The impact of remittances on financial sector development:
An exploration in the SADC region

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ABSTRACT

Remittances received from migrants abroad have become one of the largest sources of external finance for developing countries. It has been argued that a particular impact of this influential flow is the stimulation of financial sector development. However, current research has been mainly based at a broad level across the developing world. This paper investigates whether this consensus holds true when examined at a sub-regional level within Sub-Saharan Africa. It is an important question given the extensive literature documenting the direct growth enhancing effect of financial development, and consequently, poverty reduction.

In particular, annual data from 11 countries in the South African Development Community (SADC) are analysed from 1990 to 2011 using the panel data analysis techniques of fixed and random effects models, a Generalised Methods of Moments (GMM) dynamic framework (Arellano & Bover, 1995) and Instrumental Variables (IV) Estimations (Baum, Schaffer & Stillman, 2003). Three indicators of financial sector development are analysed, namely: the level of bank deposits, near money (M2) and credit intermediated by the local banking sector.

Remittances are found to have a largely negative and insignificant impact on financial sector development in SADC over the period of study. This contradicts the findings of the current literature on this topic. The implications of this are noteworthy as it adds evidence that the model currently held in the literature (i.e. that remittances have a positive and significant relationship on financial sector development) is not robust at the less smoothed level of a sub-regional scale. But further, it provides evidence to motivate the further exploration of the impact of measurement errors of remittance flows. Recommendations for further research are provided on the basis of both these possible causes.

TABLE OF CONTENTS

LIST OF FIGURES AND TABLES

GLOSSARY OF TERMS

Remittance	Remittances are the sum of workers' remittances, compensation of employees and migrants' transfers. They are classified as current private transfers from migrant workers resident in the host country for more than a year, irrespective of their immigration status, to recipients in their country of origin; compensation of employees is the income of migrants who have lived in the host country for less than a year; migrants' transfers are defined as the net worth of migrants who are expected to remain in the host country for more than a year (IMF 1993)
Near Money (m2)	An economics term which describes non-cash assets that are highly liquid, such as bank deposits, certificates of deposit (CDs) and Treasury Bills. Central banks, economists and statisticians may utilize near money when determining the current money supply. Near money refers to assets that can be quickly converted into cash. It is also called quasi-money. http://www.investopedia.com/terms/n/near-money.asp
Bank Deposits	Money placed into a banking institution for safekeeping. Bank deposits are made to deposit accounts at a banking institution, such as savings accounts, checking accounts and money market accounts. The account holder has the right to withdraw any deposited funds, as set forth in the terms and conditions of the account. The "deposit" itself is a liability owed by the bank to the depositor (the person or entity that made the deposit), and refers to this liability rather than to the actual funds that are deposited.

	. (Bank Deposits, n.d.)
Regional Economic Community	Sub-Saharan Africa has a number of regional economic com munities (RECs), each with similar goals of fostering cooperation and a degree of economic integration-typically as free trade areas, customs unions (free trade area with common external tariffs), or monetary unions. (Anonymous, Regional Economic Communities, n.d.)

LIST OF ACRONYMS AND ABBREVIATIONS

FDI	Foreign Direct Investment
GDP	Gross Domestic Product
IMF	International Monetary Fund
PPP	Purchasing Power Parity
SADC	Southern African Development Community
WB	World Bank

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1 INTRODUCTION

1.1 Research Area

Throughout history, migration has been intertwined with economic and social development. It is often seen as a result of imbalances in development globally, but also as a factor that can influence development. As said by Hollifield, Orrenius and Osang (2006, p.4), “simple, neoclassical economic models predict that prices should drive factors such as labour and capital across regions and countries toward their most valuable use. As this happens, developing countries, which are typically labour-rich and capital-scarce, should experience more rapid growth, higher income, and eventually convergence to industrial world levels of well-being.” As such, migration and issues relating to it are unlikely to lessen while developing nations, and consequently the inability to of their economies to support a full labour force, exist.

It has been stated that the remittances flows which result from migration form the most tangible, and at times controversial link, between migration and development (Ratha, 2007; Kemegue, Owusu-Sekyere & van Eyden; 2011 and Nyberg-Sorensen, Van Hear & Engberg-Pedersen, 2002). These links to development have come to fore of academic discussion due the exponential growth of remittances in recent years to one of the largest sources of financial flows; in many cases exceeding those of official aid and foreign direct investment (Nyamongo, Misati, Kipyegon, & Ndirangu, 2012; Giulia & Zazzaro, 2011; Gupta, Pattillo, & Wagh, 2009; Cooray, 2012 and Aggarwal, Demirgüç-Kunt, & Pería, 2011; among others). This is illustrated by the immense increase in remittances flows to the developing world from US $31,058 billion in 1990 to US $327,591 billion in 2008 (Coraay, 2012). This figure further increased to $372billion in 2011 and is estimated to continue on this growth path with worldwide remittances flows expected to reach US $615billion by 2014 (Ratha & Silwal, 2012). It must be noted that a large number of remittances flows through formal and informal channels go unrecorded and therefore the potential size of these flows is even greater than the figures stated above (Freund and Spatafora, 2008; Sanders, 2003).

The core function of remittances is a private capital transfer by migrants to recipients in their home countries (IMF, 1993). This flow most often flows to poor households as means of augmenting their income and as such can have a direct effect on the financial sector of the recipient country, along with a number of indirect multiplier effects and macroeconomic effects (Gupta *et al*, 2009). The financial sector is defined as the set of institutions, financial instruments and regulatory framework that permit transactions to be made by incurring and settling debts; and thus, by extending credit (Baden, 2000). Naturally this would not be possible without the accumulation of capital in the financial sector. Development of the financial sector occurs when the various elements work together to reduce the costs of obtaining information, enforcement transactions (World Bank, 2013). This development can be defined as the factors, policies and institutions which lead to effective financial intermediation and efficient markets, along with deep and broad access to capital and financial services (World Economic Forum, 2011). This is especially significant due to the well-established premise in academic literature of financial sector development as a driver of economic growth (Goldsmith, 1969; Boyd & Prescott, 1986; King & Levine, 1993; Levine, 1995; and Levine & Zervos, 1996; among others). Thus high volume of remittances flows and their potential interaction with the financial sector through increasing currency in circulation and direct uptake into the financial sector is a noteworthy developmental impact.

Yet, this concept has only recently begun to be explored in academic literature. Remittances and financial sector development have been studied from various angles in the research of Giuliano and Ruiz-Arranz (2009); Aggarwal, Demirgüç-Kunt and Pería (2011); Gupta *et al* (2009); Coraay (2012), Nyamongo *et al* (2012); Sharif and Amjad (2012); Mundaca (2009); Demirgüç-Kunt, López Córdova, Pería and Woodruff (2011); Oke (2011); and Brown and Fayad (2011) among others. Guiliano and Ruiz-Arranz (2009) make the link that remittances can promote economic growth in developing countries by enhancing financial sector development in a study across 73 countries from 1975-2002. Mundaca (2009) perform a similar study across Latin America and show that remittances promote economic growth in economies with well-developed financial markets. Nyamongo *et al* (2012) provide further evidence that remittances are an important source of economic growth while financial sector development holds a weak relationship in this regard. They perform their study across 36 countries in Africa over the period 1980 to 2009. This contributes to a current debate in literature on the direct impact of remittances on economic growth. It is strongly contested whether this direct impact is infact significant (Rao & Hassan, 2011). Gupta *et al* (2009) take a slightly different approach by examining the effect of remittances on poverty and financial development in Sub-Saharan Africa. They find that remittances have a positive effect on both variables.

A second line of enquiry in the set of literature on remittances and financial sector development focuses on examining the link between the two factors. Aggarwal *et al* (2011) study a panel of 109 countries across the developing world to investigate the impact of remittances on financial sector development through the volume of deposits and credit intermediated by the banking sector. They find this impact to be positve, significant and robust. Sharif and Amjad (2013) provide a continuation of this study of the impact of remittances on financial sector development in Latin America and the Caribbean. Their findings are consistent with those are Aggerwal *et al* (2011) except for the indicator of bank deposits to GDP where remittances are found to have an insignificant relationship. Coraay (2012) focuses on the impact of remittances on the efficiency of the financial sector and finds the remittances have a positive impact on this aspect of the financial sector, particularly when government ownership of banks is low. Brown and Fayad (2011) are, to the knowledge of this researcher, the first peer-reviewed paper to establish a negative relationship between remittances and financial sector development. This study was performed both at the macro level across 138 countries and at the micro level in the countries of Azerbaijan and Kyrgyzstan. Their conclusion is remittances appear to deter the use of formal banking services.

Furthermore, few studies in this area have been performed at the country level. Demirgüç-Kunt *et al* (2010) use municipality-level data for Mexico to show that remittances are strongly associated with banking breadth and depth. Oke (2011) take a slightly different approach by purely focusing on the impact of remittances on banking breadth in Nigeria over the period 1977 to 2009. Chowdhury (2011) analysed the effects of remittances on the financial sector in Bangledesh over the period of 1971 to 2008. Similarly, they find a positive and siginficant impact upon financial sector development. Moreover, Oke (2011) was the first study to explicitly explore this concept in an African context. If the currently held assertation in literature that remittances have a positive and significant impact on economic growth and financial sector development, a driver of economic growth, then this is a vital area of study for Sub-Saharan Africa as one of the poorest and economically deprived regions of the world (Kemegue, Owusu-Sekyere & van Eyden; 2011).

1.2 Problem Statement

To provide a summation of the problem that will be explored in this research, the problem statement follows below:

It is argued in the literature that remittances have a positive and significant impact on the financial sector development of receiving countries in the developing world (for e.g. Aggarwal *et al* (2011); Gupta *et al* (2009); Coraay (2012), Nyamongo *et al* (2012); Sharif & Amjad (2013); and Brown & Fayad (2011)). However, this argument is currently based on a light level of exploration largely through expansive studies across the developing world or regions within it (for e.g. Sub-Saharan Africa, Latin America and the Caribbean). These findings have a high probability of being 'oversmoothed' due to an inherent inability to take into account the unique characteristics and drivers of sub-regions and countries at this broad level. Consequently, it is useful to explore whether this premise holds true at a sub-regional level. This allows for a closer focus that brings regional characteristics into greater focus and questions whether the current hypothesis is scale dependent. It is vital to know the true nature of these relationships before proposing and implementing interventions that affect these two vital variables, which have a substantial and direct impact at the household level and on macro drivers of the economy.

The study will take place within the randomly selected regional economic community of the Southern African Development Community (SADC). This adds the further benefit of exploring this premise within a region with high levels of migration, intermigration and an established economic partnership, and thus, additional incentive to harness the potential of an significant capital flow at both ends of the remittance flow spectrum (Pendleton, Crush, Campbell, Green, Simelane, Tevera & De Vletter, 2006)..

1.3 Purpose and Significance of the Research

The purpose of this research is an explorative study to determine the impact of remittances on financial sector development of receiving countries in the SADC region of Sub-Saharan Africa. It will test whether the commonly argued assertion in academic literature that remittances have a positive and significant impact on financial sector development holds true for the SADC region of Sub-Saharan Africa. As such, the study will examine the unique responses of the region to this premise and discuss the various factors that could underlie the results.

This exploration holds significance for a number of reasons. Firstly, the primary objective of the study is to add weight to the current body of research on remittance flows. While this is significant in its own right, further import is added due to the influential nature of the two variables under study; namely remittances and financial sector development. It is essential to study the nature of influential factors in development in order to understand whether and how to harness or moderate their influence.

As established above, migration is a core issue in development and one which is unlikely to lessen while developing nations, and consequently the inability to of their economies to support a full labour force, exist. Remittances flows are an important and substantial by-product of the high levels of migration from developing nations that have been found to have a stimulation effect on financial sector development (Kemegue *et al*, 2011). Moreover, remittances hold significance at a broader scale than the scope of this study. They have been found to have direct and indirect impact on key socio and macro-economic factors such as poverty, labour supply, inequality, accumulation of foreign capital, education and entrepreneurship among others (Aggarwal *et al,* 2011; Rao & Hassan, 2011). It is imperative to investigate the various impacts of this capital resource which tend to flow directly at the household to the most vulnerable in an economy (Ratha, 2003). In particular, investigation is necessary to understand the nature of these relationships in order to take appropriate measure to enhance or mitigate its outcomes.

The financial sector is an influential factor to study due to the vital intermediation function it plays in the efficient allocation of the scarce resource of capital within an economy (World Economic Forum, 2011). Further to this, it has been well established that aside from its own necessary function within an economy, financial sector development is a driver of economic growth (for e.g. Boyd & Prescott, 1986; King & Levine, 1993; Levine & Zervos, 1996; and Levine, 2006). The assessment of the drivers of financial sector development in order to support this growth impact on the real sector is an important focus for development studies as this is where the social costs and benefits ultimately reside.

As said by Sander (2003), "While interest in remittances has been growing, Africa has received the least attention and Sub-Saharan Africa in particular remains largely neglected. This is in part due to the relatively low share of global remittance flows to the continent." Sub-Saharan Africa is a region that stands on a global scale as extremely vulnerable and under-developed. It is therefore vital to study any measures that might address this issue. A number studies have explored the impact of remittances in Sub-Saharan Africa yet, to the knowledge of the researcher, few have focused on the impact on financial sector development and no peer reviewed studies have been performed at a sub-regional level. As mentioned above, this could be due to the low share of remittances competing for interest with areas of high volume flows in this research focus. Alternatively, it could be due to the complication of data availability in a region notorious for high informal remittances flows and under-measurement of formal flows. Yet if the premise of a positive and significant impact of remittances holds true, research is necessary to catalyse action to increase overall flows, leverage current informal flows into the formal system and improve upon reporting to enhance measurement of this impact. Further, it is equally important to establish if a negative impact exists in order to implement measures to mitigate the effect. As such, a ‘chicken and egg’ situation exists. The intention of this study is to contribute to the current knowledge base and in doing so, inform stakeholder discussions on the role of remittances and what, if any, policy and other interventions might be required.

Lastly, it is significant to study this premise in the context of a regional economic community. The SADC region was randomly selected for this purpose. The mission of SADC is regional integration and poverty eradication through economic development, while ensuring peace and security (SADC, 2012). Further, the SADC region holds the strongest economic standing of the regional blocs in Africa. This will be discussed further in the paper. It is significant to study factors that have established direct and indirect impacts on economic growth in an economically influential region committed to implementing practices to drive this growth and, further, one in which strong migration and intermigration patterns that are present (Pendleton *et al*, 2006). This is due to the fact these elements provide high motivation and the ability for the SADC region to take note of the impact of remittances and implement measures to enhance or mitigate its effects as necessary.

A notable benefit for the potential for implementation of these measures is the fact that SADC contains some of the top remittance sending countries for other countries in the region (Ratha & Shaw, 2007). While negative externalities of remittances can affect remittance sending countries, the potential economic benefits from the impact of remittances on remittance receiving countries flowing into the region should outweigh any negative barriers to implement measures to enhance remittance flows, should this be deemed necessary. The study will enhance the possible significance of this discussion by exploring the area under study a time period in which remittances had begun to gain recognition and due to this, an increased focus on accurate measurement and data collection.

In summary, it is valuable to explore the impact of remittances on financial sector development due to the potential implications of this relationship and the importance of identifying how they apply in a unique regional context before taking action on them.

1.4 Research Questions and Scope

As stated above, the ultimate aim of the research is to explore whether current assertations in literature regarding the impact of remittances on financial sector development hold true for the SADC region, along with the implications these results hold for the region.

The study is designed to answer the following questions:

1. What is the impact of remittances on financial sector development in the SADC region over the period of 1990-2011?
    a. What impact do remittances have on the aggregate level of bank deposits in the SADC region over the period of 1990-2011?
    b. What impact do remittances have on the aggregate level of near money (M2) in the SADC region over the period of 1990-2011?
    c. What impact do remittances have on the aggregate level of credit intermediated by the private banking sector in the SADC region over the period of 1990-2011?

The exploration of the above research questions will provide conclusions on the following research objectives:

1. To understand the impact of remittances on the depth of the financial sectors within the SADC region, as measured in this study by the broad level of the combination of money supply and short-term deposit instruments and the specific area of bank deposits.
2. To understand the impact of remittances the level of financial intermediation by the financial sectors within the SADC region and, consequently, their impact on the depth and efficiency of the financial sectors.
3. To establish whether the premise of a positive and significant impact of remittances applies at the various levels of investigation and therefore is worthy of motivating action in the SADC region.

On the basis of the research questions and objectives above the hypothesis to be concluded upon is as follows:

Remittances flows have a significant and positive impact on financial sector development, as measured by the aggregate level of bank deposits, credit intermediated by the banking sector and near money (m2), for the period under study.

The subject of the impact of remittances on financial sector development in the SADC region is a wide and complex, especially due to the low levels of exploration of this general concept in literature. However, this study will limit the focus on this impact to the selected period of 1990 to 2011. While it is possible to discuss the impacts of remittances at both the remittance sending and receiving ends of the spectrum (as discussed in Ratha & Shaw, 2007), it is too broad a subject area for the purposes of this study. Thus the scope of this paper will remain on the impacts on remittance receiving countries. Analyses will be performed on the selected indicators of financial sector development. For the purpose of this study, aspects of the financial sector beyond these indicators will not be analysed.

1.5 Research Scope and Assumptions

The research in this paper is based upon the following assumptions:

- Countries under study are remittance receivers.
- For the period of study, the examined countries conform to the Sub-Saharan pattern established in literature of receiving a large number of formal and informal remittance flows.
- The publically available information in the World Bank databases utilized for this study was obtained ethically.

1.6 Conclusion

This chapter has defined the research area of remittances and financial sector development. It has shown how this study will seek to rectify a current gap in research by performing an investigation into the impact of remittances on financial sector development in the SADC region. The significance of this research has been described and on the basis of this the research questions, objectives and hypothesis were defined. Lastly, the research scope and assumptions were outlined.

The structure of the report will be as follows: Chapter 2 will investigate the foundation in current academic thinking for exploring the research described above by conducting a literature review. Chapter 3 will describe the research methodology that will be utilized to investigate the research questions. Chapter 4 will present and analyse the research findings. Chapter 5 will build on work presented in previous chapters by providing the conclusions that arose from exploration of the findings. Finally, Chapter 6 will provide recommendations for future research.

2 LITERATURE REVIEW

2.1 Introduction

Remittances provide a financial lifeline to the poor in many countries. It has been established above that remittances can constitute a vital developmental flow, both due to the capital influx, but even more so, due to the outworking's of the receipt of that capital directly at the household level. It places capital in the hands of the economically vulnerable (Ratha, 2003).

This chapter will begin by reviewing the nature of remittances. It is important to establish the characteristics of the capital flow under study in order to appropriately discuss the possible impacts it may have. From this foundation, the various impacts identified in literature will be explored. An exploration of the wider impacts is necessary to understand the complexities of the focal impact of financial sector development for this paper; as well as this basis is necessary to understand the wider reaching impacts of leveraging one impact of remittances. The purpose of this research is to study the particular impact that remittances can have on financial sector development. This chapter will therefore explore the details of this impact as the basis for further exploration into them.

2.2 Nature of Remittances

Much of the impact of remittances can be linked back to the inherent nature of this capital flow; namely, it is stable, countercyclical, a foreign exchange flow, a developmental flow (as it flows directly in the hands of poor), both formal and informal in nature and often vastly unrecorded (Kemegue *et al,* 2011). As established above, remittances are currently a high volume capital flow for the developing world that in areas have eclipsed traditional developmental flows such as FDI and official aid (for e.g. Giulia & Zazzaro, 2011; Cooray, 2012). The potential impact of these flows is therefore substantial.

The stable nature of remittances is oft cited as a positive factor of this flow due to the reliability this provides (Rathat, 2003; Ratha & Silwal, 2012; Gupta *et al*, 2009). Ratha (2003) illustrate how remittances are a stable flow that increases in value during periods of shocks, such as economic downturns and natural disasters, and thereby smoothing household consumption. This speaks to both a stable and countercyclical nature of remittances. It is currently debated in literature whether the countercyclical nature of remittances holds true across multiple contexts due to the altruistic motivation of remittances (with evidence building for the affirmative, such as in Quartey and Blankson (2004) and Ratha (2007)), but the stable nature has been firmly recognised (Frankel, 2011). The stable nature of remittances is further established by Yang (2008); Kireyev (2006); Ratha and Silwal, (2012); and Vargas-Silva and Huang (2006). While stability is discussed here because it is a characteristic of remittances flows, it is noteworthy due to highlight the increased value it provides to impacts by ensuring their consistent application.

Remittances are by definition sent from one country to another (IMF, 1993). Consequently, they are often transmitted in a currency foreign to the receiving country (Chami *et al,* 2003). Rajan and Subramanian (2005) show that remittances do not hold the typical capital inflows' adverse effect of eroding a country's competitiveness. Related to the transmission nature of the flows is the developmental nature of remittances (Brown, 2011). This is a term applied to remittances to describe their receipt directly at the household level which is generally that of a low-income family. As said by Ratha, (2007, p. 3), "In addition to providing financial resources for poor households, they affect poverty and welfare through indirect multiplier effects and also macroeconomic effects. These flows typically do not suffer from the governance problems that may be associated with official aid flows."

The dual formal and informal nature of remittances is widely discussed in the literature (Freund & Spatafora, 2008; Aggarwal *et al,* 2010; Gupta *et al*, 2009; Chami *et al*, 2009; World Bank, 2011; Nyamongo *et al,* 2012; Sanders (2003); Kemegue *et al,* (2011)). In summary, this is largely to the high impact this has on measurement errors, the difficulty of leveraging the positive impacts of remittances and negating negative impacts. Freund and Spataford (2005) highlight that estimates of unrecorded remittances range from 50 to 250 percent of the officially recorded statistics on remittances. Gupta *et al* (2009) posit that remittances through informal channels hold the potential to add at least 50 percent to currently recorded flows worldwide. As mentioned above, this is significant for the discussion on leveraging and mitigating externalities of remittances, but further, for the purpose of this study it is particularly interesting due to untapped impact on the financial sector it holds.

Lastly, the formal nature of a flow does not guarantee that it will be accurately reported. Formal remittances hold the nature of being underreported alongside underutilized informal flows. The common causes of this are a lack of recognition by some central banks to monitor 'non-bank' flows, such as money transfers, and wide discrepancy in common remittance measurement and reporting standards globally (Irving *et al*, 2010; World Bank, 2011).

2.3 Impacts of Remittances

As said by Aggarwal *et al* (2011, p.1), "As researchers and policymakers have come to notice the increasing volume and stable nature of remittances to developing countries, a growing number of studies have analyzed their development impact along various dimensions, including: poverty, inequality, growth, education, infant mortality, and entrepreneurship." The nature and increasing size of remittances flows has generated interest into studying both the positive and negative potential developmental impacts of these flows.

2.3.1 Positive Impacts

The core function of remittances is a private capital transfers by migrants to recipients in their host countries (IMF, 1993). Gupta *et al* (2007); Ratha (2003); Adams and Page (2003) and Adams and Page (2005) show that due to this core function of supporting recipient welfare, remittances contribute to reducing the poverty of the recipient. It must be noted that the stable and countercyclical nature of flows discussed above has a positive influence in this situation due to the reliable smoothing effect it creates for vulnerable households (Chami, 2009; Ratha, 2003). Further, Gupta *et al* (2007) illustrate that remittances affect poverty and welfare via indirect multiplier effects. I.e. non-recipient households benefit indirectly from remittances through payment for goods and services and labour income. An interesting point is that these flows typically do not suffer from the governance problems associated with alternate development flows, such as official aid, because they flow directly to the household level (Gupta *et al*, 2007).

As said by Nyomongo *et al*, (2012): "Remittances may improve a country's credit worthiness for external borrowing. This is because remittances are included in the exports of goods and services. Higher remittances will therefore improve the country's debt to exports ratio, an indicator that is critical in the assessment of a country's credit worthiness." Further to this, due to their foreign currency nature discussed above, remittances can provide a source of foreign exchange for the country. Remittances act as a resource for savings and investment that can be channelled towards the productive uses of education, health and entrepneaurship (Ratha, 2007; Woodruff & Zenteno, 2007). These can have an impact on productivity, unemployment and ultimately, economic growth (Nyomongo *et al*, 2012). Among others, Aggarwal *et al* (2011) illustrate the possible positive impact of remittance flows on financial sector development. This is based on the notion that remittance recievers are active in the formal financial system and will deposit their capital into a formal bank account, from it can be intermediated to be offered as credit to the private sector.

Nyamongo *et al* (2012) illustrate the positive impact of remittances on economic development. Conversely, studies by Giuliano and Ruiz-Arranz (2009) and Mundaca (2005) highlight that the impact of remittances on economic growth can depend on the level of financial sector development in a country. However, these studies present opposing opinions. Mundaca (2005) found that by controlling for financial sector development the impact was strengthened, while Giuliano and Ruiz-Arranz (2009) show that remittances promote growth in under-developed financial sectors. This is a further illustration on the academic debate of the true impact of remittances on economic growth discussed in Chapter 1.

2.3.2 Negative Impacts

Chami *et al.*, (2003) argue that remittances may create a situation of financial dependency by remittance reduce recipients' motivation to work and thereby aggravating unemployment and possibly slowing down economic growth. Yet, as mentioned above, remittances also hold the potential to be channelled towards productive uses such as education and entrepreneurship. Remittances can hold a negative impact of creating inflationary pressures they are generally spent on consumption goods (Gupta et al., 2007).

Remittances have been shown to increase inequality due to a bias towards favouring affluent remittance receiving households (Carling, 2004). This is due to the fact that lower barriers to migration, namely costs and immigration policies, could exist for higher skilled workers. Dutch disease is the impact of foreign exchange flows, an established nature of remittances, on an economy when the capital flow causing exchange rate appreciation and lowers export comptativeness (IMF, 2005). “Dutch disease caused by international remittances afflicts the middle income countries but not the upper income and low income countries. The middle income countries can inoculate their economies from getting the disease with robust macro and sectorial economy conditions.” (Beja, 2010, p.1). Moreover, the IMF (2005) highlight the stable time profile of remittances and according to this, conclude that the Dutch disease effects may not be credible.

While the negative impact of foreign exchange flows are noted, Acosta, Baerg and Mandelman (2009) show that the upward pressure on exchange rates brought about by the increase in remittance can be lessened by financial sector development. They investigated this effect across 109 developing and transition economies and found that countries with well-developed financial sectors had lower adverse effects from foreign exchange flows.

2.3.3 Conclusion

A number of negative and positive impacts of remittances exist. The appearance of these impacts will likely differ from country to country; yet on the whole, the balance appears to be weighted towards a positive impact of remittances in general. This is especially due to the fact that it has been shown that the majority of negative impacts have some means of negation possible.

2.4 Nature of Remittances’ Impact on Financial Sector Development

As discussed in Chapter 1, remittances have been shown by current literature to have a largely positive and significant impact on financial development. Table 1 below illustrates the main areas of study of these papers and their individual conclusions to support this assertation.

Literature Resource	Main Area of Study	Conclusions
Aggarwal *et al* (2011)	Investigate the impact of remittances on financial sector development through the volume of deposits and credit intermediated by the banking sector for 109 countries across the developing world. Period: 1975 to 2007.	Positive, significant and robust impact of remittances on both indicators of financial sector development.
Coraay (2012)	Investigates the impact of remittances on the efficiency of the financial sector through their interaction with government banks for 94 non-OECD countries. The dependent variables explored are as follows: deposit money bank assets to GDP, private sector credit to GDP, liquid assets to GDP, overhead costs to total assets, and net interest margin to total assets.	Positive impact on this aspect of the financial sector, particularly when government ownership of banks is low.
Nyamongo *et al* (2012)	Invesitgates the role of remittances and financial development on economic growth in a panel of 36 countries in Africa over the period 1980–2009. Dependent variable is real GDP per capita growth.	Remittances appear to be working as a complement to financial development.
Sharif and Amjad (2012)	Investigates the impact of remittances on financial sector development across	Overall results: positive and significant impact of remittances

	29 countries in Latin America and the Caribbean region over the period 1991-2010. Dependent variables: bank deposits to GDP, bank credit to GDP and near money to GDP.	on financial development. Ratio of bank deposits to GPD found to be insignificant.
Demirgüç-Kunt, López Córdova, Pería and Woodruff (2011)	Invesitgate municipality-level data for Mexico to show that remittances are strongly associated with banking breadth and depth. Dependent variables: number of branches and accounts per capita and the amount of deposits and credit to GDP for the year 2000.	Remittances are strongly associated with greater banking breadth and depth
Oke (2011)	Investigates impact of remittances on banking breadth in Nigeria over the period 1977 to 2009. Dependent varibles: near money to GDP and private credit to GDP.	Remittances positively and significantly influence financial development.
Brown and Fayad (2011)	Investigates macro and micro economic impacts of financial sector development. Study performed both at the macro level across 138 countries and at the micro level in the countries of Azerbaijan and Kyrgyzstan over the period 1970 to 2005.	Negative relationship between remittances and financial deepening in developing countries.

Chowdhury (2011)	Investigates the effects of remittances on the development of the financial sector of Bangladesh over the period of 1971-2008.	Remittances positively and significantly influence financial development.

Table 1: Overview of literature that investigates the impact of remittances on financial sector development

It is therefore clear there is a strong bias towards the hypothesis that remittances have a strong and positive link on financial sector development. This positive relationship therefore holds high potentia to capitalise on on the impacts of remittances discussed above.

2.5 Conclusion

It has been established above that remittances hold many positive and negative impacts for remittance receiving countries. While a number of negative implications exist, the evidence in current literature points to the positive impacts and long-standing nature of migration providing sufficient justification to promote this flow while implementing measures to mitigate negative impacts. Of particular interest in this regard is the impact this capital flow has upon financial sector that receives it. The predominant hypothesis in current academic literature is that the effect of remittances on financial sector development is both positive and significant. This is notable due to well-established nature of financial sector development as a driver of economic growth and consequently, poverty alleviation. Thereby if this link holds to current thinking; remittances, as a by-product of the developing state of the countries of origin of the migrants sending them, could have an indirect impact on increasing development and therefore reducing the drive for migrants to leave their homes in order to obtain employment.

While the above hypothesis has been established in current literature, it has not been widely explored. Therefore there is strong motivation for research to explore this vital area.

3 RESEARCH METHODOLOGY

3.1 Introduction

This chapter presents the research design and methodology that will be used to explore the research questions stated in the introductory chapter of this paper. It initially presents the overall research approach and strategy to provide an overview of the foundation of the methodology. From here, it examines the data choice, frequency and collection methods that were chosen due to their appropriate fit with the research strategy and design. As part of this, the sampling technique of cross-sectional sampling is described. These elements provide the set-up for the description of the data analysis method and tests that will be applied. In order to ensure that these techniques are trustworthy, the validity and reliability of data is then discussed. Finally, before moving onto analysis of the findings, limitations to the research are provided.

3.1.1 Deductive Research Approach

This study utilized a deductive approach. The purpose of the research is to test what the impact of remittances is upon financial sector development. From this general stand point the first research question of "What is the impact of remittances on financial sector development in the SADC region?" was developed. Once this research question was established, the research then moved down a further level of specification to develop the 3 sub-questions in order to explore particular aspects of the arching research question. These questions are as follows:

a. What impact do remittances have on the aggregate level of bank deposits in the SADC region over the period of 1990-2011?
b. What impact do remittances have on the aggregate level of near money (M2) in the SADC region over the period of 1990-2011?

c. What impact do remittances have on the aggregate level of credit intermediated by the private banking sector in the SADC region over the period of 1990-2011?

This fulfils the assumptions of the “top-down” deduction approach which works from a broad base theory that hypothesis are derived which are then empirical tested through observations made by the researcher which thus lead to more specific facts using a logical, scientific research approach. The assumption is that the stated hypotheses are empirically correct. This is as opposed to the “bottom-up” induction approach which starts with general observations and patterns of behaviour from which a possible hypothesis is developed and tested. Using an interpretative approach, a new theory is developed from these findings. (Blanche, T.M., Durrheim, K., & Painter, D , 2006)

1.1.1 Quantitative Research Strategy:

The research strategy appropriate for the exploration of the research problem was a quantitative study which studied the relationship between the two factors that are measured with quantitative economic indicators. While it is possible to explore remittances and financial sector development with qualitative indicators, these would not have been the most appropriate for this study. The purpose of the research was to examine the nature and significance of the relationship between two quantifiable variables, one of which is a financial flow. The study researches predetermined categories of statistical data from which comparisons can be drawn thus meeting the requirements for a quantitative research strategy.

This is compared to the assumptions for a qualitative research strategy which collects data spoken or written or through observations collated thematically. (Blanche, T.M., Durrheim, K., & Painter, D , 2006)

3.2 Research Design

The purpose of the research is to examine the impact of remittances on financial sector development, and three indicators thereof, over a period of time. Furthermore, this impact is being examined over a cross-section of country units within the randomly selected SADC region. This fulfils the cross-sectional units studied across time requirements for the use of panel data analysis.

Panel data is longitudinal data obtained through multiple, repeated observations of time series pictures of the cross section unit which in this study are countries. This allows for the panel data assumptions that observation that effect in one time series does not necessarily impact the other time series. (Anonymous, Panel Data Econometrics -Lec06, n.d.)

These assumptions are a better fit to the exploration of my research problem than the common quantitative research designs of experimental, whose premises is cause and effect of the independent variable on the dependent variable rather than relational effect. (Blanche, T.M., Durrheim, K., & Painter, D , 2006)

3.3 Data Collection, Frequency and Choice of Data

3.3.1 Data Choice

This paper will utilize balance of payments data on remittance flows to study the link between remittances and financial sector development. The dependent variables that will be used as indicators for financial sector development are: aggregate level of bank deposits to GDP, credit intermediated by the local banking to GDP and near money to GDP. The definition of financial sector development defines the following elements as drivers:

- the factors, policies and institutions which lead to:
- effective financial intermediation,
- efficient markets, and
- deep and broad access to capital and financial services. (World Economic Forum, 2011)

Therefore it is appropriate to measure the depth, broad access to capital and effective financial intermediation when quantifying financial sector development. The dependent variables of bank deposits to GDP, credit intermediated by the private banking sector to GDP were selected due to their commonly held position in literature as appropriate indicators for financial depth; and in the case of credit intermediated by the private banking sector, an indicator of financial intermediation (Aggarwal et al., 2011; King & Levine, 1993). Further, the data analysis is based upon the methodology employed in Aggarwal *et al* (2011), among others, in which they used these two indicators.

This research will build on this methodology by adding the third indicator of near money (m2). Near money describes non-cash assets that are highly liquid, such as bank deposits and certificates of deposit. It is commonly used to determine the current money supply. It is therefore a broader measure of financial depth than bank deposits as it encompasses this indicator. Further, “M2 measures the deposit gathering ability or quality of financial service delivery.” (Kemegue, 2011, p. 4) Therefore it is a further direct measure of depth of the financial sector. The indicator of near money was used in the following studies of a similar nature: Kemegue, 2011; Oke, 2011; Sharif and Amjad, 2013.

Coraay, 2012 and Demirgüç-Kunt*et al*, 2011 used the additional dependent variables of: liquid assets to GDP, overhead costs to total assets, and net interest margin to total assets.(Coraay, 2012); and the number of branches and accounts per capita respectively. It was determined that these were beyond the scope of the study and therefore they were not included in this study.

Further, as per Aggarwal *et al*, (2011), a number of control variables will be included in the study; namely:

- GDP per capita (in thousands US$) – this controls for the level of economic development within a country. Further, this indicator can act as a proxy for the quality of legal institutions in the economy which have been shown to have a positive effect on financial sector development. (Beck *et al*, 2003)
- Log of GDP – this controls for country size.
- Inflation (%) – this controls for inflation. As argued in Aggarwal *et al*, 2011, p.257 "Studies have shown that inflation distorts economic agents' decision-making regarding nominal magnitudes, discouraging financial intermediation, and promoting saving in real assets."
- Exports to GDP (%) – this controls for capital and current account openness.
- FDI inflows to GDP (%) – this controls for capital inflow ratios.
- Aid inflows to GDP (%) – this controls for capital inflow ratios.
- Portfolio inflow to GDP (%) – this controls for capital inflow ratios.

In summary, the control variables ensure that the relationship between remittances and financial sector development is not distorted by other variables which might impact upon the relationship.

3.3.2 Data Frequency

The period of 1990 to 2011 (22 years) was been chosen for this study due to data availability and reliability. As discussed in Chapter 2, it is a commonly held issue that remittances are underreported and often incorrectly measured (Irving *et al*, 2010; World Bank, 2011). Over recent years this situation has begun to improve due to the increased recognition of the importance of these flows (World Bank, 2011). Consequently, the choice of period of study was partly due to data availability and partly due to the period in which the known quality of this data was enhanced. This measure was implemented to increase both the validity and the reliability of the results.

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Interestingly, the period of study closely matches with the SADC membership of most member countries. It grew to its full membership of 15 member countries by 1997 and aside from two short-lived suspensions of the Seychelles and Madagascar, suspended from 2009 to the present day, SADC has remained at this full strength since.

The frequency of the data within the period selected was dictated by the standard measurement period for the data collected. The majority of the indicators selected for this study are measured on a yearly basis as their standard unit of measurement. Due to this, the data will be measured on a yearly basis for the period 1990 to 2011.

3.3.3 Data Collection

The research questions will be explored utilizing quantitative empirical technique appropriate for panel data. As such, the data collection utilised random sampling and conformed to structured measurement criteria which fit into of well-defined events One of the methods of data collection are through observation and recording of defined occurrences . The results produced by quantitative data collection are simple to equate and review.

Data on common economic indicators is available from a number of secondary sources such as the World Bank, the IMF and the OECD.

Current literature on remittances, financial sector development and aspects related to these subjects was used as reference point to test for possible quality sources (Gupta *et al*(2009); Coraay (2012), Nyamongo*et al* (2012);andSharif and Amjad (2013) for e.g.). The majority of these papers utilized the World Bank and IMF as their primary data sources.

The collection of data occurred as follows:

World Bank Data:

- Data was collected from the World Bank Development Indicators Database, World Bank Global Financial Development Database and World Bank Global Findex Database. Refer to Appendix I for a detailed list of data sources per indicator.

Data from Current literature:

- Data on bilateral remittances flows was obtained from the publically available dataset that underpins the Ratha and Shaw (2007) paper. In addition to this, data on the nature of remittance flows for the period under study was collected from Irving *et al* (2010). Irving *et al* (2010) performed an in-depth global study on the remittance data recording practice of central banks which provided a reliable indicator as to whether the remittance flows under study included bank and non-bank flows.

3.4 Sampling

Cross-sectional random sampling was applied to the select the sample for study. The cross sectional unit was regional blocs in the population of Sub-Saharan Africa. The output of this random selection was the choice of the SADC region as a representative sample of the population. Cross sectional sampling aims at identifying the pervasiveness of an occurrence by providing a picture of a population at a particular point in time (Wooldridge, 2002). This was the appropriate for this research as the stated purpose is to examine the relationship between two variables in a representative sample for a Sub-Saharan regional bloc for a particular period in time.

3.5 Data Analysis Methods

It has been established above that the research strategy and design are a quantitative analysis of panel data. The data analysis methodology applied in this paper is based on the methods employed by Aggarwal *et al* (2011) along with the most appropriate fit for the study. The researcher maintained this second criteria in order to ensure reliability and validity of the results.

A number of methods of exploration have been utilized in the small sample of papers on this topic area. The most commonly applied model to those focused on panel data was that of unobserved-effects linear panel data models, and in particular, fixed and random effects models (Sharif & Amjad, 2012; Brown *et al,* 2011; Aggarwal *et al,* 2011; Gupta *et al,* 2009). Possible alternative methods were those of applied ordinary least square estimation (OLSE), cointegration analysis and vector error correction model and newly developed panel fully modified OLS (PFMOLS) models.

The unobserved-effects linear panel data models were found to have the best fit for this study due to a preference for their underlying assumption that the explanatory variables are strictly exogenous conditional on the unobserved effect. While it is conceivable that endogeneity does exist for the explanatory variable, the researcher will apply the best fit model and then run a Generalised Method of Moments (GMM) dynamic framework (Arellano & Bover, 1995) and Instrumental Variable (IV) Estimations (Baum *et al*, 2003).to control for this effect; along with possible biases due to measurement error and omitted variable bias. An important note is that a number of the studies employed the control of the GMM dynamic framework. This included some of the few studies that had chosen an alternative to unobserved-effects linear panel data models (for e.g. Coraay, 2012; Oke, 2011). The prevalent use of this control speaks to the inherent nature of the remittance variable under study. The researcher is unable to adjust for this inherent nature at the data collection level due to the use of secondary data collection. Thereby a number of controls are required to mitigate any undesirable effects.

3.5.1 Method of Estimation

The study uses unobserved-effects linear panel data models to estimate the influence of remittances on financial sector development. The estimation of data will be performed using STATA 12. This is estimated based on equation 1 below (Aggarwal *et al,* 2011):

$$FD_{i,t} = \beta_1 Rem_{i,t-1} + \beta_2 X_{i,t-1} + \alpha_i + u_{i,t} \quad (1)$$

Where FD refers to financial development, as either the share of Bank Deposits to GDP, Bank Credit to the Private Sector or Near Money expressed as a percentage of GDP.

Rem refers to remittances to GDP in country *i* at period *t-1*.

X is a matrix of controls for each country *i* at time *t-1*.

The matrix of controls here is the variables Log of GDP to Portfolio Inflows, as defined in Annexure I.

The Sargen- Hansen test for over identification will be applied as a means to test for the most appropriate model from two models. This was selected over the alternative of the Hausman test as it consistently returned more accurate results. This could be due to the fact that "this test is more appropriate in instances where the data might have heteroskedasticity or clustered errors." (Schaffer 2009)

3.5.2 Evaluation of Methodology

3.5.2.1 Control for Measurement Error

To control for tautology between banking development and remittances (see Aggarwal *et al* 2011), the model was applied to a subset of the data that is known to contain both bank and non-bank remittance flows. In short, if remittances are only captured in the dataset as a form of banking flows, they hold a fair greater probability of high correlation with the dependent variables as one is effectively the subset of the other. The data for this test was selected using Irving *et al* (2010). This paper was based on a survey of central banks data reporting structures and from this was able to indicate which of the countries under study had recorded flows from bank and non-bank sources. As such, the main results were run a second time excluding South Africa and the Seychelles (see Table 5). These 2 countries were the only countries in the sample where the presence of bank and non-bank flows was unknown (given the date provided by Irving *et al* 2010).

Sargan-hansen tests were run for this data subset to test for the most appropriate unobserved-effects linear panel data model to apply to this new dataset. While comparability to the main results is an important element of running robustness checks, it was deemed as more important to ensure the most accurate results were produced.

3.5.2.2 Control for Endogeneity

To control for possible endogeneity (unobserved effects within the dataset) in the GMM dynamic system framework is applied. Lagged values, two and higher, of the regressors are used as the instruments for this framework (Aggarwal *et al*, 2011). In addition it has been shown this bias can be further removed by applying lagged levels as instruments for equations in the first differences (Arellano & Bover, 1995). Thereby equation 2 is instrumented with lagged first differences of variables, while equation 3 is instrumented using lagged values of the variables.

$$FD_{i,t} = \gamma FD_{i,t-1} + \beta_1 Rem_{i,t} + \beta_2' X_{i,t} + u_{i,t} \tag{2}$$

$$FD_{i,t} - FD_{i,t-1} = \gamma\left(FD_{i,t-1} - FD_{i,t-2}\right) + \beta_1\left(Rem_{i,t} - Rem_{i,t-1}\right) + \beta_2'\left(X_{i,t} - X_{i,t-1}\right) + u_{i,t} - u_{i,t-1} \tag{3}$$

It is necessary to apply instruments in equations (2) and (3) in order to deal with the endogeneity discussed above. Assuming that the following assumptions hold true:

- The error terms are not serially correlated;
- The explanatory variables are weakly exogenous; and

- There is no correlation between the changes in the right hand side variables and the the country fixed effects of α_i,

The study can apply the moment conditions that follow below.

$$E\left[\mathrm{FD}_{i,t-s}\left(\mathrm{u}_{i,t}-\mathrm{u}_{i,t-1}\right)\right]=0 \text{ for } \mathrm{s}\geq 2;\mathrm{t}=3,\ldots,\mathrm{T} \quad (4)$$

$$E\left[Rem_{i,t-s}-\left(u_{i,t}-u_{i,t-1}\right)\right]=0 \text{ for } s\geq 2;t=3,\ldots,T \quad (5)$$

$$E\left[X_{i,t-s}\left(u_{i,t}-u_{i,t-1}\right)\right]=0\; for\; s\geq 2;t=3,\ldots,T \quad (6)$$

$$E\left[\left(FD_{i,t-s}-FD_{i,t-s-1}\right)\left(\alpha_i+u_{i,t}\right)\right]0\; for\; s=1 \quad (7)$$

$$E\left[Rem_{i,t-s}-Rem_{i,t,-s-1)}.\left(\alpha_i+u_{i,t}\right)\right]=0\; for\; s=1 \quad (8)$$

$$E[\left(X_{i,t-s}-X_{i,t-s-1)}.\left(\alpha_i+u_{i,t}\right)\right]=0\; for\; s=1 \quad (9)$$

Finally, two diagnostic tests are performed on the system GMM estimates. As said by Coraay (2012, p.946) “The Sargan test for over-identifying restrictions under which the null hypothesis is that the instruments are not correlated with the residuals. The second is the Arellano–Bond test for second order correlation in the first differenced residuals.”

3.5.2.3 Control for Measurement Error and Omitted Variable Bias

One disadvantage of the test above is it cannot adderess measurement errors purely through lagging regressors to create instruments (measurement errors would remain despite the adjustment in time period). As such, it is useful to perform a third test using IV Estimations with an external instrument. This study will utilize the instrument of GDP per Capita in the remittance sending country.

Aggarwal *et al* (2011) proposes the further instruments of: unemployment, as an economic instrument, and views and policies on immigration as a political instrument. Unfortunately, for the region under study, the unemployment data was too unbalanced to act as an effective instrument. Further, it was not possible to obtain greater than 6 years’ worth of data on views and policies from the World Population Policies, or a suitable alternative source, for the period under study. Thereby these instruments were discarded for the same reason as Unemployment. As established by (Baum *et al*, 2003) a key assumption for the IV Estimation model is that the instruments are truly exogenous (i.e. uncorrelated with the dependent variables). This is often a tough assumption to truly fulfill and generally impedes the selection of an appropriate instrument. As such, a proposed alternative instrument of remittance outflows from remittance sending countries was disregarded due to the high probability of a level of correlation with the financial sector development variables. It was therefore concluded the application of one quality instrument is sufficient.

To construct this instrument information on the top 5 remittance sending countries for each country in our dataset was obtained from Ratha and Shaw (2007). The instrument of GDP per Capita of these remittance sending countries were then multiplied by the normalised share remittances sent by the top 5 countries. As the economic circumstance of the remittance sending country is not expected to have a high correlation with the financial sector development of the receiving country, the researcher expects this instrument will be of sufficient quality for the estimation.

3.6 Research Reliability and Validity

This study largely follows the methodology of Aggarwal *et al*, 2011, albeit focusing on a different sample of countries at a much smaller scale; it does not tread new ground methodologically. Rather, the value of this study lies in its application of an established technique to a smaller sample of countries and a specific region, thus testing the model at a lower scale and within a specific context. It must be noted that a strong motivation for this approach is to apply a method the best fits the analysis of the research problem. A level of measurement error exist as an inherent nature of remittance flows (Irving *et al*, 2010) and thereby it is useful to flow a tested approach in a manner most appropriate to the current study. This approach is supported by the overarching preference of the limited number of studies on this subject to apply unobserved-effects linear panel data models and test their effects with appropriate versions of GMM frameworks.

Finally, the vital nature of the area of study, as established in previous chapters, provides sufficient motivation to overcome any barriers to providing conclusions to the research problem. The process of maintaining the reliability and validity was taken into account in each step of constructing the methodology.

As part of this, the set-up of the study was enacted with this focus. The data was sourced from a well-respected data source and check for consistency. Further, countries with highly influential impact on the overall dataset were excluded from the study. This included Angola, the Democratic Republic of Congo and Zimbabwe due insufficient levels of data available, and at the other end of the spectrum Lesotho was excluded due to the significant influential impact it had on the dataset. This is primarily due to the long standing nature of Lesotho as one of the top 10 remittance receivers in the developing world when measured in percentage of GDP

The selected period of study is of sufficient length to produce valid results. Further to this, the period of study was selected on the basis of a time period in which the data was known to be of a higher quality.

The subjectivity bias of the researcher has been minimised at every point in the research process. Initially it was reduced by applying random sampling to select the region under study. Past this, the methodology was based on a respected paper in the field and the variables under study selected on their established merit in literature. The application of the methodology was performed with tests at each stage in order to ensure accurate results.

3.7 Limitations

The study was limited by the following considerations.

- Time and budget: The research was limited in scope to fit within the available time and budget of the researcher.
- Data availability: Data collection within Sub-Saharan Africa, and specially the SADC region in this instance, is often incomplete and inconsistent (World Bank, 2011). In particular, the impact of this was a reduced number of overall observations.
- Quality of data: A further issue is there is no concrete means to be certain that the data in question is indeed valid. This region in particular is known for poor data reporting (Sanders, 2003).
- Measurement and recording of data: This study is based data sourced from the World Bank and consequently, the IMF. While these are recognised as the prime data sources for this research area, the issue of gaps in data still exists when it has not been possible to source. For example, the recording of remittances might have gaps in years of turmoil where accurate recording was not a priority.
- Nature of data collection. Particularly in this instance, the commonly accepted data indicators for remittances focus on those which flow through the banking sector. This opens up the possibility of reverse causation.

3.8 Conclusions

This chapter has described and justified the research approach and strategy; the choice of data in relation to the source; and the sampling and reasons for selection. Furthermore, the reliably and validity of the research; and the limitations inherent to the research have been properly stated. Given this background, Chapter 4 will focus on discussion and empirical analysis of the findings of this research.

4 RESEARCH FINDINGS, ANALYSIS AND DISCUSSION

4.1 Introduction

This chapter will apply the methodology discussed in Chapter 3 to the selected data in order to explore the research problem presented in this paper. It will explore and analyse the empirical results as a basis for providing conclusions to the research problem posited in Chapter 1.

4.2 Regional Remittance Characteristics

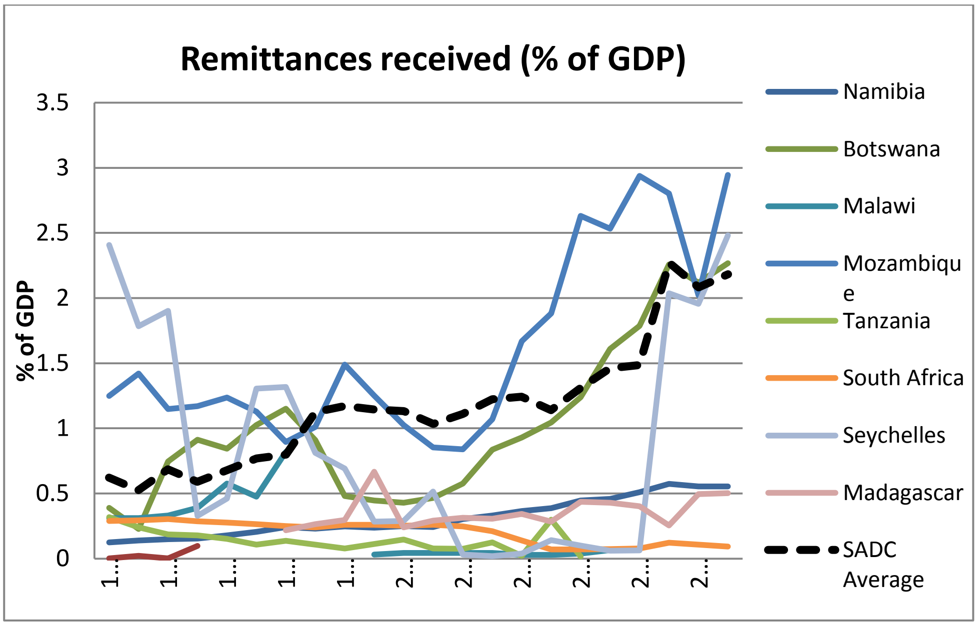

Figure 1: Regional remittance characteristics for SADC

Figure 1 above displays the characteristics of remittances flows across the SADC region for a sample of 8 countries over the period of study (1990-2011). As per Section 3.6, 11 countries of the 15 member states of the SADC region are the focus of this study. It shows a steadily increasing average trend of remittance flows across the period. It is interesting to note the spike in flows to the region from 2008 to 2010, the central period of the recent global recession. This could provide further evidence to the countercyclical nature of remittances explored in Chapter 2. Furthermore, a point of interest is the high flows of Botswana, Mozambique and the Seychelles.

4.3 Results of the Study

Table 2 below contains a summary of the descriptive statistics used in this study. Private Credit to GDP, Near Money to GDP, Bank deposits to GDP all present with fairly low and stable mean values and standard deviations. This is especially in proportion to Remittances to GDP's mean value and standard deviation from the mean. The value is consistently double across all three of the financial sector development indicators' values for the period. This is notable due to the hypothesis of a significant impact of remittances on financial sector development. Should this hold true, this significantly larger flow, and more variable, holds a high potential for impact on these areas. The positive or negative nature of this relationship will play a particularly important role in this regard.

Further, it is noted that the observation values of these four statistics are fairly consistent. Thereby the greater range between the min and max value of remittances suggests that the supposition that this flow is much larger is likely to hold true. The significant difference in the volume of flows across the SADC region, as illustrated in Figure 1, talks to the possibility that this impact might hold different in various countries across the region. The low level of variation in the flow of remittances in comparison to Remittances fell mid-way in terms of stability to its two comparable forex developmental flows, of foreign direct investment and aid inflows.

The high value and variability impact of portfolio inflows should be noted when exploring the tests performed below. Interestingly, the results are already reported with and without this flow due to low data availability for this indicator and the possibility it held for skewing results. Further, exports hold the possibility of having outlier values due to a high max value compared to its standard deviation.

Table 2: Descriptive Statistics

Variable	Observations	Min	Max	Mean	Standard Deviation
Private Credit to GDP (%)	212.00	1.13	4.46	2.97	0.89
Near Money to GDP (%)	229.00	2.60	4.71	3.54	0.56
Bank deposits to GDP (%)	212.00	1.30	4.58	3.25	0.71
Remittances to GDP (%)	205.00	0.00	10.12	1.16	1.69
Log of GDP	218.00	8.57	11.56	9.68	0.62
Inflation (%)	206.00	-2.41	83.33	11.65	11.57
Aid inflows to GDP (%)	218.00	0.00	0.58	0.09	0.10
Foreign Direct Investment Inflows to GDP (%)	218.00	-6.90	16.54	3.64	3.69
Exports to GDP (%)	218.00	8.17	100.95	37.31	18.08
Portfolio inflows to GDP (%)	218.00	0.00	560.68	7.17	53.05

Table 3 below provides the correlation matrix. It is used to test for the presence of multicollinearity in the panel before running the data analysis. While there are borderline levels of correlation between variables such as Near Money to GDP to Foreign Direct Investment Flows to GDP; Near Money to GDP to Aid Flows; and Private Credit to GDP to Exports to GD; the only worrying correlation is that of aid inflows to foreign direct investment inflows and of remittances to inflation. This last relationship is of particular concern due to the negative nature of it. For aid flows and foreign direct investment the high correlation between these variables is understandable given their similar nature and is not worrisome due to the positive nature. However for the purposes of this study, high correlation between variables is not desirable and will be taken note of. The main results and the first test in Table 5 and Table 6 respectively hold R Squared values in an acceptable and consistent range across the tables; thereby the correlation in these flows doesn't appear to have significantly affected the study.

This paper is based on the model provided by Aggerwal *et al* (2011) and thereby it is necessary to maintain the provided control variables as far as is possible due this nature of their selection for the model. Further detail is provided on this in Section 3.4.1 of this paper. Impacts of correlation will be taken note of when interrupting the results that follow.

Table 4 below illustrates the results from the Sargen Hansen tests run to ascertain whether a random or fixed effects model applies. This test was selected in lieu of the standard Hausman Test as it was found to produce more consistent results, likely due the possibility of heteroskedasticity or clustered errors in some of the tests. The test indicates whether a random or fixed effects model is the best fit for the panel data tested. Therefore, despite extra measures that will need to be implemented in order to allow for comparability across fixed or random models, the researcher chose to apply whichever model was deemed the best fit in order to maintain the validity of the research.

Table 5 presents the main results of this study. Models were run as fixed or random effects depending on the results given in Table 4 above. Consistently across all the dependent variables the relationship to remittances is found to be negative and insignificant. This result held true in the first test in Table 6 below. This is meaningful as it shows that the results hold when a test of measurement accuracy of the explanatory variable is applied. Interestingly, when the GMM dynamic framework is applied in Table 7 the impact of remittances remain insignificant but the relationship to the indicators of Bank Deposits to GDP and Near Money to GDP becomes positive. The same outcome repeated from the IV Est Test in Table 10

Table 3: Correlation Matrix

	Private Credit to GDP(%)	Near Money to GDP (%)	Bank Deposits to GDP(%)	Remittances to GDP (%)	Log of GDP (in constant $US)	Inflation (%)	Aid inflows to GDP (%)	GDP per Capita (in constant $US)	Foreign Direct Investment Inflows to GDP (%)	Exports to GDP (%)	Portfolio inflows to GDP (%)
Private Credit to GDP(%)	1										
Near Money to GDP(%)	-0.2917	1									
Near Money (p value) (%)	0.0001										
Bank Deposits to GDP	-0.0349	0.6761	1								
Bank Deposits (p value)	0.6541	0									
Remittances to GDP (%)	0.2099	-0.0652	-0.1132	1							
Remittances (p-value)	0.0065	0.4028	0.1453								
Log of GDP	-0.1751	0.0059	0.0809	0.1708	1						
Log of GDP (p-value)	0.0236	0.9397	0.2987	0.0273							
Inflation (%)	0.1925	-0.3445	-0.316	-0.0294	0.1655	1					
Inflation (p-value)	0.0127	0	0	0.706	0.0326						
Aid inflows to GDP (%)	-0.3549	-0.1655	-0.3442	-0.2543	-0.46	0.1787	1				
Aid Inflows (p-value)	0	0.0325	0	0.0009	0	0.0208					
GDP per Capita (in constant $US)	-0.3554	0.6572	0.6232	-0.1029	-0.1176	-0.5497	-0.1724	1			
GDP per Capita (p-value)	0	0	0	0.1857	0.1302	0	0.0258				
Foreign Direct Investment Inflows to GDP (%)	0.0628	0.0328	-0.1805	0.288	-0.3269	-0.163	0.0193	0.0698	1		
FDI (p-value)	0.42	0.674	0.0196	0.0002	0	0.0354	0.8042	0.3704			
Exports to GDP (%)	-0.145	0.2121	0.1901	-0.3044	-0.3722	-0.1413	0.1048	0.4173	0.0316	1	
Exports (p-value)	0.0616	0.0059	0.0139	0.0001	0	0.0686	0.1778	0	0.6856		
Portfolio Inflows	0.1275	0.1037	0.4539	-0.2266	0.3423	0.1015	-0.1977	0.1001	-0.3506	0.1868	1
Portfolio Inflows (p-value)	0.1005	0.1821	0	0.0032	0	0.1918	0.0105	0.1981	0	0.0156	

Table 4: Sargan-Hansen Table

The Sargan-Hansen test is generated in STATA using the - xtoverid - command. As argued by the author of this module (see Schaffer 2009), this test is more appropriate in instances where the data might have heteroskedasticity or clustered errors. In short, where the p-value is greater than 0.05, given a 95% confidence level, a random effects model is suggested and where it is less than 0.05, a fixed effects model is suggested.

	Deposits (w/ portfolio flows)	**Deposits (w/o portfolio flows)**	**Credit (w/ portfolio flows)**	**Credit (w/o portfolio flows)**	**Money (w/ portfolio flows)**	**Money (w/o portfolio flows)**
Sargan-Hansen statistic	161.282	17.899	10.825	16.823	33.21	5.869
P-value of Sargan-Hansen test	0	0.0124	0.2118	0.0186	0.0001	0.5551
Result	**FE Required**	**FE Required**	**RE Required**	**FE Required**	**FE Required**	**RE Required**

Table 5 presents the main results of this study. Models were run as fixed or random effects depending on the results given in Table 4 above. Consistently across all the dependent variables the relationship to remittances is found to be negative and insignificant. Of particular note, near money has highest negative directionality and while the current impact of remittances is insignificant, it is the dependent variable that lies closest to becoming significant. It is important to note the low range of the R Squared value for this variable. Therefore despite a number of key economic control variables that hold greater significance for explaining the movement of bank deposits and private credit (R Squared values of roughly 0.55 and 0.49 respectively), the movement of near money in proportion to remittances appears to highly explained by variables outside of this study. This meaningful due to the greater risk that unknown variables pose when it is impossible to predict their impact on near money in order to negate the negative and borderline significant flow.

This result held true in the first test of excluding South Africa and the Seychelles in Table 6 below. This is meaningful as it shows that the results hold when a test of measurement accuracy of the explanatory variable is applied. It should be noted that comparability across private credit including portfolio flows and near money excluding portfolio When the fit of the model to the data was tested by the researcher, it held at a fairly reasonable level and therefore is not a key issue.

Interestingly, when the GMM dynamic framework is applied in Table 7 the impact of remittances remain insignificant but the relationship to the indicators of bank deposits and near money becomes positive. This test was particularly to control for measurement bias and thereby it is possible that the true impact of remittances on the dependent variables, and particularly those of bank deposits and near money, is being masked. A notable point in this regard is that the instrumentation in this model appears most appropriate for bank deposits due to the Sargen-Hansen test. It is unfortunately not possible to rule out the impact of autocorrelation. It is valuable that this impact appears to hold across two indicators of similar nature (one, in fact, as a subset of the other). Further, the significance of near money has decreased while the nature of the relationship has become positive. Lastly the negative and insignificant impact of remittances on private credit holds consistently across the current levels of exploration.

The same outcome repeated from the IV Est. Second Stage Test in Table 10. The impact of remittances on private is partly sound due its result at a 95% confidence level; as opposed to results below a 90% confidence level for bank deposits and near money. It should however be noted that these results should be explored further for credit with portfolio flows included due to the application of fixed effect model in order to perform this test. The Sargan-Hansen Test showed this model as appropriate but the moderately weak f-statistics calls into question the validity of the use of GDP per Capita of remittance sending countries as an instrument. The borderline value for this test is 10 and therefore it is not possible to reject this impact of this instrument out right.

Table 5: Main Results

As per Aggarwal *et al* 2011, "$FD_{i,t} = \beta_1 Rem_{i,t-1} + \beta_2 X_{i,t-1} + \alpha_i + u_{i,t}$ where ....
Remittances to GDP is the share of remittances as a % of GDP in country i at period t-1.
X is a matrix of controls for each country i at time t-1."
The matrix of controls here is the variables Log of GDP to Portfolio Inflows, as defined in Annexure I.
FD= Financial Development in this model is expanded beyond Aggarwal et al 2011 who limits the proxies as Bank Deposits to GDP & Bank Credit to GDP, whereas in this model a third proxy is included, namely Near Money to GDP.

t-statistics in square brackets *** p<0.01, ** p<0.05, * p<0.1

	Bank Deposits to GDP		**Bank Credit to GDP**		**Near Money to GDP**	
Variables	**1**	**2**	**3**	**4**	**5**	**6**
Remittances to GDP	**-0.0128**	**-0.0127**	**-0.0165**	**-0.0166**	**-0.0258****	**-0.0247****
	[-1.205]	**[-1.190]**	**[-1.170]**	**[-1.129]**	**[-2.435]**	**[-2.348]**
Log of GDP	0.838***	0.816***	0.952***	1.139***	-0.469***	-0.337***
	[7.031]	[6.912]	[5.777]	[6.452]	[-3.849]	[-3.070]
Inflation	0.00292**	0.00287**	-0.00024	-0.00033	-9.83E-05	-0.000439
	[2.202]	[2.161]	[-0.121]	[-0.162]	[-0.0712]	[-0.322]
Aid Inflows to GDP	0.343	0.359	1.185***	1.267***	-0.168	-0.0755
	[1.119]	[1.17]	[2.859]	[2.912]	[-0.531]	[-0.246]
GDP per Capita	-3.69e-05***	-3.43e-05***	-1.23E-05	-2.48E-05	6.20e-05***	6.70e-05***
	[-2.910]	[-2.739]	[-0.653]	[-1.227]	[4.822]	[5.865]
Foreign Direct Investment Inflows	-0.00636	-0.00714	-0.0119	-0.00776	0.000632	0.00169
	[-1.094]	[-1.232]	[-1.581]	[-0.994]	[0.116]	[0.314]
Exports to GDP	0.000978	0.00068	-0.00339	-0.00166	-0.00186	-0.00107
	[0.54]	[0.378]	[-1.182]	[-0.549]	[-0.993]	[-0.592]
Portfolio inflows to GDP	-0.000303		0.00143***		0.000255	
	[-1.241]		[4.247]		[1]	
Constant	-4.679***	-4.468***	-6.184***	-7.996***	7.839***	6.477***
	[-3.811]	[-3.669]	[-3.534]	[-4.314]	[6.236]	[5.692]
Observations	**178**	**178**	**178**	**178**	**193**	**193**
Number of Countries	**10**	**10**	**11**	**11**	**11**	**11**
R-squared	**0.544**	**0.539**	**0.4849**	**0.429**	**0.392**	**0.3854**
			Random effects model applied due to Hausman (Sarggen - Hansman) test			Random effects model applied due to Hausman (Sarggen - Hansman) test.

4.4 Testing the Results of the Study

Table 6: Main results (Excluding South Africa and Seychelles)

As per Aggarwal *et al* 2011, "$FD_{i,t} = \beta_1 Rem_{i,t-1} + \beta_2 X_{i,t-1} + \alpha_i + u_{i,t}$ where ....
Remittances to GDP is the share of remittances as a % of GDP in country i at period t-1.
X is a matrix of controls for each country i at time t-1."
The matrix of controls here is the variables Log of GDP to Portfolio Inflows, as defined in Annexure I.
FD= Financial Development in this model is expanded beyond Aggarwal et al 2011 who limits the proxies as Bank Deposits to GDP & Bank Credit to GDP, whereas in this model a third proxy is included, namely Near Money to GDP.

t-statistics in square brackets *** p<0.01, ** p<0.05, * p<0.1

	Bank Deposits to GDP		**Bank Credit to GDP**		**Near Money to GDP**	
Variables	**1**	**2**	**3**	**4**	**5**	**6**
Remittances to GDP	**-0.0175***	**-0.0171***	**-0.0225**	**-0.0234**	**-0.0230****	**-0.0231****
	[-1.844]	**[-1.773]**	**[-1.654]**	**[-1.618]**	**[-2.398]**	**[-2.446]**
Log of GDP	0.760***	0.737***	1.064***	1.143***	-0.321***	-0.295**
	[6.52]	[6.278]	[6.021]	[6.117]	[-2.659]	[-2.531]
Inflation	0.00261**	0.00258**	-0.000755	-0.000639	1.18E-03	0.00118
	[2.078]	[2.032]	[-0.407]	[-0.324]	[0.892]	[0.905]
Aid inflows to GDP	0.399	0.426	1.232***	1.162***	0.0521	0.0442
	[1.465]	[1.545]	[3.073]	[2.727]	[0.183]	[0.159]
GDP per capita	-7.52e-05***	-6.94e-05***	1.24E-05	-5.08E-06	8.60e-05***	8.19e-05***
	[-5.203]	[-4.844]	[0.583]	[-0.228]	[5.734]	[5.93]
Foreign Direct Investment inflows	-0.00503	-0.00604	-0.0139*	-0.0109	0.00966*	0.0105**
	[-0.898]	[-1.069]	[-1.881]	[-1.392]	[1.846]	[2.046]
Exports to GDP	-0.00398**	-0.00418**	-0.00164	-0.000799	-0.000592	-0.000391
	[-2.040]	[-2.120]	[-0.551]	[-0.253]	[-0.292]	[-0.201]
Portfolio inflows to GDP	-0.000427**		0.00135***		0.000376*	
	[-2.002]		[4.25]		[1.665]	
Constant	-3.831***	-3.629***	-7.289***	-8.002***	6.112***	5.861***
	[-3.192]	[-2.998]	[-3.989]	[-4.137]	[4.907]	[4.843]
Observations	**138**	**138**	**147**	**147**	**151**	**151**
Number of Countries	**8**	**8**	**9**	**9**	**9**	**9**
R-squared	**0.68**	**0.67**	**0.51**	**0.442**	**0.494**	**0.4838**

Hausman (Sargon-Hansman) Test run. A fixed effects model is required for both models. This differs from the requirements for Table 3 where a random effects model is required when Portfolio Inflows are excluded.

Table 7: GMM

As per Aggarwal et al 2011,

“ $FD_{i,t} = \beta_1 Rem_{i,t-1} + \beta_2 X_{i,t-1} + \alpha_i + u_{i,t}$ (2)

$FD_{i,t} - FD_{i,t-1} = \gamma(FD_{i,t-1} - FD_{i,t-2}) + \beta_1 (Rem_{i,t} - Rem_{i,t-1}) + \beta_2 (X_{i,t} - X_{i,t-1}) + u_{i,t} - u_{i,t-1}$ (3)”

Where FD refers to financial development measured as the % of bank deposits
Remittances to GDP is the share of remittances as a % of GDP in country i at period t−1.
The variables are defined in Annexure I.

t-statistics in square brackets *** p<0.01, ** p<0.05, * p<0.1

Variables	Bank Deposits to GDP 1	2	Bank Credit to GDP 3	4	Near Money to GDP 5	6
Lag 1 (Bank Deposits)	1.035*** [12.91]	1.036*** [12.95]				
Lag 2 (Bank Deposits)	-0.0433 [-0.392]	[0.0439] [-0.397]				
Lag 3 (Bank Deposits)	0.0118 [0.177]	0.0126 [0.19]				
Lag 1 (Bank Credit)			1.362*** [11.67]	1.356*** [11.86]		
Lag 2 (Bank Credit)			-0.224 [-1.436]	-0.201 [-1.290]		
Lag 3 (Bank Credit)			-0.148* [-1.806]	-0.167** [-2.067]		
Lag 1 (Near Money)					0.962*** [8.591]	0.963*** [8.572]
Lag 2 (Near Money)					-0.0752 [-0.569]	-0.0737 [-0.557]
Lag 3 (Near Money)					-0.0199 [-0.252]	-0.0172 [-0.219]
Remittances to GDP	**0.000337 [0.906]**	**0.000344 [0.935]**	**-0.000145 [-0.297]**	**-0.0000736 [-0.153]**	**0.000414 [0.799]**	**0.000453 [0.886]**
Log of GDP	0.00159 [0.326]	0.00163 [0.334]	-0.00308 [-0.517]	-0.00333 [-0.563]	-0.00472 [-0.695]	-0.00483 [-0.712]
Inflation	0.0515 [0.58]	0.0519 [0.584]	-0.0679 [-0.449]	-0.0698 [-0.467]	0.278** [1.986]	0.279** [1.998]
Aid inflows to GDP	0.0183 [1.271]	0.0183 [1.272]	0.00558 [0.284]	0.00652 [0.337]	0.0365* [1.698]	0.0369* [1.719]
GDP per capita	-0.00012 [-0.193]	-0.000118 [-0.188]	-5.30E-06 [-0.00614]	-2.03E-05 [-0.0237]	0.000871 [0.982]	0.000899 [1.017]
Foreign Direct Investment inflows	0.000000434 [-0.148]	-0.000000541 [-0.189]	-0.00000361 [-1.407]	-0.00000384 [-1.507]	1.26e-05*** [2.633]	1.22e-05*** [2.583]
Exports to GDP	0.00517* [1.742]	0.00520* [1.757]	-0.00195 [-0.530]	-0.00206 [-0.565]	0.000727 **[0.186]**	0.000637 [0.163]
Portfolio inflows to GDP	0.0000165 [0.142]		0.00015 [1.08]		0.0000874 [0.553]	
Constant	-0.199 [-1.368]	-0.203 [-1.418]	0.0182 [0.0724]	0.0178 [0.0717]	-0.0158 [-0.0809]	-0.0356 [-0.185]
Observations	**151**	**151**	**148**	**148**	**166**	**166**
Number of Country’s	**9**	**9**	**10**	**10**	**10**	**10**
++Sargan -Hansen	**120.69**	**120.54**	**91.75**	**92.64**	**70.4**	**79.43**
+Arellano-Bond [AR1] z	**-3.88**	**-3.87**	**-3.82**	**-3.59**	**-3.51**	**-3.48**
+Arellano-Bond [AR1] Pr>z	**0**	**0**	**0**	**0**	**0**	**0**

+Arellano-Bond [AR2] z	**0.68**	**0.69**	**0.38**	**0.35**	**0.06**	**0.05**
+ Arellano-Bond [AR2] Pr>z	**0.496**	**0.493**	**0.702**	**0.73**	**0.955**	**0.956**

++ = Sargan –Hansen is included as this test whether the instruments used are appropriate (see Roodman 2006).
+ = Arellano-Bond is used as a test for autocorrelation (see Roodman 2006).

Table 8: First Stage IV Estimation

As per Aggarwal *et al* 2011, "$FD_{i,t} = \beta_1 Rem_{i,t-1} + \beta_2 X_{i,t-1} + \alpha_i + u_{i,t}$ where ....
Remittances to GDP is the share of remittances as a % of GDP in country i at period t-1.
X is a matrix of controls for each country i at time t-1."
The matrix of controls here is the variables Log of GDP to Portfolio Inflows, as defined in Annexure I.
FD= Financial Development in this model is expanded beyond Aggarwal et al 2011 who limits the proxies as Bank Deposits to GDP & Bank Credit to GDP, whereas in this model a third proxy is included, namely Near Money to GDP.

z-statistics in square brackets *** p<0.01, ** p<0.05, * p<0.1

Variables	**1**	**2**
Instrument: GPC	-0.000175*** [-2.968]	-0.000174*** [-2.961]
Log of GDP	0.0174 [0.0165]	-0.0116 [-0.0111]
Inflation	-0.0347*** [-3.578]	-0.0348*** [-3.590]
Aid inflows to GDP	-1.632 [-0.525]	-1.581 [-0.510]
GDP per capita	-0.000359*** [-3.343]	-0.000355*** [-3.363]
Foreign Direct Investment inflows	0.0407 [0.977]	0.0396 [0.959]
Exports to GDP	-0.0345** [-2.523]	-0.0348** [-2.568]
Portfolio inflows to GDP	-0.000378 [-0.210]	
Observations	**175**	
Number of Countrys	**10**	
R-squared	**0.184**	

Table 9: First Stage IV Estimation: FE substitutes for RE models

As per Aggarwal *et al* 2011, "$FD_{i,t} = \beta_1 Rem_{i,t-1} + \beta_2 X_{i,t-1} + \alpha_i + u_{i,t}$ where ....
Remittances to GDP is the share of remittances as a % of GDP in country i at period t-1.
X is a matrix of controls for each country i at time t-1."
The matrix of controls here is the variables Log of GDP to Portfolio Inflows, as defined in Annexure I.
FD= Financial Development in this model is expanded beyond Aggarwal et al 2011 who limits the proxies as Bank Deposits to GDP & Bank Credit to GDP, whereas in this model a third proxy is included, namely Near Money to GDP.

t-statistics in square brackets	*** p<0.01, ** p<0.05, * p<0.1	
	(Fixed effects: Bank Credit w/portfolio)	(Fixed effects: Near Money to GDP w/o portfolio inflows)
Variables	**1**	**2**
Remittances to GDP	**-0.0162**	**-0.0259****
	[-1.159]	**[-2.442]**
Log of GDP	1.046***	-0.451***
	[6.171]	[-3.743]
Inflation	-0.000522	-0.0000563
	[-0.269]	[-0.0408]
Aid inflows to GDP	1.339***	-0.18
	[3.232]	[-0.569]
GDP per capita	-0.00000955	5.98e-05***
	[-0.488]	[4.721]
Foreign Direct Investment inflows	-0.0107	0.00123
	[-1.437]	[0.226]
Exports to GDP	-0.00281	-0.00161
	[-0.972]	[-0.866]
Remittances to GDP	-0.0162	-0.0259**
	[-1.159]	[-2.442]
Portfolio inflows to GDP	0.00140***	
	[4.196]	
Constant	-7.132***	7.669***
	[-4.015]	[6.157]
Observations	**178**	**193**
Number of Countrys	**11**	**11**
R-squared	**0.486**	**0.388**

Table 10: Second stage IV estimation

As per Aggarwal *et al* 2011, "$FD_{i,t} = \beta_1 Rem_{i,t-1} + \beta_2 X_{i,t-1} + \alpha_i + u_{i,t}$ where ....
Remittances to GDP is the share of remittances as a % of GDP in country i at period t-1.
X is a matrix of controls for each country i at time t-1."
The matrix of controls here is the variables Log of GDP to Portfolio Inflows, as defined in Annexure I.
FD= Financial Development in this model is expanded beyond Aggarwal et al 2011 who limits the proxies as Bank Deposits to GDP & Bank Credit to GDP, whereas in this model a third proxy is included, namely Near Money to GDP.

	Bank Deposits to GDP		Bank Credit to GDP		Near Money to GDP	
Variables	1	2	3	4	5	6
Remittances to GDP	**0.0412**	**0.0392**	**-0.156****	**-0.156****	**0.0452**	**0.0477**
	[0.779]	**-0.741**	**[-1.962]**	**[-1.962]**	**[0.883]**	**[0.919]**
Log of GDP	1.010***	0.990***	0.850***	0.850***	-0.22	-0.196
	[6.328]	-6.235	[3.317]	-3.317	[-1.393]	[-1.235]
Inflation	0.00428*	0.00415*	-0.00694*	-0.00694*	0.0019	0.00206
	[1.942]	-1.882	[-1.824]	[-1.824]	[0.866]	[0.926]
Aid inflows to GDP	0.766*	0.796*	1.989***	1.989***	0.125	0.0892
	[1.729]	-1.806	[2.955]	-2.955	[0.272]	[0.193]
GDP per capita	-0.0000121	-0.0000101	-5.56E-05	-5.56E-05	9.96e-05***	9.70e-05***
	[-0.594]	[-0.501]	[-1.636]	[-1.636]	[5.145]	[5.019]
Foreign Direct Investment inflows	-0.0112	-0.0118	-0.00783	-0.00783	-0.00535	-0.00461
	[-1.472]	[-1.561]	[-0.785]	[-0.785]	[-0.798]	[-0.685]
Exports to GDP	0.00288	0.00257	-0.00828*	-0.00828*	1.13E-03	0.00151
	[1.175]	-1.054	[-1.767]	[-1.767]	[0.454]	[0.599]
Portfolio inflows to GDP	-0.00025		0.00145***		0.000306	
	[-0.962]		[3.643]		[1.131]	
Observations	**165**	**165**	**164**	**164**	**176**	**176**
Number of Countrys	**9**	**9**	**10**	**10**	**10**	**10**
R-squared	**0.464**	**0.467**	**0.21**	**0.19**	**0.272**	**0.255**
Sargan -Hansen ++	**0**	**0**	**0**	**0**	**0**	**0**
Sargan -Hanse(p-value) ++	**0.0079**	**0.0081**	**0.0084**	**0.0086**	**0.0043**	**0.0044**
Cragg-Donald F-statistic +	**7.01**	**7.022**	**6.887**	**6.91**	**8.174**	**8.183**

++ "A crucial assumption for the validity of GMM is that the instruments are exogenous. If the model is exactly identified, detection of invalid instruments is impossible because even when E[zϵ] ≠ 0; the estimator will choose β so that Z'Ê = 0 exactly. But if the model is overidentified, a test statistic for the joint validity of the moment conditions (identifying restrictions) falls naturally out of the GMM framework (Roodman 2006)"
+ This tests for weak instruments, where a value of less than 10 indicates a weak instrument (Tellez 2007).

4.5 Conclusion

Chapter 4 has therefore established that remittances have a negative and insignificant impact on financial sector development. This finding held true at the board level and when analysed through each financial development indicator. Yet, while the significance level was found to be robust after performing three separate methodology checks, the nature of the relationship to Bank Deposits and Near Money to GDP (two interrelated indicators) changed direction. This provides a solid basis for providing conclusions on the research questions, objectives and hypothesis that follow in chapter 5.

5 RESEARCH CONCLUSIONS

5.1 Introduction

This chapter will build on the research findings and analysis presented in the previous section by providing conclusions to the research questions and objectives in order to conclude upon the research hypothesis. Further, it will discuss the impact of these conclusions in order to explore their impact and from this, provide recommendations for further research.

5.2 Research Questions and Objectives

The objective of this study was to test the research hypothesis by exploring the posited research questions and objectives. Conclusions on the questions and objectives will be presented in Table 11 and Table 12 respectively as the basis for providing a final conclusion on the research hypothesis. Table 11 below provides the conclusions to these the research questions.

Research Question	Conclusion
1. What is the impact of remittances on financial sector development in the SADC region over the period of 1990-2011?	The overall impact of remittances on financial sector, using the model developed by development is insignificant, given that in all three proxies investigated the t-statistics too small to be meaningful. The positive or negative impact of remittances is difficult to ascertain at overall levels as it was consistently negative when initially tested, but this adjusted for two variables under study when controls were applied. It therefore can be lightly concluded that the impact of remittances is positive when controls for measurement error and endogeneity are applied.

a. What impact do remittances have on the aggregate level of bank deposits in the SADC region over the period of 1990-2011?	The impact of remittances on the aggregate level of bank deposits in the SADC region impact is a negative and insignificant, given the coefficient of -0.0128. Yet when controls are applied, the relationship remains insignificant but returns the positive relationship of 0.0003 and 0.0392 respectively.
b. What impact do remittances have on the aggregate level of near money (M2) in the SADC region over the period of 1990-2011?	The impact of remittances on the aggregate level of near money (M2) in the SADC region impact is negative and insignificant impact, given the coefficient of -0.0165. Yet when controls are applied, the relationship remains insignificant but returns the positive relationship of 0.000453 and 0.0477 respectively.
c. What impact do remittances have on the aggregate level of credit intermediated by the private banking sector in the SADC region over the period of 1990-2011?	The aggregate level of credit intermediated by the private banking sector in the SADC region impact is a negative and insignificant impact, given the coefficient of -0.0258. The result held true when controls were applied, with a negative relationship of -0.0000736 and -0.156 respectively.

Table 11: Conclusions on the proposed research questions

The table below Table 11provide the conclusions to these the research objectives.

Research Objective	Conclusion
1. To understand the impact of remittances on the depth of the financial sectors within the SADC region, as measured in this study by the broad level of the combination of money supply and short-term deposit instruments and the specific area of bank deposits.	All 3 proxies used are measures of financial depth, as such, given that all 3 proxies indicated a negative and insignificant relationship with remittances we can conclude that *measured* flows of remittances do not have substantial impact on the depth of the financial sector at the overall level. However, bank deposits and near money show that when measurement error and endogenity are controlled for; it changes the nature of the impact, though albeit not the significance. Thereby, it is important to investigate measurement error in order to truly understand the impact of remittances on the depth of financial sectors.
2. To understand the impact of remittances on the level of financial intermediation by the financial sectors within the SADC region and, consequently, their impact on the depth and efficiency of the financial sectors	Remittances are shown to have an insignificant impact on the level of financial intermediation. The strongest relationship between remittances and financial intermediation is seemingly with regard to private credit, a variable that maintained a consistent negative and insignificant profile across the tests, indicating that the impact of remittances on the level of intermediation is likely consistent with the outcomes of credit for this study.
3. To establish whether the premise of a positive and	Given the fact that the model was seemingly robust, yet the impact of remittances was negative and insignificant, a finding which

significant impact of remittances applies at the various levels of investigation and therefore is worthy of motivating action in the SADC region.	contradicts the general, more macro-scale findings in literature, this reject the argument for further action and investigation of this relationship. Yet, when controls were applied the directionality of the impact of remittances on bank deposits and near money shifted to a positive but still insignificant value. Further, these controls were shown to have weaknesses and therefore further research should be done before concluding before taking action the positive result. Moreover, the consistently insignificant relationship would negate the motivation for these actions.

Table 12: Conclusions on the research objective

The research hypothesis was the following:

Remittances flows have a significant and positive impact on financial sector development, as measured by the aggregate level of bank deposits, credit intermediated by the banking sector and near money (m2), for the period under study.

On the basis of the conclusions above it can be resolved that the research hypothesis is rejected at the overall level as all three variables returning a negative and insignificant result. When controls mitigating endogeneity and measurement error were applied this result changed for bank deposits and near money to a positive but still insignificant impact. The impact on private credit maintained a negative and insignificant relationship. The hypothesis is therefore rejected for the individual variable of credit, but only partially rejected for the variables of bank deposits and near money due a continueing negative relationship.

This holds significant implication as it provides a mixed directionality result to the currently held premise in literature that remittances have a positive and significant impact on financial sector development. Discussion and recommendations on the basis of these conclusions continue below.

5.3 Discussion

The implications of these results are meaningful as it either provides evidence to disprove the hypothesis currently held in literature for the SADC region, or, alternatively, the mixed results when controls were applied speak to the possibility that the true impact of this potentially vital capital flow in the region has been masked. This is likely due to under-measurement of remittances flows or, alternatively, an interaction with the other control variables included in this study to produce a different impact when controls where applied. The uncertainty of the cause of this result provides good motivation to investigate whether the implications mentioned above hold true with further investigation, or revert to their true negative or positive nature. For bank deposits and near money it is less certain which side of the spectrum should apply.

As shown in Table 1 in the literature review the overwhelming conclusion is the remittances provide a positive and significant impact on financial sector development. The one exception to this was Brown *et al* (2011) which showed a significant negative relationship to financial sector development. In addition to this, while the overall result of the Sharif and Amjad (2013) held true to the trend in literature, i.e. positive and significant, their study did produce the exception of one positive but insignificant variable of bank deposits to GDP. As per the partly disproved research hypothesis above, this paper has found the reverse of the trend found in the literature in terms of significance, and possibility the relationship of the impact of remittances. A number of reasons could underlie this result. First and foremost, the reason could be because this result is correct for the unique data in the region and period of study. This research has differed to previous research by utilizing a slightly shorter time period and a sampler sub-regional sample of countries. The obvious exceptions, regarding samples, in this case are the country level studies of Oke (2011) and Demirgüç-Kunt*et al* (2011). It must be noted that the number of observations at the country level were higher than that of this study.

A stated purpose of this result was to add to the current body of literature on the subject of remittances and financial sector development. It is possible that due to only a recent focus on this subject in literature, and thereby the low level of exploration, that insufficient comparable evidence existed prior to this study to correctly predict its true result. This probability is especially possible due to the large samples studied in other literature and the natural data smoothing that would happen as a result of this. This study focused on a smaller region and thereby was able to take into account more of the variability caused by individual subjects in the sample. Further, remittances have been shown to be a high volume developmental flow globally, but it has been noted in the literature that Sub-Saharan Africa recieves a far smaller share of recorded flows in comparision to a region such as South America. Consequently, it is possible that this is the reason that the research result has resulted in a rejection of the hypothesis.

Yet, during the testing of the initial results it was shown that measurement error had a significant impact due to changing the directionality of bank deposits and near money when controls where applied. Consequantly, the conclusion that the true impact of remittances is being masked in the region holds a greater likelihood of being true. This is both due to direct impact of measurement error on the results, but also due the results being into contradiction with current research in the area. It was established in Chapter 3 that two aspects of the nature of remittances is their high proportion of informal flows and the issue inaccurate measurement of these flows. It was shown that these issues are particularly prevalent in Sub-Saharan Africa and the SADC region.

The two possible conclusions based on the results of this research call for two different levels of intervention. If the research outcome is a true reflection of the impact of remittances on financial sector development then this is significant as it has provided policymakers in the SADC region with information appropriate for their context to act upon. While this research has shown remittances to have a largely negative impact on financial sector development, this relationship was further concluded to be insignificant. This means that it does not have a notable impact on financial sector development and therefore does not call for any intervention.

That said, given the established high levels of informal flows and the established possibility of measurement error in the region, this researcher believes there is sufficient basis to recommend further in-depth research into the issue in the region in order to uncover whether the results hold true at different levels of study. This is the second level of intervention that the researcher recommends SADC policymakers move directly to should they conclude the second conclusion of insufficient data is holds a greater likelihood of being correct. If insufficient data is masking the true indication of the impact of remittances on financial sector development, it is vital for further research to be conducted to uncover the true relationship. As noted above, this is especially important due to the negative direction of the relationship in an economically underdeveloped region with high levels of migration and intermigration.

In summary:

- The commonly held premise in literature of significance was disproved on the basis of no significance showing across all tests. But yet, the premise that remittances have a positive impact has been shown it could hold in the region; despite an initial negative results when the study was performed.
- The impact of remittances on bank deposits, private credit and near money holds little to no impact in the region. This is a positive benefit for the time being as the impact of remittances has been shown to be consistently negative for private credit and initially negative, but yet, subsequently positive for bank deposits and near money when measurement error and endogeneity are controlled for. Therefore potential for to leverage a positive relationship exists if this holds true.
- Measurement error has a significant impact on masking the true nature of the impact of remittance flows as tests to control for it, while shown to be only partly robust, were able to redirect the direction of this relationship.
- The consistently negative, yet insignificant, impact of remittances on private credit shows that as remittances increase, the demand for credit by remittance recipients will decrease. The insignificant nature of this impact shows that private credit is protected from this impact by a financial flow that has been established to be double its volume.
- Remittances have been shown to be a voluminous flow in comparison to the indicators of financial sector development and yet their impacts have held as consistently insignificant. This adds further evidence to the possibility of high measurement error in the region, or alternatively, low levels of uptake into the financial system (financial inclusion) via the indicators in this study.

6 RECOMMENDATIONS FOR FUTURE RESEARCH

Recommendations for future research are as follows:

- Research into the causes and implications of a negative and insignificant impact of remittances on financial sector development in the SADC region.
- Research into the impact of remittances on financial sector development in other regional blocs in Africa.
- Research into the link between remittances and financial sector development at the individual country level in Africa.
- Research into the measurement of remittance flows in Sub-Saharan Africa. Particularly, this research could focus on how to reduce the measurement error in remittance flows. A subset of this research area is research into methods to motivate and enhance central banks' measurement of non-bank remittance flows.
- Research into the impact of remittances on financial sector development in regions that receive different levels of remittance flows.
- The research has raised the issue of a large number of informal remittance flows. Recommended areas for future research in this matter are the following:

– Research into effective means to bring informal flows into the formal system for general remittance flows and remittance flows within the SADC region.

– .Research into the impact of formalising remittance channels on remittance senders and receivers.

– Research into the benefit financial inclusion could have upon reducing measurement error of remittance flows.

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APPENDIX I: VARIABLE NAMES, DEFINITIONS AND SOURCES

Variable (short name)	Code	Official Name	Description (as defined by data provider)	Source
Bank deposits to GDP (%)	GFDD.OI.02	Bank deposits to GDP (%)	"Demand, time and saving deposits in deposit money banks as a share of GDP, calculated using the following deflation method: {(0.5)*[Ft/P_et + Ft-1/P_et-1]}/[GDPt/P_at] where F is demand and time and saving deposits, P_e is end-of period CPI, and P_a is average annual CPI. Raw data are from the electronic version of the IMF's International Financial Statistics. Bank deposits (IFS lines 24 and 25); GDP in local currency (IFS line 99B..ZF or, if not available, line 99B.CZF); end-of period CPI (IFS line 64M..ZF or, if not available, 64Q..ZF); and annual CPI (IFS line 64..ZF). (International Monetary Fund, International Financial Statistics, and World Bank GDP estimates)"	World Bank - Global Financial Development Database (GFDD) 2013
Bank credit to GDP (%)	GFDD.DI.01	Bank private credit to GDP (%)	"Private credit by deposit money banks and other financial institutions to GDP, calculated using the following deflation method: {(0.5)*[Ft/P_et + Ft-1/P_et-1]}/[GDPt/P_at] where F is credit to the private sector, P_e is end-of period CPI, and P_a is average annual CPI. Raw data are from the electronic version of the IMF's International Financial Statistics. Private credit by deposit money banks (IFS line 22d); GDP in local currency (IFS line 99B..ZF or, if not available, line 99B.CZF); end-of period CPI (IFS line 64M..ZF or, if not available, 64Q..ZF); and annual CPI (IFS line 64..ZF). (International Monetary Fund, International Financial Statistics, and World Bank GDP estimates)"	World Bank - Global Financial Development Database (GFDD) 2013

Variable (short name)	Code	Official Name	Description (as defined by data provider)	Source
Near money to GDP (%)	FM.LBL.MQMY.GD.ZS	Money and quasi money (M2) as % of GDP	"Money and quasi money comprise the sum of currency outside banks, demand deposits other than those of the central government, and the time, savings, and foreign currency deposits of resident sectors other than the central government. This definition of money supply is frequently called M2; it corresponds to lines 34 and 35 in the International Monetary Fund's (IMF) International Financial Statistics (IFS)."	World Bank - World Bank Development Indicators 2013
Remittances to GDP (%)	BX.TRF.PWKR.DT.GD.ZS	Personal remittances, received (% of GDP)	"Personal remittances comprise personal transfers and compensation of employees. Personal transfers consist of all current transfers in cash or in kind made or received by resident households to or from non-resident households. Personal transfers thus include all current transfers between resident and non-resident individuals. Compensation of employees refers to the income of border, seasonal, and other short-term workers who are employed in an economy where they are not resident and of residents employed by non-resident entities. Data are the sum of two items defined in the sixth edition of the IMF's Balance of Payments Manual: personal transfers and compensation of employees."	World Bank - World Bank Development Indicators 2013

Variable (short name)	Code	Official Name	Description (as defined by data provider)	Source
GDP per capita (in thousands US$)	NY.GDP.PCAP.PP.KD	GDP per capita, PPP (constant 2005 international $)	"GDP per capita based on purchasing power parity (PPP). PPP GDP is gross domestic product converted to international dollars using purchasing power parity rates. An international dollar has the same purchasing power over GDP as the U.S. dollar has in the United States. GDP at purchaser's prices is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources. Data are in constant 2005 international dollars."	World Bank - World Bank Development Indicators 2013
Log of GDP	Derivate of NY.GDP.MKTP.KD		Note: the formula =LOG(x) was applied to this dataset. "Gross domestic product (GDP) represents the sum of value added by all its producers. Value added is the value of the gross output of producers less the value of intermediate goods and services consumed in production, before accounting for consumption of fixed capital in production. The United Nations System of National Accounts calls for value added to be valued at either basic prices (excluding net taxes on products) or producer prices (including net taxes on products paid by producers but excluding sales or value added taxes). Both valuations exclude transport charges that are invoiced separately by producers. Total GDP is measured at purchaser prices. Value added by industry is normally measured at basic prices. When value added is measured at producer prices. Growth rates of GDP and its components are calculated using the least squares method and constant price data in the local currency. Constant price U.S. dollar series are used to calculate regional and income group growth rates. Local currency series are converted to constant U.S. dollars using an exchange rate in the common reference year."	World Bank - World Bank Development Indicators 2013

Variable (short name)	Code	Official Name	Description (as defined by data provider)	Source
Inflation (%)	FP.CPI.TOTL.ZG	Inflation, consumer prices (annual %)	Inflation as measured by the consumer price index reflects the annual percentage change in the cost to the average consumer of acquiring a basket of goods and services that may be fixed or changed at specified intervals, such as yearly. The Laspeyres formula is generally used.	World Bank - World Bank Development Indicators 2013
Exports to GDP (%)	NE.EXP.GNFS.ZS	Exports of goods and services (% of GDP)	Exports of goods and services represent the value of all goods and other market services provided to the rest of the world. They include the value of merchandise, freight, insurance, transport, travel, royalties, license fees, and other services, such as communication, construction, financial, information, business, personal, and government services. They exclude compensation of employees and investment income (formerly called factor services) and transfer payments.	World Bank - World Bank Development Indicators 2013
FDI inflows to GDP (%)	BX.KLT.DINV.WD.GD.ZS	Foreign direct investment, net inflows (% of GDP)	Foreign direct investment are the net inflows of investment to acquire a lasting management interest (10 percent or more of voting stock) in an enterprise operating in an economy other than that of the investor. It is the sum of equity capital, reinvestment of earnings, other long-term capital, and short-term capital as shown in the balance of payments. This series shows net inflows (new investment inflows less disinvestment) in the reporting economy from foreign investors, and is divided by GDP	World Bank - World Bank Development Indicators 2013

Variable (short name)	Code	Official Name	Description (as defined by data provider)	Source
Aid inflows to GDP (%)	DT.ODA.ALLD.CD	Net official development assistance and official aid received (% of GDP)	"Net official development assistance (ODA) consists of disbursements of loans made on concessional terms (net of repayments of principal) and grants by official agencies of the members of the Development Assistance Committee (DAC), by multilateral institutions, and by non-DAC countries to promote economic development and welfare in countries and territories in the DAC list of ODA recipients. It includes loans with a grant element of at least 25 percent (calculated at a rate of discount of 10 percent). Net official aid refers to aid flows (net of repayments) from official donors to countries and territories in part II of the DAC list of recipients: more advanced countries of Central and Eastern Europe, the countries of the former Soviet Union, and certain advanced developing countries and territories. Official aid is provided under terms and conditions similar to those for ODA. Part II of the DAC List was abolished in 2005. The collection of data on official aid and other resource flows to Part II countries ended with 2004 data. Data are in current U.S. dollars."	World Bank - World Bank Development Indicators 2013
Portfolio inflow to GDP (%)	Sum of GFDD.DM.10 & GFDD.DM.08	Gross portfolio equity liabilities to GDP (%)(GFDD.DM.08) & Gross portfolio debt liabilities to GDP (%)(GFDD.DM.10)	Note: Sum of GFDD.DM.08 & GFDD.DM.10 - both definitions supplied - GFDD.DM.10 = Ratio of gross portfolio debt liabilities to GDP. Debt liabilities cover (1) bonds, debentures, notes, etc., and (2) money -rket or negotiable debt instruments. Raw data are from the electronic version of the IMF's International Financial Statistics. IFS line 79AEDZF / GDP. Local currency GDP is from IFS (line 99B..ZF or, if not available, line 99B.CZF). Missing observations are imputed by using GDP growth rates from World Development Indicators, instead of substituting the levels. This approach ensures a smoother GDP series. (International Monetary Fund, International Financial Statistics) & GFDD.DM.08: Ratio of gross portfolio equity liabilities to GDP. Equity liabilities include shares, stocks, participation, and	World Bank - Global Financial Development Database (GFDD) 2013

Variable (short name)	Code	Official Name	Description (as defined by data provider)	Source
			similar documents (such as American depository receipts) that usually denote ownership of equity. Raw data are from the electronic version of the IMF's International Financial Statistics. IFS line 79LDDZF/ GDP. Local currency GDP is from IFS (line 99B..ZF or, if not available, line 99B.CZF). Missing observations are imputed by using GDP growth rates from World Development Indicators, instead of substituting the levels. This approach ensures a smoother GDP series. (International Monetary Fund, International Financial Statistics)	
GDP per capita in remittance-sending countries (in thousands)	Note: This dataset is further derived. NY.GDP.PCAP.PP.KD	GDP per capita, PPP (constant 2005 international $)	"GDP per capita based on purchasing power parity (PPP). PPP GDP is gross domestic product converted to international dollars using purchasing power parity rates. An international dollar has the same purchasing power over GDP as the U.S. dollar has in the United States. GDP at purchaser's prices is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources. Data are in constant 2005 international dollars."	Bilateral remittance data from Ratha and Shaw (2007) and the corresponding data set available from the World Bank. GDP per capita form World Bank Development Indicators (2013).