to be U.S. \$484 billion in 2018 according to World Bank (2016b). Ahmed and Martínez-Zarzoso (2016) attributes this significant growth to better data capture and a growing shift from informal channels prompted by low costs of formal channels. While this growth has been evidenced, aid from developed countries is set to stagnate, thereby leaving remittances as a prime source of income.

In the case for Sub-Saharan Africa (SSA), Akobeng (2016) states that the region lags in terms of development indicators leading to lack of support of basic needs of its people and education; areas that are critical to support growth. The research further notes that as a result of this lag, consistent migration in search for better working and living conditions has been witnessed. Remittances represent a significant financial flow for these countries which benefit the poor households from health to education and basic consumption needs.

According to the World Bank (2016a), globally, the cost of sending remittances is 7.4 percent, on average while SSA remains the most expensive region to send money to, averaging about 9.5% of the amount remitted in the fourth quarter of 2015 as shown in Figure 1.1. South Asia is the cheapest region at about 5.43 percent. As a result, greater emphasis by governments and global organisations needs to be placed on the cost of remittances into SSA. There have been major commitments by organisations such as the G8 Summit and the World Bank, to reduce the cost of sending remittances significantly, with the United Nations 2030 goal of 3 percent cost of sending US \$200 Vasconcelos et al. (2017).

Figure 1.1: Average Cost of Sending US \$200

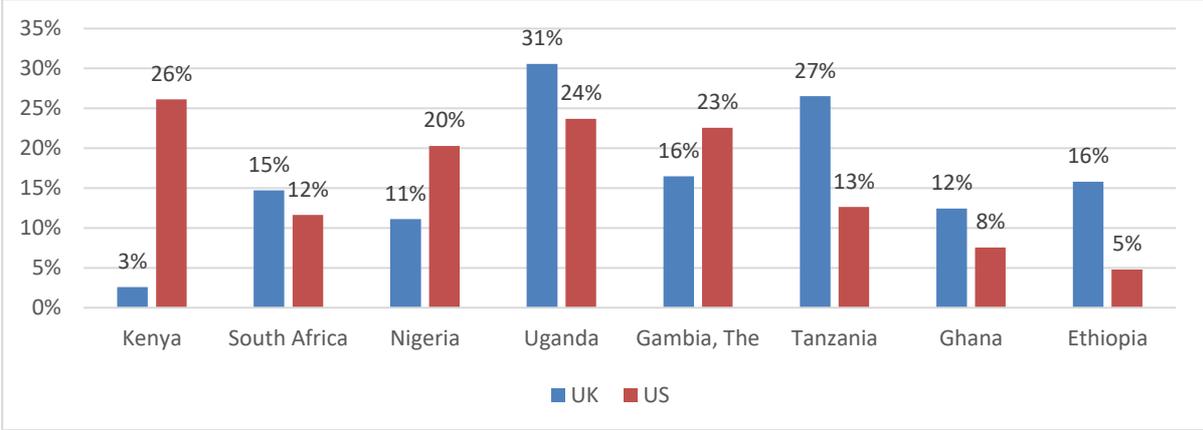


Source: Remittance Prices WorldWide, the World Bank 2016

SAR- South Asia Region, LAC- Latin America and Caribbean, ECA- Europe and Central Asia, EAP- East Asia Pacific, MENA- Middle East and North Africa, SSA- Sub-Saharan Africa

Ratha (2009) shows that most migrants from underdeveloped countries move to a more developed country which is the case for SSA. Figure 1.2 below shows a glimpse of a select SSA countries and their main migrants’ destination using estimates of 2013 migration Factbook. The estimates represent a proportion of all the respective country’s international migrants. The UK is the main destination for migrants from South Africa, Uganda, Tanzania, Ethiopia and Ghana. On the other hand, the US has the highest percentages for Kenya, Gambia and Nigeria.

Figure 1.2: Main Countries of Destination as a % of all International Migrants, 2013



Source: Authors own calculations, World Bank Migration and Remittances Factbook 2013

1.2 Problem Statement

Freund and Spatafora’s (2008) study shows that SSA average fees in 2005/2006 period were the highest at approximately 13.02%. The key questions that should be answered are:

Why are transaction costs highest in SSA and would lowering the costs lead to increased remittance inflows from developed countries?

Therefore, there is a need to undertake an in-depth evaluation of the SSA transaction costs and their determinants as well as the effect remittances have on remittance flows given their importance to the region’s households.

Ahmed and Martínez-Zarzoso (2016) in a study of flows to Pakistan from 23 sending countries over the period 2001 to 2013, find that transaction costs effect on remittance flows is negative and significant, which means that an increase in cost of formal channels leads to reduced remittance flows. Freund and Spatafora (2008) study covers 104 countries over the period 1995 to 2003 and find that remittance costs are lower when financial systems are developed and that transaction costs have a negative impact on remittances. The authors have only estimated the effect of transaction costs based on data capturing only the traditional MTO providers globally namely, Western Union and MoneyGram and only for one year that was available that is 2005, in the case for Freund and Spatafora (2008). Given the technological advancements recently, new providers have arisen that utilise digital enhancements to significantly reduce these costs.

According to Ratha (2013), remittances transaction costs should be very low in the digital age and due to the contribution of mobile phone transfers in remote areas and recommends

improvement in retail payments through better technologies. This study aims to give a clearer picture of SSA remittance transaction costs and where the region may focus on to improve these flows given their ultimate contribution to households. Understanding the impact transaction costs can have on remittance volumes through a more accurate assessment that incorporates the new market players would greatly help policy makers to implement policies geared to lower the costs.

Hence, this study aims to evaluate the effect of transaction costs on remittance flows specifically to SSA, from a developed country, the United Kingdom (UK) by utilising remittance cost data that includes the new service providers brought about by technological advancements in the recent period.

1.3 Purpose and Significance of the Research

Migrant remittances in SSA countries play a major role in households as alluded to by Nyamongo, Misati, Kipyegon and Ndirangu (2012) Given the importance remittances play, there is need to advance more literature on this subject which will continue to facilitate effective policy oversight.

This study covers a more recent period when bilateral remittance data and channels cost has become more available compared to existing studies. Few studies have examined the effect of reducing transaction costs on remittance flows especially into SSA and only incorporated the major global MTOs namely MoneyGram and Western Union. This study aims to introduce the impact of digitalisation and technological advancements as evidenced by the increase in more players and reduction in costs recently. The World Bank (2016b) estimates that the efforts to reduce the costs of sending money since 2005 have saved migrants and their families about US\$62.5 billion.

It is of great use to research the effect of transaction cost as a determinant of remittance flows and help complement the significant role remittances play in promoting financial inclusivity, which in turn contributes to economic development and empowerment. This will provide evidence and will also lead to policy implications by major institutions and non-governmental organisations vision to reducing costs of formal remittance channels in efforts to counter terrorism financing and anti-money laundering.

With evidence of the impact of reducing the cost of remittances on the volumes remitted, policy makers would be able to garner efforts towards implementing concrete measures to bring down the transaction costs and encourage more use of formal channels. This would also have

an indirect benefit of reducing illegal activities through informal channels and improve competition.

Firstly, this study will contribute to the body of knowledge of this emerging issue in an SSA context where transaction costs are considered the highest as well as motivate the quest for more in-depth analysis of this subject more so at an intra-regional level, which is dominant.

Secondly, this study will also improve on existing literature by utilising recent data recorded on remittance costs by sources like the World Bank. That is, the recent technological advancement globally has led to new digital players in the provision of remittance services. This study incorporates the cost data of all available players per corridor which previous research like Freund and Spatafora (2008) has not addressed due to the unavailability of data.

Lastly, this paper also aims to contribute to a richer analysis specifically in a developed to developing countries perspective specifically in SSA where costs are considered highest. This will help addresses most policy issues and recommendations at a regional level as suggested by the World Bank (2013).

1.4 Research Questions and Scope

Given the considerable efforts towards reducing remittance costs by global organisations, this paper raises the question of how the effect of transaction costs impacts on remittance inflows into SSA and the need to direct policy efforts or aim at the underlying drivers of transaction costs in the region.

SSA migrants have established large communities in developed markets like the UK as shown in Figure 1.2 earlier, with the remittances these migrants send to their home countries found to have a substantial impact on the households and the macroeconomy. This has led to arguments on whether transactions costs should be reduced to help those in diaspora remit more funds. Evidence on the use of informal channels to avoid costs charged by the formal providers may also have led to increased money laundering issues and terrorism financing.

The importance of remittances has led to policy makers paying close attention to improving financial systems and technological advancements in home countries to reduce costs and attract more inflows.

The specific research questions of this paper are:

1. *What are the determinants of remittance transaction costs in SSA?*
2. *What is the effect of transaction costs on remittance flows from developed countries into SSA?*

In the light of the above research questions, the following research objectives arise;

1. *To explore the determinants of remittance transaction costs in SSA.*
2. *To determine the effect of transaction costs on remittance flows from developed countries to SSA.*

1.5 Organization of the Study

The study is divided into five chapters and organised as follows: Following the current chapter, the study presents the literature review in Chapter 2 detailing the factors that determine remittance flows. The various models and theories of estimating the cost of remittance flows are discussed and the limitations of the existing literature are explained. Chapter 3 discusses the data and the methodology used to collect data for the variables identified. Chapter 4 presents the results from the empirical analysis. Finally, Chapter 5 concludes the study and provides policy recommendations and further research possibilities on this topic.

2 CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This chapter presents an overview of remittances as well as the specific areas of this topic pertinent to this study. Firstly, the impact and importance of remittances, at both a household level and the macro level are discussed, as well as the channels used by migrants to remit funds. Secondly, the trends in remittances globally and in SSA are examined. Thereafter, the drivers of remittance costs are reviewed. Lastly, the general determinants of remittance flows are considered, with specific focus on the link between remittance costs among other determinants.

Nyamongo et al. (2012) define migrant remittances as the cross-border earnings that migrants send to their home countries or countries of origin. The transfers can be made through formal channels which involve the banking system or money transfer operators (MTOs), such as MoneyGram and Western Union, or informal channels that are mostly in cash through friends as well as unofficial courier methods. However, there has been a considerable increase in the use of formal channels due to technological advancements such as mobile transfers which are faster and cheaper compared to the traditionally dominant players in the formal sector according to Muthiora (2015). Informal channels amount to huge remittances due to their significantly lower costs compared to formal channels. The higher informal volumes may also be attributed to the lower compliance requirements for anti-money laundering and countering terrorism financing. Freund and Spatafora (2008) state that informal channels may contribute over 35% of recorded remittances to developing countries.

2.2 The Impact and Importance of Remittances

Remittances play a major role both at a household level and a macro-level. At the household level, Griffith et al. (2008), in their study of Barbados over the period 1970 to 2002, report that remittances made a huge contribution to investment both in the short- and long-run, with a good example being the investment in savings bonds as well as housing. This is also supported by Ratha (2013), who observed that globally, remittances act as a form of insurance in hard times for poor families and hence enable them to participate in economic activities that can accrue a profit. Most of the remittance inflows into SSA households are used to cover basic needs such as food, education and shelter (Ratha, 2013). The economies of the developing countries benefit the most from migrant remittances as they represent a major catalyst in the reduction of poverty while improving human capital development and reducing inequality

(Ratha, 2013). This in turn leads to a direct benefit to economic growth resulting from contributions in education, investments in businesses and better health care due to increased household incomes, proving to be a powerful anti-poverty force. Adams and Page (2005) also find support that remittances significantly reduce poverty severity in the developing world. Acosta, Lartey and Mandelman (2009) find that remittances improve the welfare of households in their study of El Salvador.

At the macro-level, a 2017 IFAD report by Vasconcelos et al. (2017) report that remittances receiving end globally is mostly in rural areas, benefitting the agricultural economy, food security improvement as well as creating employment opportunities. Misati and Nyamongo (2011) and Gupta, Pattillo and Wagh (2009) find that formal channel remittances have a significant impact such as growth of financial sector. Remittances have also been linked with financial sector development according to Aggarwal, Demirgüç-Kunt and Peria (2011) through banks and other money transfer services providers creating affordable products to serve the huge demand of remitters. This is enabled by investments in infrastructure in the sector to improve access and efficiency. Williams (2017) provides evidence of positive effect of remittances on improvement of democratic institutions in SSA due to their role of increasing schooling for households and reducing poverty levels.

Despite the household level and macroeconomic impact and benefits of remittances various authors find contrary views. Konte (2016) study indicates that remittances may be a curse to a country to the extent that the non-taxable income may hinder the legitimacy of a democracy if personal economic conditions are a priority than rights and freedom. That is, government leaders may substitute remittances for government expenditure and neglect public investments leading to less concern by remittance receivers demand for democracy.

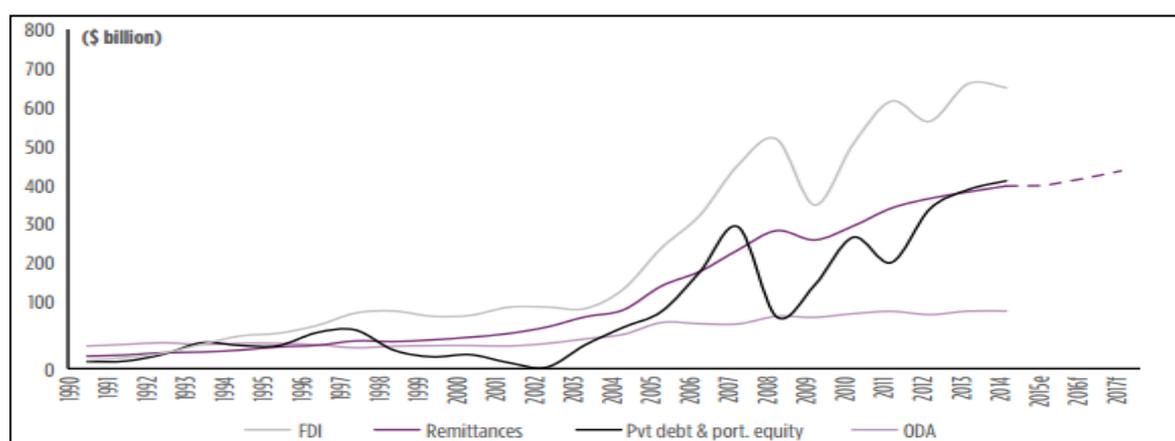
Contrary to most previous empirical work on the impact of remittances such as Barajas, Chami, Fullenkamp, Gapen and Montiel (2009) find that remittances do not promote economic growth. That is, their contribution is minimal, with an argument that remittances are not intended to serve as investments but for personal life necessities. This is also supported by Lim and Simmons' (2015) study of the Caribbean Community which does not find any long-run relationship between remittances and economic growth and they are used for consumption. Other authors such as Katsushi, Gaiha, Ali and Kaicker (2014) study on Asia and Pacific countries, results show that workers' remittances have no impact on economic growth.

2.3 Overview of Global Remittances and Trends

Vasconcelos et al. (2017) estimate that US\$6.5 trillion in remittances will be sent to low and middle-income countries between 2015 and 2030. This is a result of about 200 million migrants from these low to middle-income countries sending money back to their families, with an estimated 800 million people getting direct support from remittances.

Remittances in general have shown significant growth recently, as depicted in Figure 2.1 and, as such, have attracted the attention of policy makers to ensure legitimacy and the beneficial impact. Businesses such as banks and MTOs have paid attention to ensure they leverage on the benefits accruing from remittance flows. World Bank (2016b) paper reports that remittances outpaced Official Development Assistance (ODA) and Foreign Direct Investment (FDI) in 2012 and 2013. Many developing countries have very poor balance of payments and large amounts of remittance inflows, playing a major source of foreign exchange earnings. Remittances have proved to be more resilient during economic crisis according to research by Ahmed and Martínez-Zarzoso (2013) and Mughal and Makhoulf (2011). Figure 2.1 clearly illustrates that the private debt and portfolio equity as well as FDI, had a significant decline in the years between 2007 and 2009 which coincides with the 2008 global financial crisis. As depicted by Figure 2.1 below, remittances only had a minimal decline, supporting Ratha (2005) and Sander (2003), that remittances have proven to be stable flows and resilient. Nyamongo et al. (2012) attributes the slight decline in remittance inflows during the 2007-2008 financial crisis because of migrants' job losses as well as reduced ability to send money home.

Figure 2.1: Remittance Flows Compared to FDI, ODA 2015

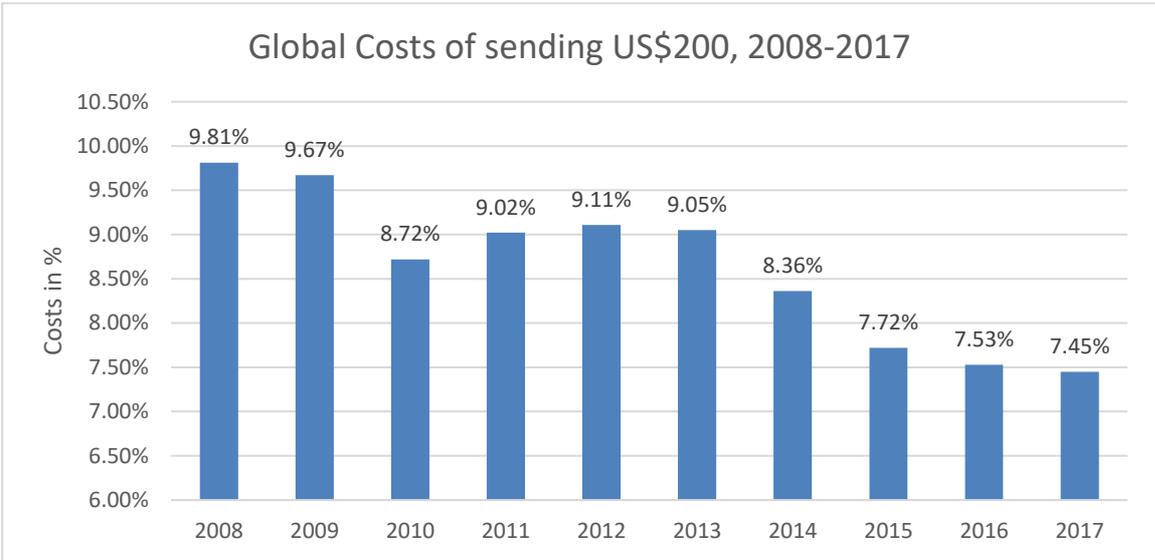


Source: World Bank 2016, OECD, WDI

Globally the cost of sending remittances has decreased from 9.8% in 2008 to about 7.45% in 2017, as shown in Figure 2.2 below a 31 percent decrease over the period. Costs may

be triggered by scale and competition in certain corridors. According to Vasconcelos et al. (2017), various channels globally differ significantly in terms of cost. Banks are highest at 11.2%, Money-Transfer Operators (MTOs) at 6.2% and post offices at 5.8%. Mobile Network Operators (MNOs) are the cheapest averaging about 2.9% due to their ability to capitalize mobile phones and agency networks resulting in an improvement in convenience and ease of access.

Figure 2.2: Global Costs of Sending US\$200, 2008-2017



Source: *The World Bank 2017, Remittance Prices Worldwide 2017, IFAD 2017*

Freund and Spatafora’s (2008) study shows that SSA average fees in 2005/2006 period was the highest through formal channels like MTO at approximately 13.02% compared to other regions globally such as South Asia, averaging about 7.58 percent. Sander (2003) report findings show that informal channels are substantially cheaper averaging about 3- 5% globally.

2.4 SSA Remittance Flows

Remittances to SSA are larger than ODA and slightly less than FDI but remittances volumes have been rising steadily (Namasaka, 2017). A country like Gambia, remittances take a high percentage of 22% of GDP according to a report by Vasconcelos et al. (2017). The World Bank has emphasized the need to redeploy remittances as a tool for development especially in developing countries, given their significant importance serving as huge income sources for most SSA households.

According to the survey of Ratha and Navarrete (2011), migrants from SSA leave their countries mostly in search of economic opportunity in developed countries; others leave for

education purposes, conflict or civil war as well as for family reasons such as marriage. Despite the predominance of intraregional migration within SSA, Ratha and Navarrete (2011) highlight the UK as one of the top destination for Ghanaian, Nigerian and Kenyan migrants. In addition, the survey highlights that the migrants from the SSA countries end up in labour market activities such as self-employment, fulltime or part time wage earners in the destination countries having been predominantly unemployed in their home countries. Docquier, Rapoport and Salomone’s (2012) results show that family members in the home countries who tend to have less skills and income levels tend to receive higher remittances.

Table 2:1: Africa Remittance Flows and Trends to Developing Countries

	2007	2016	Trend
Total number of migrants (millions)	25.5	33.0	29%
Total remittances (US\$ billion)	44.3	60.5	36%
Central Africa	0.2	0.3	53%
Eastern Africa	2.4	5.2	117%
Northern Africa	19.2	27.6	44%
Southern Africa	1.6	1.1	-34%
Western Africa	20.9	26.3	26%
Share of global remittances	15%	13%	

Source: UNDESA 2015, The World Bank 2017, IFAD 2017

Table 2.1 above summarizes the total number of migrants from Africa and the associated remittance flows from the developed countries. According to Vasconcelos et al. (2017), Africa has about 33 million migrants as of 2016 with some maintaining ties to their formal colonial power such as Ghana and Nigeria with the UK. The total number of migrants has grown by 29% from 25.5 million in 2007. In terms of remittances, there has been growth of 36% from US\$44.3 billion in 2007 to US\$60.5 billion in 2016. Eastern Africa has seen the largest growth in remittances of 117% while Western and North Africa continue to receive the highest flows in absolute terms.

2.5 Channels used for Remittances in SSA

Ratha and Navarrete’s (2011) survey, conducted in 2009, shows that remittances within a country are mainly through informal means such as friends and relatives except in cases such as East African Community (EAC), especially Kenya, where mobile transfers mainly through M-PESA are used. Intra-SSA remittances or cross-border transfers are mainly informal through

friends or visits but MTOs such Western Union and MoneyGram account for a significant proportion. However, the survey shows that international cross-border remittances into SSA are mainly through formal channels, which may be explained by the high expenses of travelling and distances, hence reducing the frequency and number of friends and relatives that may travel back to their home countries at a given time. In contrast, Nyamongo et al. (2012) maintains that a high proportion of remittances to SSA occur through informal channels which tend to be more attractive to many immigrants due to lower compliance requirements such as proof of identity or bank accounts. However, these compliance measures are crucial in order to counter anti-money laundering and terrorism financing.

2.6 Overview of Remittance Transaction Costs

The World Bank (2016b) reports that in SSA remittance costs, on average, have been consistently higher than the global average. Sending money to Africa on average is around 9.1% and the article highlights the reason for this to; financial exclusion, high bank charges and monopolistic MNOs like the Money Gram and Western Union which in some cases account for almost 90% market share. This has caused SSA to lag despite the invaluable impact remittances have on the continent. This high cost of remittance, is incurred by the sender, whereas the receiver is affected due to a reduced amount that would have been sent. Watkins and Quattri (2014) highlight that intra-SSA corridors costs are exceedingly high to sometimes 20 percent. According to Vasconcelos et al. (2017), remittance costs reflect a market's state of competition. This entails small and large MTOs generating economies of scale and achieving sustainable margins through volumes.

Gibson, McKenzie and Rohorua (2006) in a survey of Tongan migrants living in New Zealand, find that migrants are not affected by changes on the transaction costs of remittances, if migrants lack consumer awareness and inability to compare costs across channels. The information gap acts as a barrier to competition among the market players. The ability of migrants to compare costs of different channels may help to boost competition and promote flows.

Freund and Spatafora's (2008) study finds that transaction costs have a negative impact on remittances and provide a possible explanation of migrants opting to use informal channels which may have significantly cheaper costs. Orozco's (2002) study also highlights that a major obstacle of remittance flows is the high transaction cost incurred by senders. This is further supported by the World Bank (2016b) and Gibson et al. (2006) who purport that high transaction costs are more likely to lower remittance flows.

Gibson et al. (2006) findings propose that various policies that may lower remittance costs may have a significant contribution in increasing the amounts of remittance flows. These policies may be geared towards improving access to banking, promoting competition and information dissemination. Lower transaction costs would not necessarily reduce remittance-service providers profitability but may increase volumes to them as a result of more frequent transactions.

Remittance service providers costs may also be attributed to external factors such as legal barriers; for example, in setting up business and infrastructure systems used.

2.7 Drivers of Transaction Costs

The underlying drivers of transaction costs have been hypothesised to be bank concentration, financial risk and financial development which this study reviews in the next section.

2.7.1 Financial Development

Financial sector development makes an important contribution in making remittances easier and cheaper in terms of cost (Freund and Spatafora, 2008; Hernandez-Coss, 2006; Singh, Haacker, Lee and Le Goff, 2011). This is supported by the fact that financial development stimulates the flows through official or formal channels due to the availability of more financial products resulting from innovation and ease of access to capital for entrepreneurs. Increased competition by market players, be it from banks providing mobile money transfer services, to telecoms to MTOs, there is a potential for costs to be reduced in providing remittance services according to Sing et al. (2011).

According to a Financial Sector Deepening Africa (FSD) report, existing technology should be scaled as well as its regulation complemented by consumer behaviour to use end-to-end digital platforms when sending money (Isaacs, Hugo, Boakye-Adjei and Robson, 2017). The challenge lies within the SSA countries that lag in technological advancement, but governments can direct their efforts to promoting financial development and inclusion, which improves the economy at large. Migrants using more formal channels, especially digital ones and less cash methods, would boost volumes and improve competition which may lower costs.

Namasaka (2017) highlights the need for various stakeholders in SSA, such as governments, development agencies and service providers to reduce remittance costs through the digitisation value chain as well as foster financial sector reforms that improve trust in the use of digital platforms. A vibrant mobile economy improves financial access and development,

experiences lower costs due to the digital pathways which Muthiora (2015) highlights to be the driving force behind Kenya's success. A broad access to financial services, which has been characterised by mobile network operators use of technology and through partnerships to render services to the unbanked, has been a more efficient method than the use of bank accounts. Perceptions around the use of mobile money platforms in Kenya has grown significantly, which other SSA governments need to pursue to change consumer behaviour.

According to Scharwatt and Williamson (2015) an end-to-end mobile money channel with many MTOs has an impact on the fees charged. Mobile network operators (MNOs) have the capacity to develop cross-border remittance systems and take advantage of their widespread networks. This improves convenience and ease of access to rural areas and significantly reduces costs. Regulatory frameworks should allow mobile money providers to offer remittance services from both the developed and developing countries. This would enhance competition, which in turn would reduce remittance costs including on other channels. Mobile money should be a key focus of all stakeholders in policy making to leverage its significance in reducing transaction costs across all channels and force market players to innovate and expand to the rural areas.

Farooq, Naghavi and Scharwatt (2016) highlight that mobile money remittances are crucial for financial inclusion digitally and cheaper compared to using global MTOs for international remittances. Department for International Development (DFID) also supports the need for mobile technology as a tool to strengthen and drive remittance costs lower in order to improve flows to developing countries. This is, of course, in addition to anti-money laundering standards as well as secure and legitimate channels that are more transparent. Atkinson and Messy (2015) report that high transaction costs increase the risks for financial integrity due to the use of informal channels such as transactions that are cash-based and anonymous. GSMA (2015) reports that when using mobile money for international transfers, low-value transactions are cheaper. SSA migrants in developed countries are characterised as low-income migrants, who therefore tend to send low-value transactions more often.

From a financial development point of view, pay out locations, be it digital or agency-based, have increased interconnection between countries according to Vasconcelos et al. (2017). This has improved the time taken to send remittances, eased collection and thereby reduced the end-to-end costs of remitting. Digital MTOs have started to play an increasingly huge part in the market with partnerships with traditional MTOs also having increased. The existence of electronic wallet providers and agency banking have been a key part of this evolution. These new technologies have improved financial access and inclusion to the benefit

of consumers and in particular the recipients of remittances. There are 411 million mobile money accounts globally according to GSMA (2015). Mobile money remittance internet-based tools and digital money have exhibited lower costs, convenience and provided more security and transparency (Vasconcelos et al., 2017). These financial sector developments need to be associated with appropriate regulation in order to capitalize on the benefits of mobile money. This is also supported by Farooq (2017).

With the innovative players emerging in the remittance service provision, competition with the traditional players will reduce market concentration and segmentation and also reduce restrictive business practices especially in the receiving countries amplified by an imperfect consumer education.

2.7.2 Bank Concentration

Bank concentration has a significant impact on the market share as well as profitability. The bank concentration index in the home country of migrants may play part in determining the competitiveness of the remittance services provision. According to Vasconcelos et al. (2017) banks have traditionally been the most dominant in paying out international remittances. A bank concentration index is typically used to assess the extent of their dominance, with this calculated by taking the assets of the three largest banks in a country as a share of all assets of commercial banks in the country (Beck, Demirgüç-Kunt and Levine, 2006). With the existence of exclusivity agreements between banks and the largest global MTOs, barriers of entry for small players have been high. According to Beck et al. (2006), bank concentration may be viewed as a proxy for market power, which means a higher concentration may provide an incentive for fewer players to control prices. This view is also supported by Bourke (1989) in the study of twelve countries in Europe, North America and Australia for the period 1972 to 1981. Bank concentration has a significant impact on the market share as well as profitability which is related to market power and price control (Rhoades,1982; Schuster, 1984).

Banks have recently tended to de-risk or terminate relationships with small MTOs and only have exclusive agreements with major players which may lead to greater use of informal channels as highlighted by Vasconcelos et al. (2017). Orozco (2002), in a study of the Guyanese community living in the US, highlights that the costs involved are among the highest in the region and are attributed to a lack of competition and high reliance on banks with no digital means of remitting funds from the receiving end. Beck and Peria's (2011) study finds corridors with more players and hence higher competition tend to have lower costs. Freund and Spatafora (2008) finds a positive coefficient sign but however it is not significant at any level.

2.7.3 Financial Risk

Freund and Spatafora (2008) defines financial risk as an indicator that assesses a country's ability to pay its official, commercial and trade debt obligations. If a country's ability to repay is poor, it is considered to have a high financial risk. Since international remittances involve foreign exchange as a component of cost, exchange rate fluctuations pose a great business risk derived from the poor financial risk of a country. Freund and Spatafora (2008) highlight that higher business risk at a country level may lead to unwillingness by institutions to provide remittance services. The study found a positive coefficient sign between financial risk and cost of remittances but it was not significant.

This literature review provides support for the arguments that influencing both the host and home countries of migrants in areas such as banking and financial sector by enabling technological advancements in mobile banking may prove crucial for reducing the high transaction costs incurred in sending money from developed countries into SSA. Policies should be designed to improve formal remittance channels and reduce costs. This will encourage more senders to use these formal channels which significantly decrease use of informal channels.

2.8 Determinants of Remittance Flows

Existing research has identified various determinants of remittance flows. Most of the factors such as economic size, migration stocks, financial development and the bilateral exchange rate have consistently shown significance in explaining remittance flows while other factors such as religion, colonial ties and language, have been identified in only a few studies. Griffith et al. (2008) also alludes to the fact that improved systems and processes, complemented by relevant education, institutional quality and favourable regulations, can increase the levels of remittances to a country. This also should be coupled with investment in appropriate infrastructure that allow service providers as well as protects consumers.

This study discusses and reviews literature on these determinants, which are in addition to the focus on transaction costs discussed previously.

2.8.1 Home and Host GDP per Capita

The income level of the migrants is likely to be an important determinant of the level of remittances. To measure this, use the GDP per capita for both the host and home country as a proxy for wages or income levels. Lueth and Arranz (2008) found a significant positive

relationship between the GDP of the host and home country and remittance flows in their study of eleven countries in Asia and Europe over the period 1980 to 2004. Furthermore, they find over 50% of the variation in remittances can be attributed to the economic activity of the host and home countries. Ahmed and Martínez-Zarzoso (2016) in a study of flows to Pakistan from 23 sending countries over the period 2001 to 2013, also found that the GDP of the home country has a significant and positive relationship with remittances. Schioppa and Siegfried (2006), in their study of European countries, find that the GDP differential between sending and receiving countries is positively correlated with the average remittance per migrant. However, remittances are more responsive to the host country economic conditions.

Panda and Trivedi (2015) cross country analysis of a panel of 24 emerging and developing economies from 1991 to 2012, find significant evidence of host and home country macroeconomic factors influencing the magnitude of remittances. Abbas, Masood and Sakhawat (2017) study of Pakistan remittances from 1972 to 2012, used real GDP as an income indicator and found a significant positive relationship to remittances. This is also supported by Ahmad et al. (2008), while Kock and Sun (2011) estimates a panel of 15 countries flows to Pakistan for the period 1997 to 2008 and finds support that home country economic factors or conditions play a huge role in determining remittance flows.

However, the host GDP per capita may not be a good proxy for wages, in line with Freund and Spatafora (2008) findings. That is, in cases where migrants earn their incomes from an informal sector, this may not necessarily be well proxied by this variable. Home GDP per capita is also not significant.

2.8.2 Stock of Migrants

According to Freund and Spatafora (2008) remittances depend positively on the stock of migrants and that costs are reduced in corridors with higher stocks compared to others. The study mentions the dependence of volumes of remittances on total number of migrants and their wages in the host economy. Beck and Peria's (2011) study finds that corridors with more migrant stocks have a higher demand for services and tend to result to lower costs. However, there are various factors such as religion and language similarities that would increase the stock of migrants. For example, Nyamongo et al. (2012) attributes the high number of migrants from North Africa to oil producing Arab countries in the Middle East to the fact that they share a similar religion and language.

2.8.3 The Bilateral Exchange Rate

Freund and Spatafora (2008) find that bilateral exchange rate between the respective countries at a given time has a positive relationship with remittance flows. This means that an exchange rate that lowers the amount being remitted would lead to lower flows and may encourage informal channels. The senders may also doubt the amount their family members end up collecting and compliance requirements on both ends.

2.8.4 Geographical Distance

Lueth and Ruiz-Arranz (2008) found a significant negative relationship between the geographical distance between the home and host country and the volume of remittance flows. This is supported by Frankel (2011) on the basis that distance is used a good proxy for transfer costs only if remittances may decrease with distance. However, Ahmed and Martínez-Zarzoso's (2016) study shows that geographical distance cannot be used as a proxy for cost due to significant difference between the two and also due to its ignorance of technological advancements experienced in the digital age. Freund and Spatafora (2008) argue that technology and increased competition in the financial services industry may reduce costs that is unrelated to distance. The study explains that other research has had mixed results in using geographical distance as a proxy and since the cost of sending from a well-developed to a developing country is significantly larger compared to the reverse it does not serve as a suitable proxy.

2.9 Conclusion

The literature indicates that migrant stocks, economic size of both the home and host country as well as transaction costs are the determinants of remittance flows. Furthermore, transaction costs are driven by bank concentration, financial risk and financial development. The next chapter entails the research methodology used to answer the research questions, as well as the data collected.

3 CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

In this chapter, the methodology used to answer the research questions highlighted in Chapter 1 are presented and is organised as follows. Section two describes the data and research design while section three follows with a description of the variables used in the estimation. Thereafter, section four describes the regression model estimation with the last section presenting the limitations of the study and a conclusion of the chapter.

3.2 Research Approach and Strategy

Given the huge contribution remittances have on developing countries, such as those in SSA, policy makers will continue to investigate how they can better accelerate financial inclusion to allow for remittances to make a more substantial contribution to overall economic growth and poverty alleviation.

Initial insights on the effect of transaction cost on remittances flowing into SSA point strongly towards an underdeveloped financial sector with a poor financial inclusion banking sector, but this will only be valid once the outcome of the results point towards the lagging development indicators compared to the developed regions. Once a conclusion on the effect of transaction costs is arrived at, an ideal direction and recommendations on what the SSA governments and policy makers can do to reduce costs and improve the volumes and impact of remittances to households will potentially be useful.

SSA governments with the help of global developmental organisations on a policy and regulation level have exhibited interest and optimism in promoting remittances and cutting back on costs, which in turn has led to the reduced dominance of banks in the service provision and has allowed more players such as mobile money at an intra-regional level to be more financially inclusive. In general, the underlying drivers of remittance costs such as competition, financial development and technological developments can be addressed in SSA, in order to overall drive remittance inflows in the region up from developing countries where there are high stocks of migrants. Understanding these drivers and identifying the status of SSA in these areas is crucial.

This leads to the first hypothesis on the drivers of transaction costs as follows:

H₀: Financial development, bank concentration and financial risks are drivers of remittance costs in SSA.

H₁: Financial development, bank concentration and financial risks are not drivers of remittance costs in SSA.

The literature presents various arguments of transaction costs impact but vary in what accurately represents cost. Use of geographical distance between corridors as a proxy for cost has been heavily criticised due to its inadequacy in representing technological advancements as well as the impact of competition that has risen because more players are entering the market and competing against traditional banks and MTOs. This paper attempts to determine the transaction cost effect, with the inclusion of these new players that have made costs cheaper and faster transfer, and more effective in terms of convenience to both the sender and the receiver. The context is in a SSA region which has been considered to have the highest cost despite being a big beneficiary of remittances.

The second hypothesis is to determine the effect of remittance costs on remittance flows into SSA. This is examined alongside other possible determinants of remittance flows, in particular, the economic size of the host and home country (as measured by GDP) and migration stocks.

H₀: Remittance costs have a negative effect on remittance flows.

H₁: Remittance costs have no effect on remittance flows.

3.3 Data and Research Design

This study incorporates the use of secondary panel data on migrant remittances from a developed economy, the UK to recipients of SSA countries. The sample period for the study is from 2011 to 2014 which derives 32 observations and covers eight SSA countries, namely; Ethiopia, Gambia, Ghana, Kenya, Nigeria, South Africa, Tanzania and Uganda for bilateral remittance data with the UK. The selection of home countries and the length of time were dependent on the availability of bilateral remittances data in particular, the channels cost. The World Bank has recently started creating the transaction cost database, which incorporates emerging remittance service providers in addition to the dominant traditional ones. This data is only consistent from 2011 for SSA countries up to 2014 as it continues to be regularly updated.

The UK is a developed country that has attracted SSA migrant's due to opportunities as well as for historical colonial ties and language factor. Different sources of remittance data highlight the UK as part of the top ten sending country in the world consistently. For example, the World Bank (2016a) places the UK in tenth position, with an estimated seven billion sterling pounds in remittances.

The variables are collected from various sources. The data of SSA countries migrant stock in the host country, that is the UK, was sourced from the Bureau of Immigration and

Overseas Employment (BIOE), the United Nations Department of Economic and Social Affairs, Office for National Statistics (ONS) and from the Organisation for Economic Co-operation and Development (OECD). The transaction cost variable was estimated using data from the World Bank’s Remittance Prices Worldwide for top destinations in the 8 countries included in the sample receiving remittances from the UK. The information on bilateral remittances was sourced from the World Bank remittances database.

Firstly, the underlying factors driving remittance costs are defined as shown in Table 3.1. Data from the World Bank Remittance Prices database that include MTOs such as Western Union and MoneyGram was used. The transaction costs using formal channels assume a US \$200 and a US \$500 remittance amount and are quoted as a percentage of this amount. The two measures of transaction cost amounts are used to make the model robust and highlight any significance differences in sending a high or a low value remittance amount.

Table 3:1: Data Definition- Factors Driving Remittance Costs

Variables	Description and source
Dependent variable	
Remittance costs	Formal channels percentage cost of remitting US \$200 and US \$500 (%) from the World Bank’s Remittance Prices Worldwide
Explanatory variables	
Financial Risk	External debt stocks (% of Gross National Income). (World Bank Global Financial Development Indicators)
Bank Concentration	Assets of the three largest banks in a country as a share of the assets of all commercial banks. (World Bank Financial Structure Database) – three firm concentration Ratio
Financial Development	Financial Development Index from World Bank Global Financial Development Indicators

Remittance costs: This is the percentage cost of sending an amount through a formal channel. The World Bank Remittance Prices Worldwide defines the total cost of sending a remittance transfer as the fee charged to the sender plus an exchange rate margin (the percentage difference between the market reference rate and the exchange rate applied to a transaction). In line with Freund and Spatafora (2008) and Ahmed and Martínez-Zarzoso (2016),

financial development, financial risk and bank concentration are the possible drivers of remittance costs. The exclusion of bilateral exchange rate is as a result of its incorporation in the cost variable unlike the service fee used by Freund and Spatafora (2008) which does not include an exchange rate margin. Migrant stocks and remittance flows are expected to be the market-size effects, that is, higher remittances and migrant stocks would lead to reduced costs as proxies for large markets in line with Freund and Spatafora (2008).

Financial risk: This variable is proxied by the external debt stocks as a percentage of gross national income. External debt represents the total of public guaranteed and private non-guaranteed long-term debt and short-term debt while gross national income is the sum of value added by all resident producers plus any product taxes not included in the valuation of output plus net receipts of primary income of employees from abroad (World Bank, 2016b). Freund and Spatafora (2008) proxy for financial risk includes components namely; foreign debt as a percentage of exports of goods and services calculated by the International Country Risk Guide. This study was limited to use a proxy that takes a component that is readily available. As proxied, a higher ratio, would lead to a lack of willingness of remittance services operators to provide services in accordance with Freund and Spatafora (2008).

Bank concentration: This study used the three-firm concentration ratio, that takes the assets of the three largest banks in a country as a share of the assets of all commercial banks. This study adopted the ratio in accordance with Freund and Spatafora (2008). Recently, SSA banks which have historically been monopolistic have attempted to promote their bank accounts to senders through offering technological solutions to transfer money but the emergence of pure-play mobile money transfers has introduced huge competition. We therefore hypothesize that this variable would play part in reducing costs and improving flows.

Financial development: The proxy for financial development is the financial development index which encompasses financial inclusion indicators from bank accounts to access to automated teller machines (ATMs) and mobile money transfers. Freund and Spatafora (2008) proxy is the ratio of domestic deposits to Gross Domestic Product (GDP). The choice for the use of the financial development index is as a result of its broad-based nature, involving financial institutions and markets depth, access and efficiency (Svirydenka, 2016). Financial development in line with Freund and Spatafora (2008) is expected to have

a negative relationship with remittance costs, as an increase in competition will lead to reduction in prices.

Table 3.2 defines the variables used to determine remittance flows into SSA.

Table 3:2: Data Definition - Determinants of Remittance Flows

Variables	Description
Dependent variable	
Remittance flows	Remittance amounts (World Bank)
Explanatory variables	
Migrant Stocks	Migrant population (World Bank, UN, ONS and OECD)
Remittance costs	As defined above
Host Income per capita	GDP per capita (constant 2010 US\$) (Penn World Table)
Home income per capita	GDP per capita (constant 2010 US\$) (Penn World Table)

Remittance flows: Also referred to migrant remittances, they are the cross-border earnings that migrants send to their home countries or countries of origin according to Nyamongo et al. (2012). In this study, remittances only apply to those that are sent through formal channels and are recorded officially. In line with Freund and Spatafora (2008), this study hypothesises that remittance flows are determined by transaction costs, migrant stocks, home income per capita and host income per capita. That is in line with Lueth and Arranz (2008) there exist a significant positive relationship between the GDP of the host and home country and remittance flows,

Migrant stocks: Migrant stocks are defined as the total number of international migrants present in a given country (foreign) at a particular point in time, (Parsons, Skeldon, Walmsley & Winters, 2007). A high number of migrant stocks is expected to have a positive effect on remittance flow and a negative relationship with transaction costs in line with Freund and Spatafora (2008). That is, the higher the number of migrant stocks, the higher the volumes of remittances.

Home income per capita: This variable is proxied by the Gross Domestic Product (GDP) per capita of the migrant's home country to represent the income or wages level in line with Freund and Spatafora (2008). GDP measures the total value of goods and services produced within a country's borders. That is in line with Lueth and Arranz (2008) there exist a significant positive relationship between the GDP of the host and home country and remittance flows, Kock and Sun (2011) find support that home country economic factors or conditions play a huge role in determining remittance flows. Freund and Spatafora (2008) study does not find a significant relationship between the home GDP per capita and remittances.

Host income per capita: This variable is like the *Home income per capita* above, but applicable to the migrant's host country. It represents the income levels of a migrant, in the foreign country. Lueth and Arranz (2008) also finds a significant positive relationship between the GDP of the host country and remittance flows. According to Freund and Spatafora (2008), the host GDP per capita may not be a good proxy for wages.

3.4 Model Specification

According to Wooldridge (2002) panel data empirical analysis is a common approach that allows exploration of dynamic relationships and control of unobserved explanatory variables. The empirical investigation employs a generalised least squares (GLS) regression to analyse data on potential explanatory variables, a technique which does not impose distribution assumptions for the random errors (Orsini, Bellocco and Greenland, 2006). This type of approach allows maximum likelihood estimate β in instances of unequal variance commonly known as heteroscedasticity. The GLS model, according to Moulton (1986) and Buse (1973), demonstrates efficiency compared to an ordinary least squares (OLS) and may reduce bias in standard errors and takes into account any heteroscedasticity especially if the variables have been transformed into logs (Brooks 2014, pp 138).

The basic regression model for a balanced panel data set can be written as follows according to Dewan and Hussein (2001) and Hsiao and Hsiao (2006):

$$y_{it} = \alpha_i + x_{it} \beta + \mu_{it}, \tag{1}$$

where: y_{it} represents the endogenous variable, i is the I^{th} cross-section unit and t represents the time observation. α_i represents the intercept, x_{it} is a row vector of exogenous

variables while β is a column vector of the common slope coefficients of the units. μ_{it} represents the error term.

This study makes use of the models of Freund and Spatafora (2008) which serve as good quantitative analysis tools for analysing the determinants of remittance costs and the effect of these costs on remittance flows, which this study adapted to the SSA context depending on data availability. Notable departures are the dummies for the bilateral exchange rate and dollarization in SSA. Therefore, data is extracted from the various sources implying desktop research, providing efficiency in collection.

Ahmed and Martínez-Zarzoso (2016) use a gravity equation model to test the impact of costs on remittances to the home country which relies on distance as the proxy measure for cost. Lueth and Arranz (2008) also highlighted the use of distance as a proxy for transfer costs. Distance, as a proxy for costs, however, does not factor in the technological advancements in place as well as financial sector development of the countries involved and has been highlighted by Ahmed and Martínez-Zarzoso (2016) to be a poor proxy. Moreover, with improved data collection mechanisms, surveys on the actual costs have been implemented such that some data is now available, which previously it was not. This study therefore does not incorporate the gravity model that involves distance as a proxy instead drawing on direct measures of remittance costs.

The first panel regression on the factors driving costs follows that employed by Freund and Spatafora (2008) as follows:

$$Cost_{i,t} = \alpha_0 + \alpha_1 FinDev_{i,t} + \alpha_2 FinRisk_{i,t} + \alpha_3 BankConc_{i,t} + \varepsilon_{i,t} \quad (2)$$

where: cost denotes the percentage transaction costs of sending remittances; FinDev denotes financial development; FinRisk denotes financial risk; and BankConc denotes bank concentration. The dollarization dummy variable included by Freund and Spatafora (2008) was not used in this regression model because dollarization has not been evidenced in the countries included in the sample. In addition, the study ran this model with the stock of migrants and the total remittance flows to control for market size effects and determine the effect they have on costs. Freund and Spatafora (2008) highlight the that higher migrant stocks and volumes of remittances might lead to reduction of fees as a result of competition.

The second regression to estimate the determinants of remittance flows into SSA also followed that of Freund and Spatafora (2008) to include commonly-used determinants of

remittances such as the GDP of the home and host country and the stock of migrants from the home country in the host country. The model can be shown as follows:

$$REM_{i,t} = \alpha_0 + \alpha_1 IncHome_{i,t} + \alpha_2 IncHost_{i,t} + \alpha_3 Cost_{i,t} + \alpha_4 MigStock_{i,t} + \varepsilon_{i,t} \quad (3)$$

where: REM denotes the log of migrant remittances inflows reported from World Bank database; IncHome denotes the log of domestic GDP per capita; IncHost denotes the log of host GDP per capita; MigStock denotes the log of the stock of migrant workers in the host country; Cost denotes the percentage cost of sending remittances; and i indexes the relevant country. The dual exchange rate variable by Freund and Spatafora (2008) was dropped since its already incorporated as part of the cost variable.

3.5 Estimation Approach

This study initially examines the properties of the data using the testing strategies by Im, Pesaran and Shin (2003), Levin, Lin and Chu (2002), and Fisher tests such as Choi (2001) in order to determine the existence of unit roots in the data and secondly to test for stationarity. The primary reason for unit root tests is to gain statistical power while at the same time improve the univariate counterparts poor power (Breitung, 2001). The tests are, however, limited due to cross-sectional correlation among error terms and therefore the methodology used in this study does not correct for the presence of unit roots since McCallum (1993) argues that they may not matter significantly if autocorrelation among residuals is avoided. In cases where a study is dealing with small samples and short-term dimension like in this study, the stationarity tests may have biased outcomes as highlighted by Libanio (2005).

Given the nature of this study using panel data, an appropriate estimation technique can be used being either fixed or random effects. The panel data is balanced and has several observations collected over a period and across countries. A fixed effects technique assumes the existence of other factors impacting the dependent variable while the random effects technique assumes that differences across countries are random and not correlated with the dependent variable (Dewan and Hussein, 2001; Keane and Runkle, 1992). According to Dewan and Hussein (2001), both fixed and random effects are able to adjust for heteroskedasticity.

According Hsiao and Hsiao (2006), the fixed effects estimation model can be written as equation 1, with an intercept α_i that takes into account the heterogeneity influence from the

unobserved variables which may differ across the cross-section units. The fixed effects model can therefore be written as:

$$y_{it} = \alpha_i + x_{it} \beta + \mu_{it} \quad (4)$$

Similarly, the random effects model assumes the slope coefficients are constant for all cross-sections, but the intercept α_i is a random variable with a random error term ε_i which reflects the individual differences in the intercept value of each cross-section unit, that is, $\alpha_i = \alpha + \varepsilon_i$, where α is the mean value for the intercept of all cross-section units. The random effects model can be modified and written as follows:

$$\begin{aligned} y_{it} &= \alpha + x_{it} \beta + \varepsilon_i + \mu_{it} \\ &= \alpha + x_{it} \beta + v_{it} \end{aligned} \quad (5)$$

Where $v_{it} = \varepsilon_i + \mu_{it}$. The random effects model is estimated by GLS.

Both the fixed and random effects estimation can handle the systematic tendency of μ_{it} to be higher for some individuals than for others and similarly for higher periods than for others (Dewan and Hussein, 2001).

The next step is to determine the most appropriate method between the fixed effects and the random effects. This study utilised the Hausman test (Hausman, 1978), that compares the difference between the two estimators of the coefficient vectors. The random effects estimator is efficient and consistent under the null hypothesis and inconsistent under the alternative hypothesis while the fixed effects model is consistent both under the null and the alternative hypothesis. That is, if the null hypothesis is true, the difference between the estimators should be close to zero. The test statistics computes the covariance matrix of $\beta_1 - \beta_2$ where according to Hausman (1978), β_1 is the fixed effects estimator and β_2 is the random effects estimator.

3.6 Research Reliability and Validity

The estimation methodology used has been utilised in literature in determining the effect of transaction costs using different data and period by Freund and Spatafora (2008). The methodology is reliable in terms of adapting it to a specific context and region like the SSA in this study due to its ability to reduce errors and biases across panel data. The estimation

methodology used in this study can reduce errors and biases from heteroscedastic and serially correlated data.

The validity of the methodology is evaluated using several other tests such the Hausman test and inspections of the data reported. Comparisons with findings of other researchers on the subject matter are conducted on the direction of the influence of variables. The World Bank Remittances Research Group have utilised the same estimation approach.

3.7 Constraints and Research Limitations

The lack of available data for some of the variables for numerous countries in SSA led to the small number of countries included in the sample. In addition to this, a major limitation of the data is that it captures only remittances sent through formal channels (and the costs thereof) with remittances sent through informal channels not included. While there have been attempts to estimate the informal remittances for example by Freund and Spatafora (2008) but this falls beyond the scope of this study. Thus, this may not fully reflect the full picture of the impact of costs on remittance flows.

3.8 Conclusion

This chapter has described the research approach and strategy adopted, the data collection method, data sources and sample. The methods used to undertake the data analysis were reviewed and lastly some of the limitations of the study were highlighted. The next chapter presents the research findings, analysis and discussion linked to the literature reviewed in chapter 2.

4 CHAPTER FOUR: RESEARCH FINDINGS, ANALYSIS AND DISCUSSION

4.1 Introduction

This chapter presents the findings from the analysis and a discussion of these results, drawing on the theory and literature presented in Chapter 2. Section 4.2 and 4.3 presents the results from the analysis of the drivers of remittance costs including the descriptive statistics and the panel data regression results and discussion. Thereafter, the results from the tests of the determinants of remittances, with specific emphasis on the role of costs, are reviewed.

4.2 Preliminary Data Analysis

The preliminary step of the empirical analysis involved unit root tests using the strategies by Im, Pesaran and Shin (2003); and Fisher tests using ADF and Phillips and Perron (1998) and Choi (2001). The results are presented in Table 4.1 below and can be seen that the adjusted test statistics for most of the variables are consistently non-stationary.

Table 4.1: Panel Unit Root Tests

	Common and Individual Unit Root Test			
	Breitung t-stat	Hadri LM	Phillips and Perron	ADF- 0 lags
Fin development	0.7556	-1.1618	-1.3373	-2.0003
Fin risk	0.7763	1.7978**	-1.3681	-1.9697
Bank Concentration	0.3589	1.6350*	-2.0674	-2.2214
Cost of \$200	-0.9478	0.1376	0.1429	0.1796
Cost of \$500	-0.9401	0.8246	0.0735	0.0064
Remittance inflows	0.4294	2.2155**	7.5271***	5.0424***
Migrant stocks	-0.9126	1.933**	2.2917**	0.918
Host GDP	3.8479	2.5416***	-2.8284	-2.8284
Home GDP	2.0976	2.7655***	4.9913***	-0.1258

***, ** and * denote rejection of the null hypothesis of the unit root tests at the 1%, 5% and 10% significant levels respectively.

The Hadri LM test null hypothesis assumes that all panels are stationary but the t -stats have a significant p-values, hence reject the null hypothesis in favour of the alternative that at least one of the panel contains a unit root (Hadri, 2000). The ADF Breitung and Phillips and Perron test results, indicate that this study cannot reject the null hypothesis of existence of a

unit root. McCallum (1993) argues that they may not matter significantly if autocorrelation among residuals are avoided. Given the nature of the small sample size and the short-term dimension in this study, the stationarity tests may have biased outcomes as highlighted by Libanio (2005). The study therefore proceeds with the models in line with Freund and Spatafora (2008) as there is no consensus in literature when dealing with smaller samples.

Post examination of the unit root properties, the Hausman test to determine the appropriate estimation method between fixed effects and random effects results are presented in Table 4.3 and Table 4.4. The results in both tables do not reject the null hypothesis that the differences in the coefficient are not systematic and therefore random effects model is preferred which is consistent with Freund and Spatafora (2008).

The p-value in the determinants of costs model in Table 4.3 is 0.8633 which is not significant, hence the preference of random effects versus fixed effects. The p-value in the determinants of inflows model in Table 4.4 is 0.2251 which is not significant, hence the preference of random effects versus fixed effects.

The choice of random effects is adopted on the assumption that differences across the sampled SSA countries are random and uncorrelated with the dependent variable and do not lead to unbiased outcomes.

Table 4:2: Hausman Test Results – Drivers of Transaction Costs

	Null Hypothesis: Difference in coefficients not systematic
<i>Chi-Square Statistic</i>	p-value
0.74	0.8633

***, ** and * shows level of significance at the 1%, 5% and 10% respectively.

Source: Test analysis using Stata

Table 4:3: Hausman Test Results – Determinants of Remittance Flows

	Null Hypothesis: Difference in coefficients not systematic
<i>Chi-Square Statistic</i>	p-value
5.67	0.2251

***, ** and * shows level of significance at the 1%, 5% and 10% respectively.

Source: Test analysis using Stata

4.3 Data – Drivers of Cost

The descriptive statistics for the remittance costs and the variables which are hypothesised to influence costs are presented in Table 4.1 below, with all variables as previously defined.

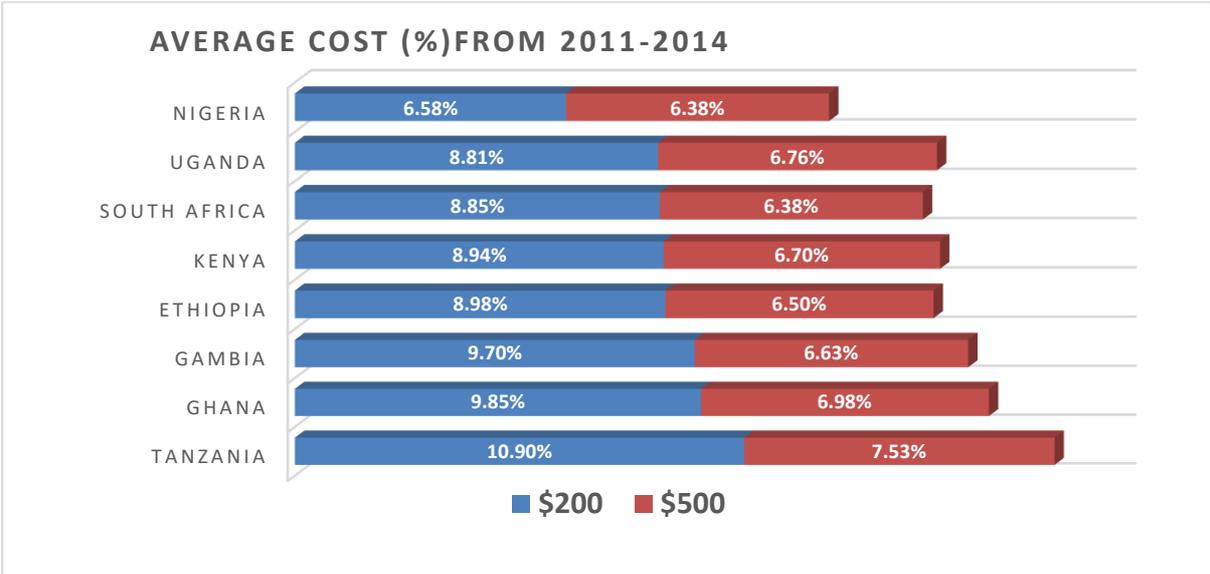
Table 4:4: Summary Statistics – Drivers of Costs

	Cost of \$200 (%)	Cost of \$500 (%)	FinDev (%)	FinRisk (%)	BankConc (%)
Mean	9.08%	6.43%	18.05%	29.89%	59.89%
Median	8.93%	6.61%	11.95%	29.04%	50.63%
Range	6.62%	5.61%	53.47%	59.63%	68.09%
Minimum	5.79%	3.08%	8.01%	4.13%	31.91%
Maximum	12.41%	8.70%	61.47%	63.76%	100.00%
Count	32	32	32	32	32

Transaction costs are quite high for the selected countries with a minimum of 5.79% for sending \$200 and a maximum of 12.41%. The mean cost is higher for sending smaller amounts, that is, 9.08% for \$200 and 6.43% for \$500.

Figure 4.1 below breaks down these pooled statistics by showing the average cost of sending \$200 and \$500 from the UK to each of the SSA countries in the sample for 2011 to 2014. Nigeria is the cheapest country to send both the \$200 and \$500 from the UK, which may be partly explained by higher number of migrants in the UK leading to higher volumes or demand and hence resulting in a reduction in prices. Tanzania is the most expensive, with an average of 10.90% for \$200 and 7.53% for \$500. On average, the costs of sending a higher amount, that is as depicted by \$500, are lower than the costs of sending lower value amounts of \$200. The differences across the countries for sending \$500 is quite small with a maximum of 7.53% and a minimum of 6.38%. bank concentration has a mean of 59.89% while a maximum of 100%. Financial risk has a very low minimum of 4.13% and a mean of 29.89%.

Figure 4.1: Average Cost of Sending \$200 and \$500 for 2011-2014



Source: Authors own calculations based on the data from the World Bank Price Remittances database (2016)

The next step is to assess pairwise correlations of selected variables, with the correlation matrix is presented in Table 4.2 below. The results reveal that financial development is negatively correlated to both measures of cost. This suggests that a higher level of financial development in the home country may lead to a lower cost of remittances. Financial risk has the strongest positive correlation with remittance costs while bank concentration has a lower positive correlation. This may be interpreted as a higher financial risk level in the recipient SSA country leads to a higher cost of remittance, due to the unwillingness of service providers to enter the corridor since the risks are high. A high bank concentration ratio would mean that the monopolistic nature of the banks may lead to lack of competition and hence lead to higher costs. However, in line with Gujarati (2003, pg359), there is no evidence of multicollinearity as the correlation coefficients do not exceed 0.80.

Table 4.5: Correlation Matrix – Factors Driving Remittance Costs

	Cost of \$500	Cost of \$200	FInDev	FinRisk	BankConc
Cost of sending \$500	1				
Cost of sending \$200	0.9399	1			
FInDev	-0.0506	-0.1062	1		
FinRisk	0.3661	0.4645	0.0951	1	
BankConc	0.0966	0.1286	0.2060	0.6282	1

4.4 Panel Regression Results: Factors Driving Remittance Costs

In this section, the results from the Random Effects panel regression of the drivers of remittance costs in SSA countries from the UK are presented. As shown in equation 3.1, bank concentration, financial development and financial risk are included as the potential variables as utilised by Freund and Spatafora (2008).

As mentioned in chapter 3, the cost of remitting \$200 as well as for \$500 are incorporated for robustness. This is essential in identifying whether the amounts being remitted do play a role in the impact of the determinants of the cost. The financial development levels for a country might reduce transaction costs and lead to greater remittance flows as alluded to by Freund and Spatafora (2008). An advanced financial services sector that allows fair competition in the industry may attract service providers which would in turn increase competition. Increased business risks may not encourage providers and therefore cause the competition to be hindered causing monopolistic behaviours by the few number of players.

The results are presented in Table 4.3, for \$200 and for \$500.

In the \$200 column, the coefficients on financial development and bank concentration have positive signs and are significant at the 1% and 10% levels respectively. This means that a 1% increase in financial development would lead to a 0.42% percent increase in costs. Thus, the higher the level of financial development does not necessarily lead lower costs in line with Singh et al. (2011) and Muthiora (2015). Vasconcelos et al. (2017) strongly supports digital or agency based pay outs to increase interconnectivity and improve financial development, leading to higher remittances across borders.

In the case of bank concentration, a 1% increase in the ratio would lead to a 13.39% increase in costs. That is, the more the concentrated the banking sector of a developing country, the higher the remittance costs in line with Beck, Demirgüç-Kunt and Levine (2006), who attribute a high banking concentration to market power. A high concentration ratio means that the top three banks by assets may have monopolistic behaviour and control prices and increase barriers of entry and thereby reduce competition in line with Vasconcelos et al. (2017). Financial risk has a negative sign in line with Freund and Spatafora (2008), that higher business risk may lead to unwillingness by institutions to provide remittance services, either due to unfavourable regulations or uncondusive environment. However, the variable is statistically insignificant in the model. The model is significant with a p-value of 0.0009 and has an R-squared of 0.3705. This means that that the explanatory variables explain 37.05% of the variation in the dependent variable.

Table 4:6: Regression results: Factors Driving Remittance Costs in SSA

	US \$200		US \$500		US \$200 - remittance flows		US \$500 - remittance flows		US \$200 - migrant stocks		US \$500 - migrant stocks	
	Coef.	p>z	Coef.	p>z	Coef.	p>z	Coef.	p>z	Coef.	p>z	Coef.	p>z
Constant	1.8629	0.158	5.4277	0.000	0.5792	0.711	4.94	0.000	0.2921	0.879	2.60	0.009
Fin dev	0.4274	0.000***	0.0152	0.883	0.3986	0.000***	0.54	0.590	0.4246	0.000***	0.14	0.888
Fin risk	-0.0793	0.301	-0.0682	0.385	-0.0632	0.406	-1.38	0.168	-0.0655	0.396	-0.83	0.404
Bank Conc	0.1339	0.064*	-0.036	0.669	0.1435	0.044**	-0.66	0.511	0.1351	0.056*	-0.41	0.679
Remittance inflows					0.2598	0.143	-1.83	0.068*				
Migrant stocks									0.3475	0.259	-0.23	0.815
Prob> F	0.0009		0.8562		0.0007		0.3198		0.0013		0.9459	
R-squared	0.3705		0.0698		0.4169		0.3493		0.3989		0.1219	

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

In the case for the costs of sending \$500, all the variables are insignificant and the model has an insignificant F-statistic of 0.8562. The R-squared is also substantially lower at 0.0698, meaning that the model explains only 6.98% of the variation in the costs. This may be explained by the fact that, costs are significantly lower if larger value amounts are sent by an individual. Service providers tend to drive volumes by giving better rates for higher amounts sent.

Freund and Spatafora (2008) highlight the need to incorporate market-size factors that may play a role in determining remittance costs. That is, increased competition may arise as a result of high demand of remittance senders leading to more remittances being sent. This may lead to a reduction in fees. This study controls for that by estimating two additional regressions including firstly the remittance inflows and secondly the migrant stocks in the cost of sending \$200.

Remittance inflows has a positive sign when regressed against the cost of sending US \$200 and a negative sign for US \$500, which is significant at the 10% level. This may be explained by evidence that, the higher the amounts of money remitted, the lower the costs charged as a percentage of the total amount. Smaller value remittances tend to attract high fees. Migrant stock has a positive coefficient contrary to this study's expectations. However, in both regression equations, migrant stocks and remittances are insignificant. Contrary to Freund and Spatafora (2008), market-size effects or demand arising from high numbers of migrant stocks and higher volumes of remittances, do not seem to influence the costs particularly on smaller value remittances. Financial development remains significant at the 1% level. However, bank concentration remains significant at the 10% when migrant stocks variable is added but changes to 5% level when remittance inflows variable is added.

4.5 Data- Determinants of Remittance Flows

The descriptive statistics for the determinants of remittance flows are presented in Table 4.4 below and all variables are as previously defined.

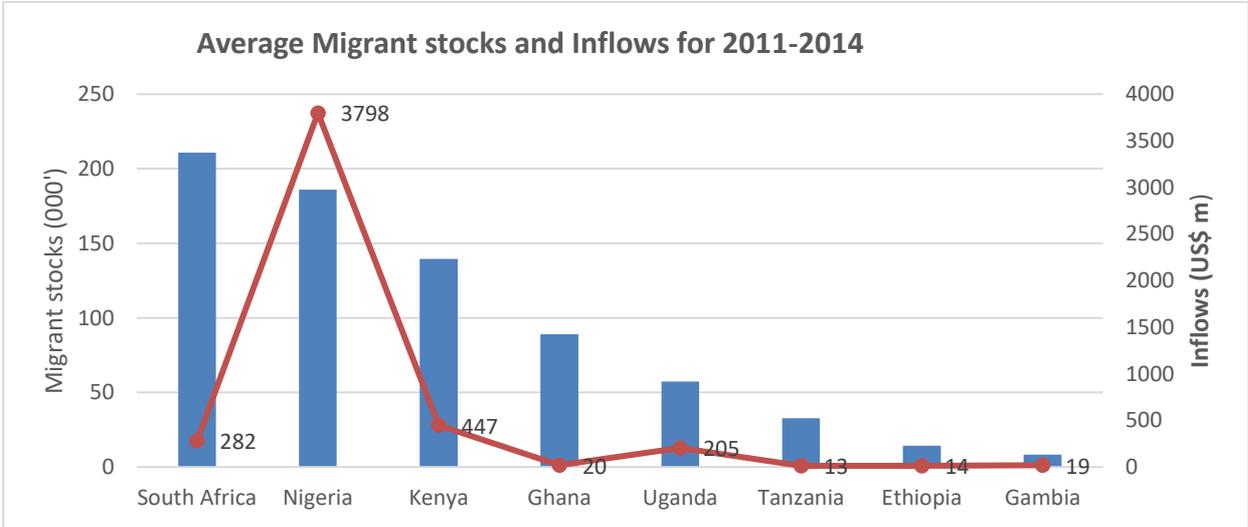
Table 4.4 presents the descriptive statistics for the variables in the sample. Remittance inflows have a minimum of US\$ 8.54 million and a maximum of US\$3.852 billion. Migrant stocks from the sample vary significantly, with a maximum of 221 000 migrants and a minimum of 5200 migrants, but may be explained by relative population sizes variation across the sample.

Table 4:7: Summary Statistics – Determinants of Remittance Inflows into SSA

	Cost of \$200	Cost of \$500	Inflows (US\$ m)	Migrant stocks (000)	Home GDP per capita	Host GDP per capita
Mean	9.08%	6.43%	599.70	92.21	1,873.03	39,636.25
Median	8.93%	6.61%	87.28	74.50	902.57	39,467.78
Range	6.62%	5.61%	3,843.25	215.80	7,258.27	1,633.20
Minimum	5.79%	3.08%	8.54	5.20	369.58	38,988.11
Maximum	12.41%	8.70%	3,851.79	221.00	7,627.85	40,621.31
Count	32	32	32	32	32	32

Figure 4.2 below shows the average migrant stocks of the sample countries living in the UK and remittance inflows from the UK to the SSA country in the sample for 2011 to 2014. South Africa has the highest number of migrants in the UK on average with approximately 211,000 migrants, followed by Nigeria with about 186,000. Gambia and Ethiopia have the lowest migrant stocks of about 8,000 and 14,000 respectively. In terms of remittances however, Nigeria, attracts the highest inflows from the UK of about US\$3.798 billion, followed by Kenya with close to US\$ 447 million while South Africa is third with about US\$ 282 million. Tanzania and Ethiopia have the lowest inflows from the UK with about US\$13 million and US\$14 million respectively.

Figure 4.2: Average Migrant Stocks and Inflows for 2011-2014



Source: Authors own calculations based on the results of data collected

The correlation matrix is presented in Table 4.5 below.

Table 4:8: Correlation Matrix – Determinants of Remittance Inflows into SSA

	Cost of \$200	Cost of \$500	Inflows	Migrant stocks (000)	Home GDP per capita	Host GDP per capita
Cost of sending \$200	1					
Cost of sending \$500	0.9399	1				
Inflows	-0.6520	-0.6918	1			
Migrant stocks (000)	-0.4631	-0.4027	0.5583	1		
Home GDP per capita	-0.1968	-0.1741	0.1428	0.7781	1	
Host GDP per capita	-0.0031	-0.0201	0.0022	-0.0114	0.0156	1

As shown in the table, both estimates of costs are negatively correlated to remittance inflows. Migrant stock has the strongest positive correlation with home country GDP per capita of 0.77. Since there is no correlation coefficients that exceeds 0.80, the study concludes that there is no evidence of multicollinearity in line with Gujarati (2003). However, Schiopu and Siegfried's (2006) study of European countries GDP differential between the host and home country has a positive correlation with remittances. The correlation between migrant stocks and remittance inflows is also positive, 0.558, which infers that, the higher the number of migrant stocks, the higher the volumes of remittances.

4.6 Panel Regression Results: Determinants of Remittance Flows

As hypothesised, remittance inflows are dependent or can be explained by several factors ranging from total number of migrants in the host country. Transaction costs play a major effect in such a way that, if high, migrants will tend to avoid remitting to their home countries due to the costs of the total amount remitted. This may as well lead to dependency on informal channels, which are not recorded.

The results of the panel regression of determinants of remittance inflows are presented in Table 4.6; column 1 shows the results with a cost of \$200, while Column 2 shows the results with a cost of \$500.

The cost of remittance or fee paid has an expected negative and significant impact on the remittance inflows into SSA, consistent with Gibson et al. (2006), Orozco (2002), Freund and Spatafora (2008) and Beck and Peria (2011), that a higher cost of sending leads to migrants refraining from sending or going for an alternative and cheaper informal channel. This study deduces from the coefficient, which is significant, that a 1% increase in fees of sending US\$200 reduces remittances by 0.046% and even higher for US\$500 with a reduction of 0.108%.

Table 4:9: Regression Results: Determinants of Remittance Inflows into SSA

	Cost of \$200		Cost of \$500	
	Coef.	p>z	Coef.	p>z
Constant	0.4140	0.989	-6.7625	0.834
Remittance cost	-0.0463	0.048**	0.1082	0.032**
Migrant stocks	1.0503	0.000***	0.9131	0.001***
Home income per capita	-0.1292	0.841	0.1705	0.768
Host income per capita	0.0936	0.976	0.5593	0.857
Prob> F	0.0000		0.0000	
R-squared	0.5681		0.5126	

Note: All variables except the remittance cost are in logs.

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

Migrant stock has a positive coefficient, as expected, which is significant at the 1% level. This implies that, a higher number of migrants in a developed country, leads to a higher volume of remittances. This is in line with the findings of Beck and Peria (2011) and Freund and Spatafora (2008). Higher volumes resulting from a high number of migrants, may lead to higher demand for remittance services and providers, leading to reduced prices as a result of competition. This may in turn lead to migrants opting to send more often and higher volumes. The positive relationship between migrant stocks and remittance flows is also supported by the finding of Nyamongo et al. (2012).

The host country GDP per capita has a positive sign on remittances as expected. This is in line with Schiopu and Siegfried (2006) findings. However, the variable is not significant, which may be explained by the fact that GDP per capita, is not a good proxy for wages in which migrants are employed in line with Freund and Spatafora (2008) findings. Migrants from SSA may earn their incomes from an informal sector which may not necessarily be well proxied by this variable. The home GDP per capita has a negative sign on the US\$200 column as expected,

which translates to, a weak migrant home country GDP per capita, means higher volumes of remittances. However, the variable is also insignificant on both costs. This is however contrary to Abbas, Masood and Sakhawat (2017), Ahmad et al. (2008) and Kock and Sun (2011), who find significant positive relationships between the income indicators and remittance flows.

Transaction costs have empirically had a significant effect on remittance flows, which is consistent with the hypothesis. That is, migrants will refrain from sending money to their home countries when formal channel fees or costs are high. This may infer that they will be incentivised to seek informal channels, which may be cheaper to lower their costs and increase the total amount remitted. The initial analysis on the drivers of transaction costs is crucial but with only the bank concentration being a significant positive driver of costs, which ties back to market power and a lack of competition.

4.7 Conclusion

This chapter has presented the findings from the analysis and results, drawing on the theory and literature. Section 4.2 and 4.3 has presented the results from the analysis of the drivers of remittance costs including the descriptive statistics and the panel data regression results and discussion. Thereafter, the results from the tests of the determinants of remittances, with specific emphasis on the role of costs, are discussed. The next chapter draws conclusions arising from this study's findings and analysis and provides recommendations.

5 CHAPTER FIVE: RESEARCH CONCLUSIONS AND RECOMMENDATIONS

The transaction costs on remittances to SSA compared to other regions globally have been of significant note given the high costs associated with formal channels. Examining the determinants and effects of transaction costs served as the major motivations for this study in order for policy makers in the region to have clear insights on how the costs can be reduced and the importance thereof.

The study's findings with regards to the determinants of transaction costs reveal that financial development and bank concentration have a positive relationship with transaction costs and are statistically significant. That is, a higher level of financial development in the home country does not necessarily lower transaction costs but in turn leads to higher costs. This may be as a result of the broad-based definition of financial development index, which captures both financial markets and institutions. A high banking concentration, which infers lower competition in the banking sector, drives remittance costs up. Regulators in the SSA region should ease barriers to entry and enhance competition in the banking sector in order to reduce the overreliance of a small pool of banks that may have anti-competitive behaviour. Financial risk was however insignificant both for a US \$200 and US \$500 amount.

On the effect of transaction costs on remittance flows into SSA, the study found a negative and significant relationship. That is, higher costs of remitting through formal channels reduces the remittance flows and increases the probability of use of informal channels. The stock of migrants was also found to have a positive and statistically significant effect on remittances, meaning that a higher number of migrants in a developed country leads to higher volumes of remittances to the migrants' home countries. The proxies for incomes, home and host GDP per capita, are insignificant. The implications of the significance of remittance costs are noteworthy as they add evidence on the need to cut remittance costs by formal channels significantly to three percent of the total amount remitted by global development institutions. This would help reduce the reliance on informal channels which would inevitably help combat terrorism financing and money laundering. Reducing transaction costs would improve the volumes in remittance flows into SSA and this may lead to even more formal channels used since there would be no need to seek informal channels.

Policy makers in both the developed and SSA countries would be interested in designing measures that would promote remittances in the hope that it would also lead to stimulation of domestic investment. This would also help in accuracy in recording remittance data and flows if more use of formal channels is made. Making remittances through formal channels would in

turn lead to help in efforts to combat illegal activities transacted through informal channels such as terrorism financing and money laundering.

Other benefits of using formal channels that may spill over as highlighted by Freund and Spatafora (2008) would be increased access to credit and savings products for banks. Remittance providers would also benefit from larger volumes and increased profitability as a result of economies of scale.

Further research on this topic can be undertaken on in depth investigation of intra-SSA remittance corridors having examined the effect of costs on remittance flows from a developed to a developing country context. Examination of each individual SSA country's characteristics with bilateral data of host countries would offer greater insights similar to the study conducted by Ahmed and Martínez-Zarzoso (2016) involving flows to Pakistan from 23 sending countries over the period 2001 to 2013.

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APPENDICES

Appendix A: Hausman test: Determinants of costs

Coefficients	(b) fixed	(B) random	(b-B) Difference	sqrt(diag(V_bV_B)) S.E.
findev10	0.3790	0.4274	-0.0484	0.2279
bankconc10	0.3120	0.1339	0.1780	0.3744
finrisk10	0.1078	-0.0792	0.1871	0.2243

b = consistent under Ho and Ha; obtained from xtreg
 B = inconsistent under Ha, efficient under Ho; obtained from xtreg
 Test: Ho: difference in coefficients not systematic
 $\chi^2(4) = (b-B)'[(V_b-V_B)^{-1}](b-B) = 0.74$
 Prob>chi2 = 0.8633

Appendix B: Hausman test: Determinants of Inflows

Coefficients	(b) fixed	(B) random	(b-B) Difference	sqrt(diag(V_bV_B)) S.E.
costof200	-0.0335	-0.0462	0.0127	0.0074
lnmigran~000	1.0654	1.0580	0.0075	0.0501
lnhomegdpp~a	-2.8139	-0.1527	-2.6612	1.6614
lnhostgdpp~k	4.9874	0.0005	4.9869	2.9229

b = consistent under Ho and Ha; obtained from xtreg
 B = inconsistent under Ha, efficient under Ho; obtained from xtreg
 Test: Ho: difference in coefficients not systematic
 $\chi^2(4) = (b-B)'[(V_b-V_B)^{-1}](b-B) = 5.67$
 Prob>chi2 = 0.2251
 (V_b-V_B is not positive definite)