

**AN ANALYSIS OF MACROECONOMIC DETERMINANTS OF REMITTANCES IN
SOUTHERN AFRICA**

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Abstract

The study analyzed macroeconomic determinants of remittances in Southern Africa and made use of annual data for the period ranging from 2003 to 2016. The macroeconomic determinants used include: remittances themselves, the inflation rate, GDP growth rate, the nominal exchange rate, broad money and age dependency ratio. In doing so, the study further analyzed cyclicity and the volatility of remittances in the region in order to get a more rounded perspective. In seeking to meet its objectives, a panel study was carried out using both the fixed and random methods of which the random method was found to be most appropriate. The Southern African countries included in the study were Botswana, Lesotho, Malawi, Mozambique, South Africa, Swaziland and Zambia. Other major tests applied included a Standard deviation test for volatility; the Hodrick Prescott (HP) filter with detrended series, to analyze for cyclicity; and cross correlation tests to determine if there existed pro or counter cyclical behavior. The study found that amongst the macroeconomic determinants used; only GDP growth (changes/improvements in the home countries' economic environment) and the exchange rate were statistically significant with respective positive relationships with remittance inflows. It was also found that volatility of remittances was low, which was evidently reflected in the values of the standard deviations with the highest being 1.784. In regards to cyclicity, the tests exhibited prominence of pro cyclical behavior which could imply that migrants optimize placement of their savings between origin and destination countries of which the remitting of funds is a form of investment. However, several periods of counter cyclicity were observed that made it hard to out-rightly conclude pro cyclicity as being the definite trend.

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List of Abbreviations and/or Acronyms

A	Alpha
%	Percent
AGED	Age dependency
AR	Auto Regressive
BM	Broad Money
BOTS	Botswana
EXC	Exchange (rate – nominal)
FDI	Foreign Direct Investment
FE	Fixed Effects
FMOLS	Fully Modified Ordinary Least Square
GDP	Gross Domestic Product
GDPG	Gross Domestic Product Growth (rate)
GMM	Generalized Method of Moments
H _a	Alternative hypothesis
H _o	Null hypothesis
HP	Hodrick Prescott filter
IMF	International Monetary Fund
INF	Inflation (rate)
LES	Lesotho
M2	Broad Money Base
MAL	Malawi
MOZ	Mozambique
ODA	Official Development Aid

OECD	Organization for Economic Co-operation and Development
OLS	Ordinary Least Square
RE	Random Effects
REM	Remittances
RSA	South Africa
S.D	Standard Deviation
SADC	Sothorn Africa Development Community
SWAZI	Swaziland
SSA	Sub Saharan Africa
TSLs	Two Stage Least Square
U.S.\$	United States Dollar
VAR	Vector Autoregressive
VECM	Vector Error Correction Model
WDI	World Bank Development Indicators
ZAM	Zambia

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Dedication

I thank the Lord Almighty, for his blessings and providing the opportunity to pursue my education thus far. Many thanks go to my family for their love, support and encouragement.

I therefore dedicate this thesis first and foremost to the Lord God Almighty, and to my family for without their support this would not have been a reality.

Declaration

I, Fwasa Kondwani Singogo, hereby declare that this study is my own work and is a true reflection of my research, and that this work, or any part thereof has not been submitted for a degree at any other institution.

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Chapter 1 Introduction and background

1.1 Introduction

This chapter gives background information on the subject of remittances by shedding more light on the phenomenon. In addition, the problem statement, objectives, hypotheses, significance of the study, the limitations and the delimitations of the study are discussed.

1.2 Background to the study

There are various reasons as to why people migrate which often result in various social implications that exceed those of capital movements with some being unbudgeted costs. If the expected benefits outweigh both the implicit and explicit costs, then it is likely that migration will occur. Some examples of such costs include those of war and poor standards of living which migrants seek to leave behind for employment, better paying jobs and better standards of living. However, even though the aforementioned (benefits outweighing costs) should be the basis for migration, it has not been the case recently. As extreme situations have more recently been noted where migrants leave their countries using dangerous means of transportation (crossing oceans and/or seas on small boats) and find themselves in worse situations than they were at home (AllAfrica, 2018; Saunders, 2015). For example, they face various forms of violence (though it is worth noting that some sects of migrants have been noted to be perpetrators of violence themselves) and harassment and get low or lower paying jobs than they would have in their home countries (International Organization for Migration, 2017; Blanco, 2017; European Monitoring Centre on Racism and Xenophobia, 2016).

The discussion around remittances and migration is however, centered more on migrants who find themselves in better situations than they were in, in their respective countries. As migrants settle in foreign lands, they tend to send funds home in the form of remittances. Remittances, therefore, translate to a source of income or funds for home countries from

labor migrants. This has otherwise been coined “Personal remittances” by the World Bank and defined by them as the sum of personal transfers and compensation of employees to home countries.

According to the World Bank (2016), migration has been noted to have increased and the number of migrants was estimated to have surpassed 250 million since 2015. They further estimated the value of remittances sent by international migrants to be approximately U.S. \$ 601 billion with U.S. \$ 441 billion expected to be received by developing countries. Not only is the size of these funds substantial with them surpassing Official Development Aid (Tabit & Moussir, 2016), but in addition, these funds are unique in that they flow from migrants to their home countries with little or no conditions as compared to other sources of funds for example, Foreign Direct Investment (FDIs) and Official Development Aid (ODA).

In Sub-Saharan Africa (SSA), remittances have been noted to be more stable in comparison to FDIs, private debt and equity flows (Boly, Coniglio, Prota & Seric, 2014; Ratha & Plaza, 2011). The SSA region received U.S. \$33 billion in 2016 according to the World Bank. In the same region, the top 10 receiving countries as per 2015 World Bank estimates include: Nigeria (20.8 U.S.\$ billion), Ghana (2.0 U.S.\$ billion) , Senegal (1.6 U.S.\$ billion), Kenya (1.6 U.S.\$ billion), South Africa (1 U.S.\$ billion), Uganda (0.9 U.S.\$ billion), Mali (0.9 U.S.\$ billion), Ethiopia (0.6 U.S.\$ billion), Liberia (0.5 U.S.\$ billion) and Sudan (0.5 U.S.\$ billion). Although South Africa, the only country from Southern Africa, recorded the highest stock of immigrants at 2.7 million in 2013, the highest in Africa at the time (The World Bank, 2016), it nevertheless recorded a relative minimal record of remittances. It is worth noting that these figures maybe understated due to un-documented and informal flows of remittances (Zakari & Nasiru, 2016; Mohapatra & Ratha, 2011).

According to Boly, Coniglio, Prota and Seric (2014), about 50% of the African diaspora is located within the continent; and particularly, intra-regional migration accounts for almost 65% of total emigrants in Sub-Saharan Africa. Southern Africa the focus area of this study, is a relatively integrated trade block. As alluded to earlier, migration occurs for various reasons; conflict, political instability and economic instability to mention but a few. In the region, migration is driven more by economic instability now than that of political or conflict reasons (Eyden, Sekyere & Kemegue, 2011), with countries like Zimbabwe, Mozambique and Angola being examples more recently. Southern Africa is further characterized by high unemployment levels, poverty, low financial inclusion and generally low standards of living. According to Porter (2017), it was estimated that nearly 88 million people live in extreme poverty in the region, with the region accounting for 9% of extreme poverty globally, although it only makes up 2.5% of the world's population. Furthermore, the region has some of the highest costs of sending remittances, for example in the third quarter of 2015, it cost about 19% of U.S. \$200 to send remittances from South Africa to Zambia and 17.4% from South Africa to Botswana. Whereas, in comparison to other developing countries out of Africa, it cost 6.70% from Brazil to Bolivia and 4.4% from Chile to Peru (World Bank, 2016; Watkins & Quattri, 2014).

As alluded to earlier, recorded remittance figures may be understated as they are characterized with high informal exchange of which surveys carried out in Sub Saharan African countries show (Mohapatra & Ratha, 2011). According to Tevera and Chikanda (2009); Bracking and Sachikonye (2008); Pendleton, Wade, Crush, Campbell, Green, Simelane, Tevera, and De Vletteret (2006); as cited by Mohapatra and Ratha, (2011), it was found that carrying remittances by hand during visits to migrants respective home countries' accounted for about half of remittance transfers in Southern Africa. They further found that

remittances carried by hand and those sent through friends and relatives accounted for 68% of remittances in Botswana, 88% in Lesotho, 73% in Swaziland, and 46% in Zimbabwe.

1.3 Problem statement

Recently there has been a shift of thought from the perception of emigration being a loss to that of gains (Ratha & Plaza, 2011), particularly of remittances and knowledge through exposure. As aforementioned, according to Pendleton et al (2006); Bracking and Sachikonye (2008); Tevera and Chikanda (2009) as cited by Mohapatra and Ratha (2011) it was found that carrying remittances by hand (informal exchange) during visits to migrants respective home countries accounted for about half of remittance transfers in Southern Africa.

Considering their magnitude and uniqueness (it is a source of income rivaling and with close to no conditions in comparison to other sources for example FDI and ODA), it is believed that even without targeted (macro) programs they have been able to alleviate at least household issues (Tabit & Moussir, 2016; Dorantes, 2014; Crush & Frayne, 2007). Therefore, their absence could be detrimental to the region, which is not helped by the hostile environment surrounding migration and foreigners in the region. Therefore, remittances are an interesting avenue of focus that if channeled appropriately, have the potential to alleviate a majority of the aforementioned issues regardless of its size in comparison to other regions.

1.4 Objectives

The main objective of the study was to analyze the effects selected macroeconomic factors on remittances in selected Southern African countries. Stemming from the main objective, the specific objectives for the study were:

- To analyze the impacts of macroeconomic factors on remittances in selected Southern African countries;
- To analyze the volatility of remittances in Southern Africa;
- To analyze the cyclicality of remittances in Southern Africa.

1.5 Hypotheses

Stemming from the specific objectives the hypotheses to be tested are:

- H_{01} : Macroeconomic determinants have no significant impacts on remittances in the selected Southern African countries,
 H_{a1} : Macroeconomic determinants have significant impacts on remittances in the selected Southern African countries;
- H_{02} : Remittances are not volatile in Southern Africa,
 H_{a2} : Remittances are volatile in Southern Africa and;
- H_{03} : Remittances are relatively infrequent in Southern Africa,
 H_{a3} : Remittances are relatively frequent in Southern Africa.

1.6 Significance of the study

The growth of remittances in the past years and their perceived relative lack of volatility compared to other sources including the size of remittance inflows to developing countries make them a relevant issue to address (World Bank, 2016; Rahman & Wadud, 2014). The flow of remittances has been noted to have both positive and negative impacts, with empirical evidence being mixed. For example remittances hurt exchange rates and the export sector

(Tabit & Moussir, 2016; Dorantes, 2014). On the other hand, this monetary flow is said to improve livelihoods by promoting education, investment and health, to mention but a few (Tabit & Moussir 2016; Dorantes, 2014). Remittances have more of an aura of good and optimism about them.

Given the current economic and policy issues in migrant destination countries (World Bank, 2016; Watkins & Quattri, 2014; African Economic Outlook, 2013) such as: tax/high cost of remittances, economic down turns and the animosity towards migrants (Crush & Frayne, 2007); remittances are a relevant issue to address. Furthermore, the literature in regards to Southern Africa in this context is minimal as several scholars and groups generalize and look to SSA and the Southern Africa Development Community (SADC) with some focusing largely on countries like Nigeria while ignoring the relative substantial amount that remittances make up in comparison to the gross domestic product (GDP); Lesotho-30% according to Ratha and Plaza (2011); in other countries presumably because of the relatively minimal share. However, with mixed expectations, remittances to the SSA region in 2015 were expected to increase by 3.4%, to U.S. \$36 billion, from U.S. \$35.2 billion but rather grew by 1% as remittance levels fell in Nigeria and South Africa (The World Bank, 2016). Furthermore, it was noted that the financial crisis had little effect on remittance flows globally (Goff & Salomone, 2016). Nonetheless, as Ratha and Plaza (2011) point out, even small fluctuations in the flow of remittances can pose challenges especially in countries with large inflows. Given the potential that remittances could have on the development of the region, policy and study to aid the poor regulatory environment to make this source of funds more productive, as they are targeted towards the alleviation of some of the issues faced at household and macro level in the region are integral. Several studies have looked at what and how macroeconomic factors such as exchange rates and interest rates affect remittance flows,

with inconclusive evidence found due to some conflicting results and methodologies used. Therefore, the findings of this study would add to the research gap and literature, especially in the region by not just analyzing the determinants or remittance flow on output, but also looking at other factors such as the cyclicalities and volatility of remittances which is believed to be a more holistic approach that has not been looked at in its entirety in Southern Africa. With the aforementioned in consideration, it is imperative that not only macroeconomic determinants be analyzed but issues of their cyclicalities and volatility (which are minimal in literature for the region) be analyzed, particularly, in Southern Africa as such a perspective has not been addressed. It is believed better insight would be obtained around the phenomenon of interest and add to the literature available.

1.7 Limitations of the study

A lack of continuous data for several countries in the region for the period 2003 to 2016 led to a number of countries' omission. The study was also limited to the aforementioned period due to availability of data or lack thereof beyond the period. Last but not least, the study used data from the World Bank Development Indicators and the IMF.

1.8 Delimitations of the study

The study used seven of the ten Southern African countries in a panel study that are reflective of the region as a representation of the region. Furthermore, the study looked at the period ranging from 2003 to 2016 to analyze macroeconomic determinants in the region. All of the above motivated around the availability of data.

1.9 Conclusion

As discussed, remittances go beyond just migrants sending money to their home countries. Remittances are a significant source of funds with close to no conditions for a home country and should be taken advantage of and used appropriately towards developmental issues. Therefore, as it pertains to the region and the motivation of this study, the realization to optimize them is integral for development and the fight against socioeconomic issues such as poverty.

The next sections of the thesis are organized as follows: chapter 2 entitled overview looks at remittance trends and seeks to further illustrate their significance; chapter 3 presents the literature review; chapter 4 the research methods; chapter 5 the empirical results: analysis and discussion of the study; and chapter 6 provides the conclusion and recommendations. The literature review discusses relevant literature from the motives and theoretic considerations to empirical studies. The research methods on the other hand discuss the data used, the model, and the procedure and ethical considerations that the study used. Whereas; the empirical results: analysis of the study, presents the findings of the study with an analysis of the respective findings. The conclusion as can be surmised, concludes the study by summarizing what the study sought to achieve: what it found and where it diverges or converges from what has been found before. It goes further to make recommendations it deems appropriate for the region given the idiosyncrasies of the countries in it.

Chapter 2 Overview

2.1 Introduction

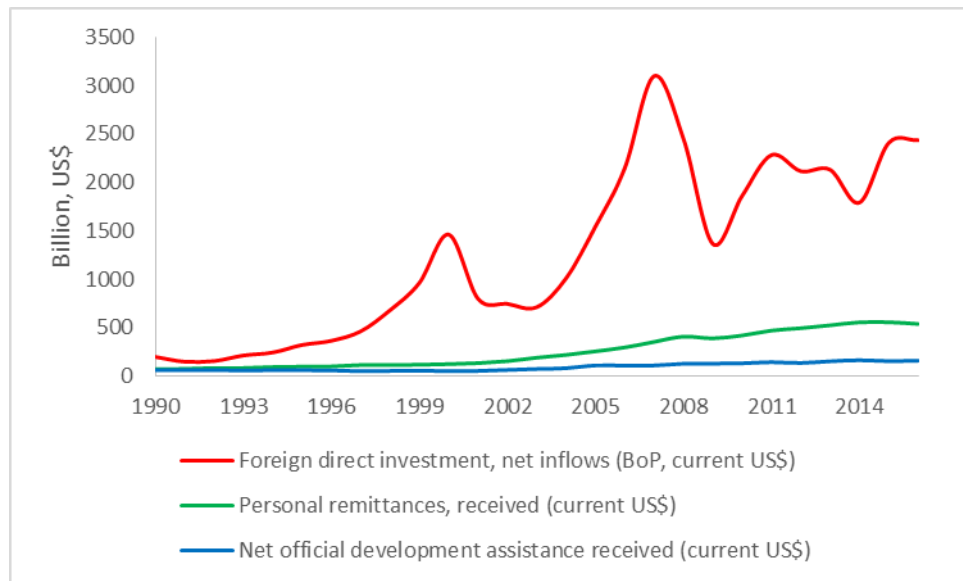
This chapter takes a look at remittances from a global and regional perspective of the selected Southern African countries. It focuses on remittance trends and further seeks to illustrate their significance.

2.2 Remittance trends

Remittances as is illustrated in Figure 1 have been on the rise globally. According to the World Bank (2016), they were estimated to be approximately U.S. \$ 601 billion with U.S. \$ 441 billion expected to be received by developing countries.

Figure 1

Global Remittances and other inflows (1990-2016)



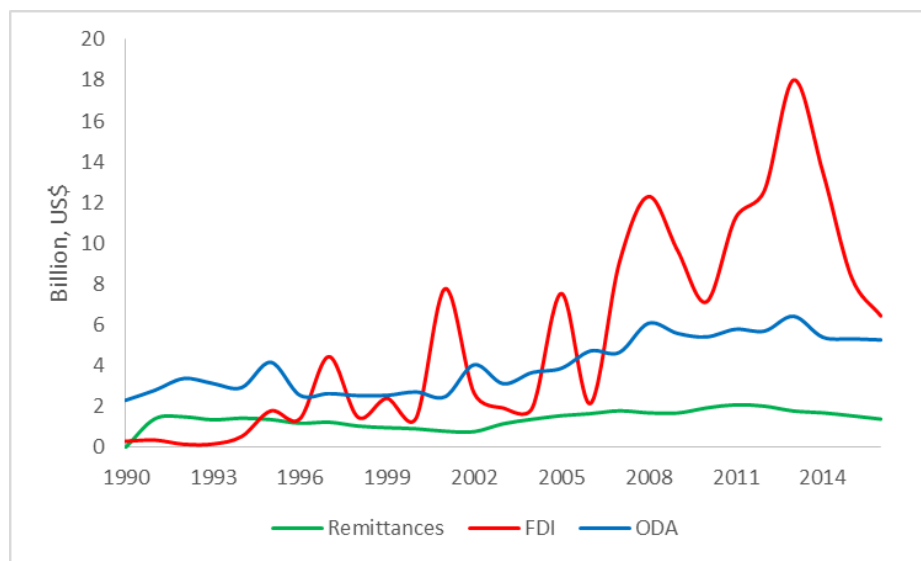
Source: Authors compilation of WDI

As illustrated in Figure 1, remittances surpass Official Development Assistance/Aid as literature purports (Tabit & Moussir, 2016) and are generally more stable in comparison to FDIs (Boly, Coniglio, Prota & Seric, 2014; Ratha & Plaza, 2011).

However, in the Southern African region, remittance inflows fall below ODA as illustrated in Figure 2 below. This trend should however, not be looked at on face value but rather the informality of remittance transfer and poor data collection (which also led to the omission of several countries that would have been part of the study but were not due to a lack of data) on the continent should be considered (Mohapatra & Ratha, 2011).

Figure 2

Remittances and other inflows for - select Southern African countries (1990-2016)

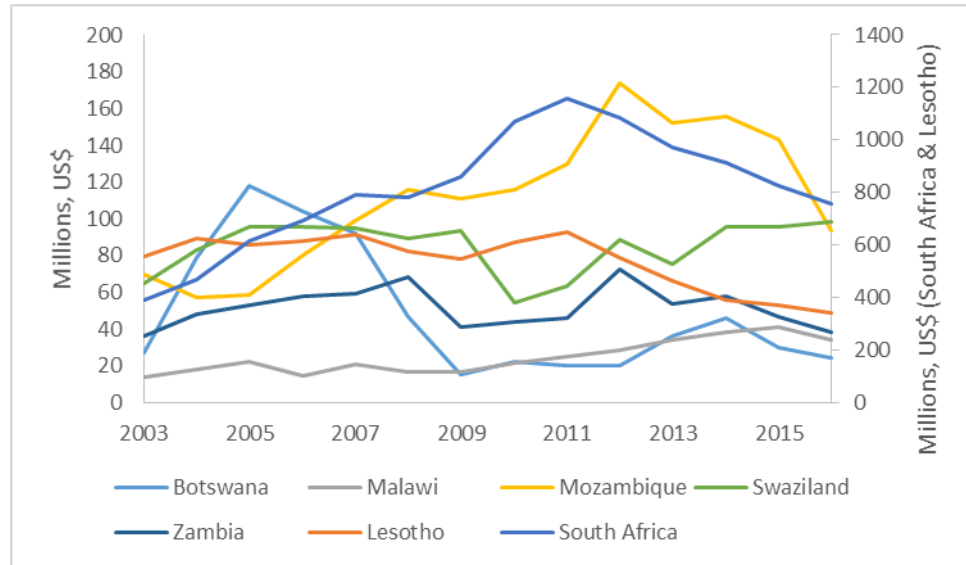


Source: Authors compilation of WDI

Aside from remittances being below ODA, what is further highlighted is the stable nature of remittances in comparison to the other sources (Boly, Coniglio, Prota & Seric, 2014; Ratha & Plaza, 2011). The stability of remittance inflows further substantiates calls for countries in the region to consider it as a development source of revenue, more so given the less straining conditions associated to them in comparison to the other sources (FDI and ODA).

Figure 3

**Personal remittances, received (current US\$) - for select Southern African countries
(2003-2016)**

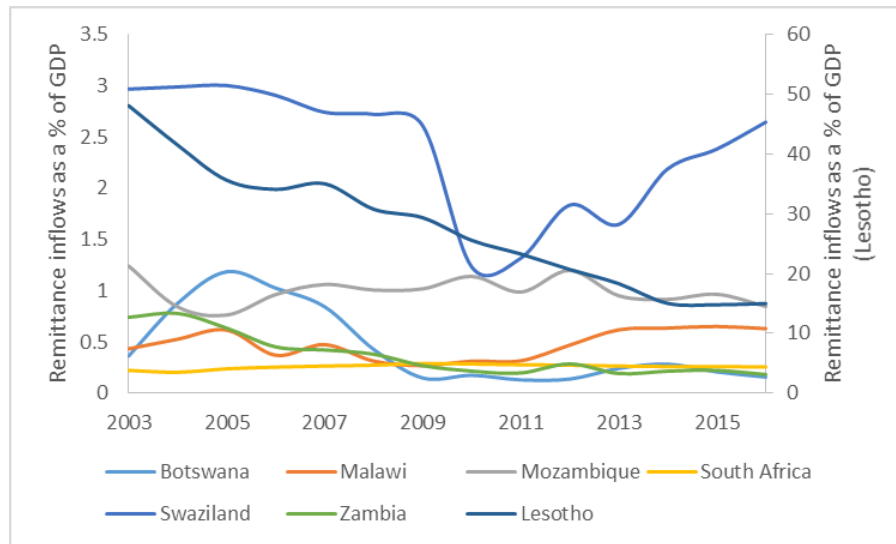


Source: Authors compilation of WDI

As a collective region, remittance inflows are depicted to be a stable source of funds. However, individual countries do not depict the same stability. Fluctuations coupled with declines are observed as is illustrated in the Figure 3 above. However, overtime the trend is generally constant in southern African. A point of interest is the disparity of remittance inflows by each nation, particularly in South Africa and Lesotho. Both countries have considerably higher remittance inflows recorded (probably highlighting their better records of data in comparison to the other nations). Another point of interest is the post-recession behavior of the remittance inflows. It is noticed that in both the Figure 3 and 4, that there are slight increases in remittance inflows before declines. The behavior of remittance inflows noticed around the recession period adds to their novelty as an alternative source of funds to spur development and growth in Southern Africa.

Figure 4

Remittance inflows (% of GDP) - for select Southern African countries (2003-2016)



Source: Authors compilation of WDI

As is illustrated in Figure 4, remittance inflows for some of the select countries make up a considerable amount of GDP - more so as illustrated by Lesotho especially as it has been rising post 2010. However, this is not the case for the majority of the countries. Even so, the magnitude cannot be ignored as is illustrated. The declining remittance inflows of Swaziland unlike the rest that are either constant or rising should be addressed with caution as official estimates – as alluded to earlier – are prone to be understated. Moreso given the informal transfer of remittances in the region (Mohapatra & Ratha, 2011; Mohapatra & Ratha, 2011).

2.3 Conclusion

The perceived low inflows of remittances (Figures 1 – 4) can be explained by informal transfers among other reasons such as poor data - which led to the exclusion of some countries that are part of Southern Africa - and relatively high costs. The importance of informal transfers and the magnitude they have on recorded remittance inflows cannot be overlooked as in some cases since they are attributed to be over 40%. According to various scholars as

cited by Mohapatra and Ratha (2011), carrying remittances by hand during visits home accounted for about half of remittance transfers in Southern Africa. Mohapatra and Ratha (2011) further found that remittances carried by hand and those sent through friends and relatives accounted for 68% of remittances in Botswana, 88% in Lesotho, 73% in Swaziland, and 46% in Zimbabwe.

The magnitude of informal transfers could be further explained by the fact that Southern Africa has some of the highest costs of sending remittances: for example in the third quarter of 2015 it cost about 19% of U.S. \$200 to send remittances from South Africa to Zambia and 17.4% from South Africa to Botswana; whereas in comparison to other developing countries out of Africa, it cost 6.70% from Brazil to Bolivia and 4.4% from Chile to Peru (World Bank, 2016; Watkins & Quattri, 2014).

However, even with the aforementioned shortcomings: remittances are of considerable magnitude. Coupled with their relative stability, there is considerable promise if utilized appropriately towards developmental purposes.

Chapter 3 Literature review

3.1 Introduction

This chapter provides a review of the literature pertaining to determinants of remittances, cyclical and volatility of remittances, discussions on the different methodologies used and findings.

3.2 Theoretical review

Even though the study is on macroeconomic factors, the microeconomic component of the theoretic discussion cannot be overlooked. This is due to the link between the two components, stemming from the motives migrants remit. According to Lucas and Stark (1985) there are three main motives to remittances' decision making. These are: pure altruism, pure self-interest and tempered altruism.

- i) Pure altruism, otherwise known as the selfless concern of others, e.g. one continues to send money and increases the money they send home as family member's incomes fall (Tabit & Moussir, 2016; Henry, Moulton & Ricketts, 2009). Lukas and Stark (1985), motivated to quantify the notion that migrants remit because they care for those left behind in a quest to answer among other questions: why some migrants remit more than others; why some do it longer; and why some do not remit at all. To test their proposed hypothesis of pure altruism, they introduced utility in their analysis of whether a migrant would enjoy remitting.

Lukas and Stark hypothesized that if indeed the migrant cared about his home family and if both his utility function and the home family utility function are well behaved then two properties of the remittance function ($r = r(w, y, n)$) are predicated. These being that, $\partial r / \partial w > 0$ and $\partial r / \partial y < 0$. Where: r = amount remitted; w = migrants wage; y = income per capita at home before any receipt of remittances; and n = household

size. The sign of $\partial r/\partial n$ may vary depending on whether there are economies or diseconomies of scale in the home base's consumption.

- ii) Pure self-interest on the other hand as the term suggests is the act of migrants remitting for their own purposes (Tabit & Moussir, 2016; Henry, Moulton & Ricketts, 2009) – the opposite of pure altruism. In this regard, three reasons as to why one would remit are considered. The first being the aspiration to inherit; the second being to invest in assets in the home area and ensuring their careful maintenance; and the third being investing in one's home country with the intent to return home.

Elaborating further on these three reasons, in the instance of aspirations of inheritance, it is assumed that a migrant will continue to remit as long as inheritance is conditioned on behavior. In regard to the investment in assets as a reason to remit, it is postulated that as a family may be a trustworthy agent, migrants will remit more to ensure their assets are maintained on their behalf. The last of the three reasons: the intent to return home, however, highlighting how inseparable altruistic and self-interest motives are as a migrant remits for investment purposes in fixed capital (land, houses), public assets (to enhance prestige), and what is termed social assets (relationship with family and friends). The aforementioned illustrating how difficult it is to determine what the true motive to remit is.

- iii) Tempered altruism - this being an implicit agreement between family members where initially the migrants family in the home country finance the initial costs of the migrant and then later the migrant becomes the 'provider' of those left back home (Tabit & Moussir, 2016; Henry, Moulton & Ricketts, 2009). Tempered altruism is also known as "family arrangements" as illustrated earlier (Moudoud, Oudient & Unan, 2008). This is further categorized into three motives: the exchange motive,

insurance and investment motive. Tempered altruism may seem to intersect with pure altruism and self-interest. However, as the discussion will show below, tempered altruism postulates separate hypotheses.

The most basic motive of exchange asserts that the migrant transfers funds to the whole family in exchange of services offered for the welfare of those left behind, usually wives and children (Moudoud et al., 2008). According to Moudoud et al. (2008), this motive goes further to presume that migrants ought to remit even if the family revenue increases because the quality of services their remittances can buy increases too.

In regard to the investment motive, it is assumed the migrant remits with the objective being to get a return on the investment in the home country. The migrant is faced with the decision of where to invest, either in the home or host country. In such a case, the migrant calculates the potential return in his home country relative to that from the host country. This motive however, goes further to assert that if the main motive to remit is to invest in the home country, then that investment motive dominates the remitting decision (Moudoud, et al., 2008).

The last of the three motives under tempered altruism – insurance – is based on family arrangements against income volatility. Under this motive, the issue of income volatility is assessed as revenues are an integral component of remitting – which are subject to various risk components e.g. price fluctuations, droughts, etc. The initial arrangement assumes that the family at home pays the migration cost in exchange for future remittances from the migrant.

While the remitting decision is made at the micro level: it is at the macro level where how much is remitted, is further determined.

This section of the chapter now briefly looks at the theoretic literature on cyclicalities. More so the cyclicalities of remittance flows. Cyclicalities of remittances have been gaining traction as policy makers seek potential avenues to reduce output volatility. Hence, the goal of determining remittance inflow behavior to assert whether they (remittances) are moving counter or pro-cyclically with output or GDP. Cyclicalities have found theoretical justification in literature underpinned by theories stemming from the motives behind the transfer of remittances. The first as mentioned before, being the altruistic motive, which gives prevalence to family ties. With this motive, remittances are expected to behave counter-cyclically, with migrants remitting more during times of crisis: for example, in times of natural disasters or economic hardship in the origin countries. The second being the portfolio theory, which asserts that migrants optimize placement of their savings between origin and destination countries of which the remitting of funds is a form of investment. The prediction of the portfolio theory is that remittances behave pro-cyclically relative to macroeconomic indicators and private capital flows.

The theoretic underpinnings of volatility – which will also be looked at briefly - in regards to remittances also stem from the motives to remit. Literature generally presents remittances as a stable source of foreign exchange flows, much less responsive to business cycles and economic shocks than the FDI and foreign portfolios (Chami, Hakura & Montiel, 2009; Ratha & Mohapatra, 2007; Bugamelli & Paterno, 2011; Ratha, 2003). With low volatility perceived to help an economy avoid sharp swings (Gabel, 2008).

Theoretic discussions in regards to remittances as alluded to earlier mostly stem from the motives to remit. Other perspectives of volatility and remittances is usually discussed from the perspective of transmission effects flowing from remittances to growth – which have been found to be ambiguous (Chami, Hakura & Montiel, 2009) - and rarely vice versa. However,

the volatility of remittances is dependent on various factors that include but are not limited to: the output fluctuations in the home and host countries, the bilateral exchange rate and socioeconomic conditions of the home and host countries (Mughal & Makhoul, 2011).

3.3 Empirical review

There are a number of studies that have examined not only macroeconomic determinants of remittances but economic determinants in general. These studies focus on what social-economic factors might cause migrants to remit and once they do remit, what factors affect the amount remitted home. However, empirical studies on the phenomenon of interest in Southern Africa particularly are minimal with most studies in Africa either being on SSA, SADC – which encompasses various countries that may not be a true reflection of what happens in Southern Africa, and other sub regions on the continent. The findings have been found to vary as has the impact of factors that affect the amounts remitted.

Among the various determinants (income, education, exchange rates and dependency just to mention a few), education has been found to be one of the important determinants of remittances not only because of the perceived amounts the educated verses the uneducated remit (which has been debated) but that remittances are sent to foster education. Two studies (Adams, 2008; Faini, 2007) used cross-country data from a variety of developing countries and found that skilled migrants (otherwise known as educated migrants) remit less than unskilled migrants. This they perceived to be down to a number of skilled migrants spending a lot of their time abroad and therefore moving with their families and having no reason to remit as much as unskilled migrants. These findings were however contested by Bollard, Albert, McKenzie, David, Morten, Melanie, Rapoport and Hillel (2009) who used microdata from immigrant surveys in 11 OECD countries, and found that while education has a mixed

effect on the disposition to remit, education as suggested by the data is positively and strongly related to the amount remitted.

As aforementioned, there are several determinants. Most linked to one another as is the case with education and dependency. Just as the determinants vary, so too do the methods of measurement Huang & Vargas-Silva, (2006) using a VECM; Baldé (2009) using a Two Stage Least Square (TSLS); whereas, Coulibaly (2009) used a panel VAR) among other issues. Baldé (2009) found that remittances do not have a direct positive impact on growth. Whereas, Huang and Vargas-Silva (2006) and Coulibaly (2009) found supporting results: in which both studies concluded that economic conditions in the host country are more significant and that remittances respond more to them than to the economic conditions in the home countries. This was irrespective of different time periods of study and countries included, although both studies looked at a similar region (Latin American countries).

Other studies as they pertain to this section of the literature review include ones done by: Zakari and Nasiru (2016); Lim and Mahbub (2015); and Yuni, Omeji and Asogwa (2013). In a study examining macroeconomic determinants of remittances for the period ranging from 1990 to 2014, Zakari and Nasiru (2016) looked at 14 West African countries. Their variables of interest included: Remittances measured as total personal remittances received in US dollars; Home income was proxied by gross domestic product measured as constant 2005 US dollars; the labour market situation proxied by the unemployment rate; and the real exchange rate as a proxy for the exchange rate. The study applied several panel unit root tests, then the Pedroni cointegration test before a fully modified ordinary least square (FMOLS) estimation. It was found that there existed a long run relationship among the variables. The FMOLS revealed that home income and the exchange rate had a positive and significant impact on remittance inflows. It was however found that the labor market situation

exhibited the opposite. Their findings led them to the conclusion that, remittance inflows increased in response to the increases in home income.

Lim and Mahbub (2015), in keeping with macroeconomic determinants of remittances investigated the aforementioned for 122 developing countries for the period ranging from 1990 to 2010. Their study applied ordinary least square (OLS) – fixed effects (FE), and random effects (RE) – on the variables: Migrant stock, GDP per capita and private credit to GDP. The analysis showed that home income stock had a negative impact on remittances, suggesting an increase in remittances could have been due to a decrease in home income. Their results showed a significant impact of financial development in easing the flow of remittances to developing countries.

In another study, related to macroeconomic determinants of remittances, Yuni, Omeje and Asogwa (2013) also investigated the phenomenon in 21 selected African countries for the period 1980 to 2011. The variables used included remittances received, real exchange rate, broad money base, tax revenue and the inflation rate. Applying a dynamic generalized method of moments (GMM), they found that the broad money base (M2) and tax revenue had a statistically significant but negative relationship with remittances, whereas, the inflation rate as well as age dependency ratio were statistically significant positive relationship.

Empirically, the literature on the cyclical properties of remittances comprises of an evaluation of the cyclicity of remittances with respect to the Output or GDP cycle and with mixed results. Some authors, have found that remittances react counter-cyclically to real GDP cycle at home as did Sayan (2006) for the case of the low and lower middle income countries. However, Lueth and Ruiz-Arranz (2007) concluded that remittances are aligned with the business cycle in Sri Lanka. Whereas, Acosta, Cesar, Pablo and Humberto (2008) examined

the correlation between the cyclical components of remittances and real output in recipient countries for 26 Latin American countries. The study showed that the counter cyclicality of remittances appears to increase with income, even after controlling for the endogeneity of output fluctuations which was highest among upper-middle income countries. Acosta et, al., (2008) results were close to that of Giuliano and Ruiz-Arranz (2005) who concluded that remittances were more pro cyclical in countries with shallower financial systems.

As alluded to earlier, the empirical literature examining the cyclical direction of remittances in relation to macroeconomic indicators, has mixed results and or conclusions. In support to the counter-cyclical response, Mishra (2005) found that for 13 Caribbean countries, a 1% decrease in real GDP leads to a 3% increase in remittances two years later. Similarly, Bouhga-Hagbe (2004) shows that remittances to Morocco are over the long run, negatively correlated (counter-cyclical) with real GDP. Whereas, in a panel study of 113 countries over 29 years, Chami, Connel and Samir (2005) found that remittances to GDP are negatively correlated with the GDP growth.

Lartey (2016) on the other hand looked at the phenomenon closer to Southern Africa in a study entitled, “The cyclical direction of Remittances in Sub-Saharan Africa”. In this study, he investigated the cyclical direction of remittances to make inferences about whether they are sent for altruistic or self-interest reasons. The results showed that remittances are pro-cyclical and therefore, do not support the general altruistic motive for sending remittances to Sub-Saharan Africa. The findings suggest that remittances to the region may be driven by some other self-interest motives or family arrangements. He further concluded that irrespective of the results, the fact that remittances remain an important source of external finance to the sub-region cannot be diminished.

The IMF (2005) examined the determinants of remittances using a panel of 101 countries during 1970-2003 and found a significant negative impact of home country output on remittances. The study's analysis of the correlations between aggregate remittances and GDP indicated that remittances are positively correlated (pro-cyclical) with GDP, although they are not as sharply pro-cyclical as other non-FDI capital inflows.

The aggregated de-trended remittances inflows to the 12 countries examined in Sayan (2006) were also found to be negatively correlated with de-trended GDP. However, both Acosta et al., (2008) and Sayan (2006) found that the correlations at country-specific level had a weaker verdict of counter-cyclicality. Several countries in the samples of each study exhibited pro rather than counter cyclical remittances in relation to output. The result prompting Sayan (2006) to assert that “counter-cyclicality is hard to generalize to all countries”. In regard to literature that gives preference to the “portfolio” approach of remitting, Lueth and Ruiz-Arranz (2006) concluded that remittances were aligned with the business cycle in the recipient countries. Their analysis was based on estimating a gravity model of the determinants of remittances in 11 countries. Later in a country specific study, Lueth and Ruiz-Arranz (2007) employed time series data and a vector error correction model and found that remittances to Sri Lanka were pro-cyclical.

Just as the analysis on remittances has varied between different studies, so too has the issue of volatility with estimation models ranging from ARCH models (Mughal & Makhoulf, 2011), to the use of the coefficient of variation (Kodongo & Ojah, 2012.), and standard deviations (Isakovic & Ilgun, 2015) among others. However, the transmission has generally been from remittances to macroeconomic variables; more commonly economic volatility, output or growth (Adeniyi, Ajide, & Raheem, 2017; Jidoud, 2015; Craigwell, Jackman &

Moore, 2010). This study seeks to have a different approach by observing the transmission from macroeconomic determinants to remittance flows.

Remittances among other things are compensatory and are generally seen to rise when downturns are experienced in home countries. They have however, been noted to be a relatively stable source of income, relative to other flows (private and public) – (Boly, Coniglio, Prota & Seric, 2014; Ratha & Plaza, 2011; Chami, Hakura & Montiel, 2009).

The transmission of volatility from remittances to output/growth as aforementioned has been documented relatively adequately and as Chami, Hakura and Montiel, (2009) assert, remittance flows contribute to reducing output growth volatility in remittance receiving countries. The empirical effects of remittance inflows on macroeconomic volatility however vary as is illustrated by: Chami, Cosimano and Gapen (2006), who unlike Chami, Hakura and Montiel assert they can increase economic volatility (more so if households labor supply become more pro cyclical). However, to have remittances as a source of funds to spur growth, there needs to be an analysis to observe what effects output and other macroeconomic determinants would have on remittance flows/inflows as this represents another perspective of transmission that may affect welfare in remittance receiving countries.

3.4 Conclusion

As can be inferred, different methodologies, determinants and results have been used and found. The study adopted some of the techniques discussed in some of the reviewed studies. With the aforementioned (remittance analysis, cyclicalities and volatility) mixed together, it can be seen that cyclicalities and volatility being added to the analysis of macroeconomic determinant effects on remittances flows in Southern Africa adds significantly to the prevailing literature.

Chapter 4 Research methods

4.1 Introduction

Chapter 4 presents the methodology that was used to achieve the set objectives. This section outlines the source(s) of data, the range of the study, and the tests and approaches used in line with literature and economic theory. The chapter further discusses the variables used, what they represent and why, supported as aforementioned by literature and theory and concluded by ethical practices adhered to.

4.2 Research Design

This study employed a quantitative method and used panel data to analyze macroeconomic determinants of remittances in select Southern African countries. The study used secondary, annual data ranging from 2003 to 2016. The data used was extracted from the World Bank Development Indicators (WDI) and the International Financial Statistics (International Monetary Fund – IMF). The Southern African countries selected were: Botswana, Lesotho, Malawi, Mozambique, South Africa, Swaziland and Zambia.

4.3 Model Specification

The study adopted the modeling approach used by Yuni, Omeje and Asogwa (2013). The initial model specification is given as:

$$REM_{it} = \beta_0 + REM_{it-1} + INF_{it} + GDPG_{it} + EXC_{it} + BM_{it} + AGED_{it} + u_{it} + \varepsilon_{it}$$

The model uses remittances of the previous year (REM_{it-1}), the inflation rate (INF_{it}), the GDP growth rate ($GDPG_{it}$), the nominal exchange rate (EXC_{it}), broad money variable (BM_{it}), and age dependency ratio ($AGED_{it}$) as the macroeconomic determinants. Whereas; $u_{it} \sim iid(0, \sigma_u^2)$ is the unobserved random effect that varies across countries but not over time, and $\varepsilon_{it} \sim iid(0, \sigma_\varepsilon^2)$ is an idiosyncratic error term, $i = 1, \dots, N$; $t = 1, \dots, T$.

Remittances are the dependent variable represented by Personal remittances, received (% of GDP). As per theoretic and literature consideration Lagged Remittances are used as one of the dependent variables to explain current remittances (Yuni, Omeje & Asogwa, 2013; Coulibaly, 2009). For the inflation variable, inflation as the GDP deflator (annual %) is used. This was done to capture the environmental conditions of the home countries as opposed Coulibaly (2009) who used GDP per capita as the study felt inflation is more reflective of the aforementioned. Whereas, to show changes in the economic environment in the home countries, the study used the GDP growth (annual %) variable as opposed to Coulibaly's study that used Real GDP. Other control variables of importance that were used include: the Nominal exchange rate (National Currency per US Dollar, End of Period), Broad money as % of GDP and the Age dependency ratio which was reflected by Age dependency ratio (% of working-age population). The exchange rate is representative of the cost of send remittances from one country to another. Whereas, broad money was used to represent market sophistication (as done by Yuni, Omeje & Asogwa, 2013; whereas Eyden, Sekyere & Kemegue, 2011 used money and quasi money as a percentage of GDP to represent market sophistication). This was done so that a single regression analysis would be enough to see the effect of market sophistication in the region which is apparent as is illustrated by the differences between economies as those in Botswana. Even more so by South Africa in comparison with countries like Malawi, Mozambique, Lesotho, Swaziland and Zambia. Last but not least, the Age dependency ratio was used to analyze how dependency on remittances affect remittance flows in the region.

4.4 Procedure

Initially, the unit root tests were estimated to mitigate against unit roots. These included: The Im, Pesaran and Shin Test, the ADF-Fisher Chi-square test, the PP-Fisher Chi-square and the Levin, Lin and Chu test. The hypotheses of the respective tests are as follows: Levin, Lin and Chu Null hypothesis states that: Panel data has unit root (assumes common unit root process) with the Alternative hypothesis being: Panel data has no unit root. The Im, Pesaran and Shin Null hypothesis states that: Panel data has unit root (assumes individual unit root process) (Non-stationary) whereas the alternative hypothesis states that: Panel data has no unit root (Stationary). Last but not least, the Fisher type test using ADF and PP test (which assume individual unit root processes) have null hypotheses that state that the: Panel data has unit root (assumes individual unit root process) whereas the alternative: Panel data has no unit root. With the decision rule being that: If $p > \alpha$ then the null hypothesis cannot be rejected and that if $p < \alpha$ then the null hypothesis is to be rejected. The tests for stationarity are important in that the regression of non-stationary variables would lead to misguided inferences.

A stability check was then estimated to check the stability of the variables to be used in the model. If the roots of the test fall within the circle or are unity, the variables are believed to be stable and suitable for the study to proceed. After which the Residual Serial Correlation LM test was estimated as one of the diagnostic tests to ensure the validity of the overall model to be estimated. Of which the p values should be greater than α as the null hypothesis is that there is no serial correlation. By finding p values greater than α , then can the conclusion of suitable estimates be made as the null hypothesis cannot be rejected.

Thereafter, several panel co-integration tests were estimated to observe whether there was any long run association or relationship among the variables. These tests included: the panel v-Statistic, the panel rho-Statistic, the panel PP-Statistic, the panel ADF-Statistic, the group

rho-Statistic, the group PP-Statistic and the group ADF-Statistic. Of which the all had the same hypothesis and decision rule. The null hypothesis being that, there is no cointegration and the alternative hypothesis that, there is cointegration. Whereas, the decision rules being that that if the p value is greater than α , the null hypothesis cannot be rejected.

Thereafter, OLS regressions of the fixed effects and Random effects models were estimated. This was done in accordance with the main objective of analyzing macroeconomic determinants in the region. To decide whether to use the fixed effects or random effects model, the Hausman test was estimated. After which, one more diagnostic test was applied which was the Residual Cross-Section Dependence Test to ensure the results were efficient and unbiased as well as ensuring their validity. Of which the Residual cross-section dependence tests null hypothesis states that there is No cross-section dependence (correlation) in residuals. With its decision rule being that that if the p value is greater than α , the null hypothesis cannot be rejected. Apart from a panel model, this paper made use of impulse response functions and variance decompositions. The impulse response functions were used to determine the effects of one standard deviation in one variable on the other variables in a system. Whereas, the variance decompositions show how shocks reverberate through a system and measure the relative importance of each innovation that affect the respective variables.

For the purpose of this study, the check for volatility was estimated using the standard deviation measures as did Isakovic and Ilgun (2015) – for its simplicity. A high standard deviation implies high volatility, and a low standard deviations implies otherwise. To analyze for cyclicalities the Hodrick Prescott (HP) filter was used. Thereafter, correlation tests were estimated to determine whether there is pro or counter cyclical behavior. All analysis procedures were done using Eviews 9 (Econometric Views 9) statistical package.

4.5 Ethics

The research endeavored to balance professional integrity. The study acknowledged all sources and avoided plagiarism. Furthermore, the data used in the study was not distorted, fabricated or falsified in any manner.

4.6 Conclusion

Having outlined the above procedures to achieving the set objectives, the data and their data representations, data sources, period range, countries of focus and ethical considerations, the subsequent chapter presents the results, analysis and discussion of the results.

Chapter 5 Empirical results: analysis and discussion

5.1 Introduction

Chapter 5 deals with the preliminary findings of the study. It further presents a detailed account of the findings. It is in this chapter that the results are presented, and an analysis and discussion of the results is provided.

5.2 Results and Discussion

5.2.1 Unit root tests

The data was first converted to log form to eliminate extreme variability in the variables. This was done for all the variables except for GDP growth which was already converted. In keeping with the outlined methodology, the unit root tests were the first to be estimated. This was done in order to avoid spurious results down the line. As aforementioned, the study checked the stationarity properties using the Im, Pesaran and Shin Test; the ADF-Fisher Chi-square test; the PP-Fisher Chi-square; and last but not least the Levin, Lin and Chu test. The results of the unit root tests are presented in Tables 1-3.

Table 1: Unit root results at levels

	AT LEVELS			
	LLC	IPS	ADF-Fisher Chi-square	PP-Fisher Chi-square
LNREM	-3.222*** (0.001)	-1.473* (0.070)	23.532* (0.052)	14.436 (0.418)
LNINF	0.620 (0.732)	-1.463* (0.072)	22.4809* (0.069)	59.239*** (0.000)
GDPG	-1.400* (0.081)	-0.774 (0.220)	18.355 (0.191)	28.294** (0.013)
LNEXC	2.925 (0.998)	4.156 (1.000)	1.285 (1.000)	0.749 (1.000)
LNBM	-3.223*** (0.001)	-0.549 (0.291)	19.765 (0.138)	11.115 (0.677)
LNAGED	-3.468*** (0.000)	0.129 (0.551)	14.377 (0.422)	54.999*** (0.000)

*Source: Authors' computations. Note: ***, **, * imply the rejection of the null hypothesis of non-stationarity at 1%, 5% and 10% level of significance respectively. In parenthesis are the p values.*

Table 2: Unit root results at first difference

	AT FIRST DIFFERENCE			
	LLC	IPS	ADF-Fisher Chi-square	PP-Fisher Chi-square
LNREM	-2.268** (0.012)	-2.914*** (0.002)	31.988*** (0.004)	54.745*** (0.000)
LNINF	-3.633*** (0.000)	-4.155*** (0.000)	45.157*** (0.000)	122.898*** (0.000)
GDPG	-4.926*** (0.000)	-3.772*** (0.000)	39.914*** (0.000)	92.744*** (0.000)
LNEXC	-1.762** (0.039)	-1.775** (0.038)	23.652* (0.051)	51.088*** (0.000)
LNBM	-2.237** (0.013)	-2.732*** (0.003)	30.531*** (0.006)	60.633*** (0.000)
LNAGED	1.735 (0.959)	3.220 (0.999)	4.905 (0.987)	2.3831 (1.000)

Source: Authors' computations. *Note:* ***, **, * imply the rejection of the null hypothesis of non-stationarity at 1%, 5% and 10% level of significance respectively. In parenthesis are the p values.

Table 3: Unit root results at second difference

	AT SECOND DIFFERENCE			
	LLC	IPS	ADF-Fisher Chi-square	PP-Fisher Chi-square
LNAGED	-7.092*** (0.000)	-3.831*** (0.000)	40.424*** (0.000)	34.209*** (0.002)

Source: Authors' computations. *Note:* ***, **, * imply the rejection of the null hypothesis of non-stationarity at 1%, 5% and 10% level of significance respectively. In parenthesis are the *p* values.

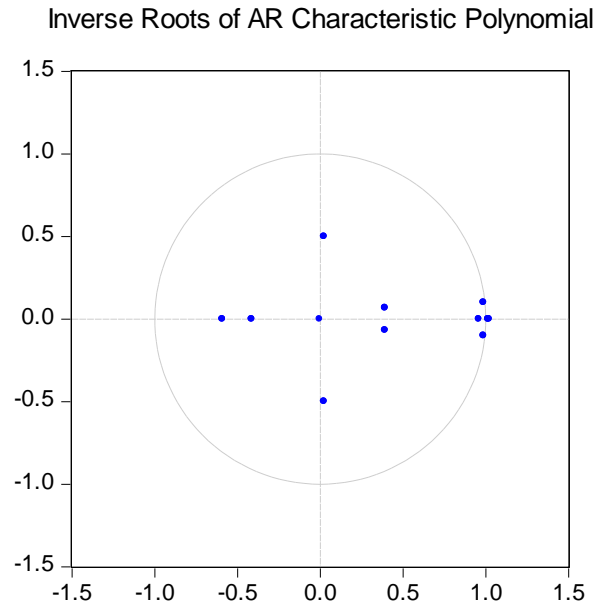
The respective tables above show the results of the unit root tests of each variable until stationary was achieved. As can be inferred from above, it was found that all the variables apart from LNAGED become stationary at first difference (at 5% level of significance). LNREM, LNINF, GDPG, LNEXC and LNBM are therefore of order of integration one. As aforementioned, LNAGED was the only variable that did not become stationary at first difference but rather at second difference and is therefore of order of integration two.

5.2.2 Diagnostic tests

Having applied the unit root tests, a stability tests was applied to check the stability of the variables to be used in the model. Figure 5 shows the AR roots graph that was derived.

Figure 5

AR roots



Source: Authors' computations

As all the dots (roots) are within the circle it was safe to conclude that the variables to be used in the model are stable or satisfy the stability condition. After which the Residual Serial Correlation LM test was estimated as one of the diagnostic tests to ensure the validity of the overall model to be estimated. Of which it was found that all the p values were greater than α at all levels of significance (1%, 5% and 10%). This leads to the conclusion of no serial correlation and that suitable estimates could be made as the null hypothesis cannot be rejected.

5.2.3 Panel cointegration test

Having applied the unit root tests and diagnostic tests, the study then applied the Pedroni panel cointegration test to see if there existed a long run relationship or otherwise. The results are presented in the table below.

Table 4: Panel cointegration tests

Within-dimension				
			Weighted	
	Statistic	p-value	Statistic	p-value
Panel v test	-0.403	0.656	-1.462	0.928
Panel rho test	1.424	0.923	0.970	0.834
Panel PP test	-2.603	0.005	-5.295	0.000
Panel ADF test	3.066	0.999	0.019	0.508
Between-dimension				
	Statistic		p-value	
Group rho test	2.165		0.985	
Group PP test	-6.135		0.000	
Group ADF test	0.091		0.536	

Source: Authors' computations

As presented above, of the eleven tests done, eight could not reject the null hypothesis of no cointegration as the p values were greater than α (1%, 5% and 10% level of significance). This was the case for six of the tests from the within dimension and two of the tests from the between dimension tests. As a majority of the tests could not reject the null hypothesis, the study concluded that there was no cointegration and therefore, there was no long run relationship or association between the variables.

After the cointegration test was applied, both the fixed and random effects model was estimated. After which, the Hausman test was applied to pick which of the two aforementioned tests would be appropriate to use. The result of the Hausman test is depicted in the table below.

Table 5: The Hausman test

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	9.357	6	0.155

Source: Authors' computations

The Hausman test has the null hypothesis that the random effect estimator is correct. As the p value is greater than α (1%, 5% and 10% level of significance), the study could not reject the null hypothesis of no statistical significance. The Random effect estimators were therefore chosen and are the ones from which inferences were made.

5.2.4 Estimation results

As the random effect estimators were the ones chosen over the fixed effect as per the Hausman test, the model generated was that of the random effect estimators and provided the following:

Table 6: Estimation results

Variable	Std. error	T stat	Prob.
C	0.029	-2.763	0.007
D(LNREM(-1))	0.094	1.620	0.109
D(LNINF)	0.022	-0.375	0.709
D(GDPG)	0.008	3.300	0.002
D(LNEXC)	0.160	2.517	0.014
D(LNBM)	0.273	0.273	0.786
D(LNAGED, 2)	11.265	-0.756	0.452
R²	0.185	Prob (f statistic)	0.015
Adjusted R²	0.120	F statistic	2.833
		D Watson	2.312

Source: Authors' computations

From the estimation results, the only significant variables were GDP growth and the exchange rate which represented changes/improvements in the home countries economic environment and costs of remitting respectively as their p values were less than α (1%, 5% and 10% level of significance and 5% and 10% level of significance respectively). The exchange rate finding similar to that of Zakari and Nasiru (2016). Whereas the GDP growth finding is unique in that most analysis looks at the impact remittances have on GDP growth and not otherwise. The results imply that the inflation rate (economic environmental conditions), broad money (market sophistication) and age dependency (or more plainly, dependency) do not influence the receiving of remittances in the select Southern African countries. Which was not expected as it would be expected that a poor economic environment

(which one would argue has been prevalent in the region) would see remittances flow into the economy as migrants try to support those left behind (of course this is also dependent on the fact that migrants left family behind) and otherwise. However, as changes/improvements in the economic environment is significant, the economic environment of the home country relative to the host country could play a vital role in the home countries as the changes reflect to an extent the economic environment. Autocorrelation was not found to be an issue in the residual given the d Watson at 2.312 (approximately equal to 2). The model was found to be jointly statistically significant as the probability (statistic test) is at 0.015 and the F statistic is at 2.833. However, as the probability (statistic test) is at 0.015 it is worth noting that there may be issues with the fitting of data (i.e., the independent variables are not purely random with respect to the dependent variable) – which is to an extent expected given the set objectives. The R^2 at 0.185 and the adjusted $R^2 = 0.120$ are relatively low, indicating that the model does very little in explaining of the variability of the response of the data around its mean. Regardless of the low R^2 , the results can be interpreted and relied upon as in panel data analysis; the individual significance and overall significance of the model instead of the R square or adjusted R square are relied on. Generally, the R^2 is low in cross sectional data as compared to time series data. In panel data due to heterogeneity of cross sections, it is not too high. All the significant variables were found to have a positive relationship with the dependent variable implying remittances would increase by respective percentage changes given a percentage change from the respective dependent variables.

After the model estimation, one more diagnostic test was applied to see if the aforementioned issues from the estimation results would be problematic (multicollinearity and the positive autocorrelation). This being the Residual cross-section dependency test. Of which the null hypothesis of the test is that there is no cross-section dependence (correlation) in residuals

and the decision rule being that that if the p value is greater than α (1%, 5% and 10% level of significance), the null hypothesis cannot be rejected which was the case. Therefore, the study concluded that the estimates found were valid and suitable to make inferences from.

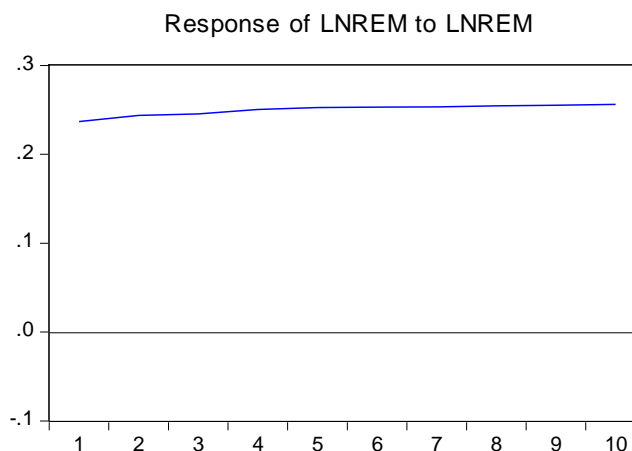
5.2.5 Impulse response functions

In keeping with the outlined procedure, after the model estimation the impulse responses of remittances were derived. The figures below illustrate the responses of remittances from the respective independent variables.

Figure 6

Impulse responses of remittances to remittances

Response to Cholesky One S.D. Innovations



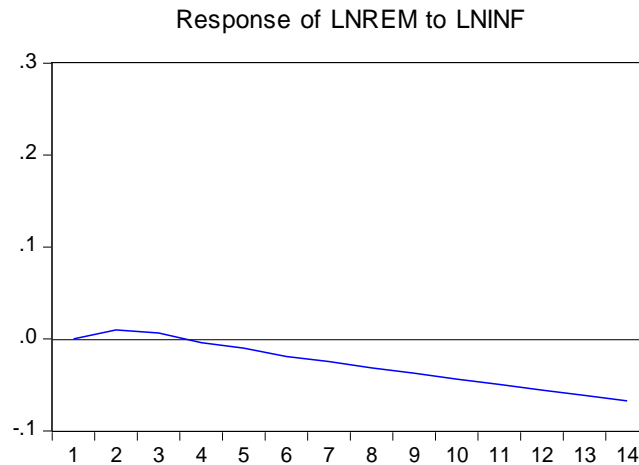
Source: Authors' computations

As illustrated in Figure 6, a one standard deviation or shock from remittances themselves sees a slight positive response in remittance inflows. However, over time this response does not vary but remains relatively constant.

Figure 7

Impulse responses of remittances to economic conditions

Response to Cholesky One S.D. Innovations



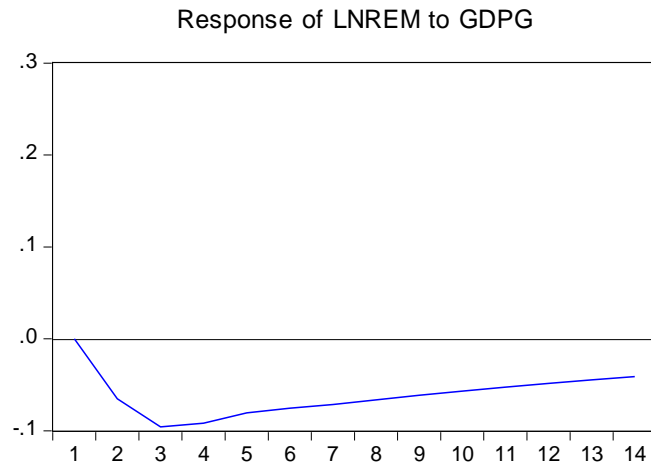
Source: Authors' computations

As is illustrated in Figure 7, a one standard deviation or shock from inflation (economic environmental environment) to remittance inflows would initially see a positive response in remittance inflows. However, over time (over three years) remittance inflows would see a fall as a response to a shock in the economic environmental conditions.

Figure 8

Impulse responses of remittances to improvements in economic conditions

Response to Cholesky One S.D. Innovations



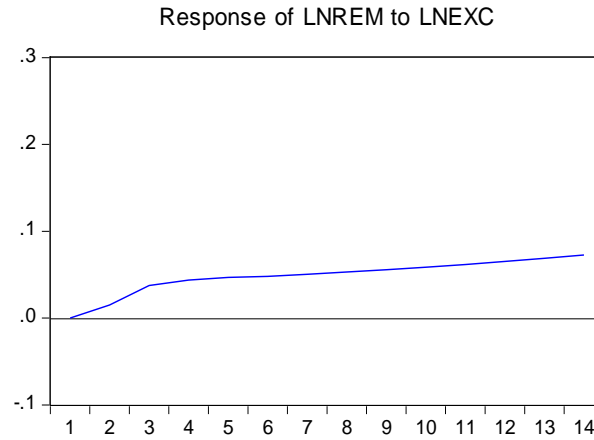
Source: Authors' computations

In regards to remittance inflows response to changes/improvements in the economic environment (GDPG) as shown in Figure 8, a standard deviation or shock in the economic environment would see a fall (negative response) in remittance in flows. Over time, remittance in flows would increase but not be 'substantial'.

Figure 9

Impulse responses of remittances to the exchange rate

Response to Cholesky One S.D. Innovations



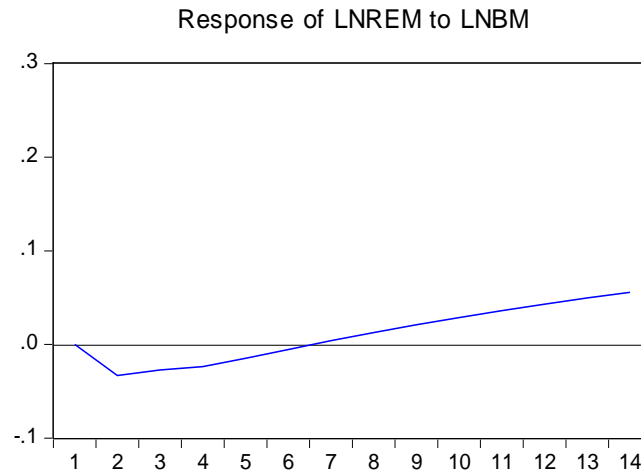
Source: Authors' computations

As shown in Figure 9, remittance inflows respond favorably to shocks in the exchange rate as is expected. Given that the exchange rate is in U.S. dollar (for consistency among the countries), a shock in terms of a depreciation of the local currencies would indeed result in perceived and actual increases in remittance inflows.

Figure 10

Impulse responses of remittances to Market sophistication

Response to Cholesky One S.D. Innovations



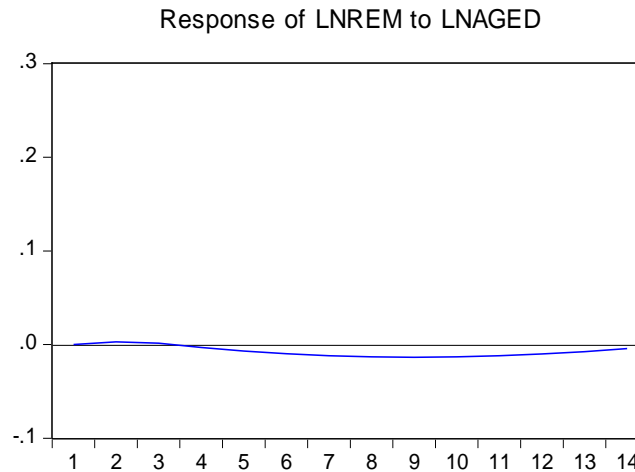
Source: Authors' computations

In regard to remittance inflows response to the market sophistication, it is noticed that a shock initially results in a negative response before a positive response six years later. From the above, it can be inferred that the more market sophistication, the more remittance inflows are initially likely to be hampered before migrants or individuals get used to the systems in place.

Figure 11

Impulse responses of remittances to Dependency

Response to Cholesky One S.D. Innovations



Source: Authors' computations

Last but not least, as is illustrated in Figure 11 remittance inflows respond slightly positively to shocks in dependency. However, as time goes by the response is negative though it does improve slightly over time. This could be attributed to the motives of which migrants are remitting. It could be assumed that initially migrants do remit funds home but as to whether their families join them or they get burdened by dependents back home verses their needs in foreign lands that see a fall and negative response to remittance inflows is not clear.

5.2.6 Variance Decomposition Test

The variance decompositions were then applied and showed how shocks reverberated through a system and measure the relative importance of innovation effects on respective variables.

Table 7: Variance decompositions of remittance

Percentage of the variation in remittances explained by:				
Period	S.E.	LNREM	LNINF	GDPG
1	0.237	100.000	0.000	0.000
2	0.348	95.316	0.078	3.503
3	0.439	91.155	0.071	6.969
4	0.516	89.497	0.057	8.207
5	0.583	89.077	0.075	8.362
6	0.642	88.942	0.150	8.271
7	0.696	88.860	0.252	8.088
8	0.747	88.789	0.397	7.818
9	0.795	88.697	0.571	7.498
10	0.841	88.545	0.780	7.158

Source: Authors' computations. *Note:* the Cholesky decomposition ordering is: LNREM, LNINF, GDPG, LNEXC, LNBW, and LNAGED.

Table 8: Variance decompositions of remittances continued.

Percentage of the variation in remittances explained by:				
Period	S.E.	LNEXC	LNBM	LNAGED
1	0.237	0.000	0.000	0.000
2	0.348	0.188	0.909	0.007
3	0.439	0.847	0.954	0.005
4	0.516	1.329	0.902	0.007
5	0.583	1.695	0.773	0.020
6	0.642	1.953	0.644	0.040
7	0.696	2.186	0.551	0.063
8	0.747	2.403	0.507	0.086
9	0.795	2.613	0.517	0.104
10	0.841	2.821	0.579	0.118

Source: Authors' computations. *Note:* the Cholesky decomposition ordering is: LNREM, LNINF, GDPG, LNEXC, LNBM, and LNAGED.

In the short run (period 3), a shock or innovation to LNREM (remittance inflows) accounts for 91.16% variation of the fluctuation in LNREM (own shock). While the shock to LNINF (economic environment) causes 0.071% fluctuation in LNREM. The shock to GDPG (changes/improvements in the economic environment) on the other hand, causes 6.97% fluctuation in LNREM. Whereas, the shock to LNEXC (or cost of remitting) causes a 0.85% fluctuation in LNREM. A shock to LNBM (market sophistication) accounts for 0.95% fluctuation in LNREM. Last but not least, a shock to LNAGED (age dependency or dependency) accounts for a 0.005% fluctuation in LNREM. In the long run, that is period 10, the shock to LNREM accounts for 88.55% variation of the fluctuation in LNREM (own

shock). While the shock to LNINF causes 0.78% fluctuation in LNREM. The shock to GDPG on the other hand causes 7.716% fluctuation in LNREM. Whereas, the shock to LNEXC causes a 2.82% fluctuation in LNREM. A shock to LNBM accounts for 0.58% fluctuation in LNREM. Last but not least, a shock to LNAGED accounts for a 0.12% fluctuation in LNREM.

5.2.7 Volatility test-Standard deviation

For the purpose of this study, the check for volatility as aforementioned was estimated using the standard deviation measures as done by Isakovic and Ilgun (2015) – for its simplicity. With a high standard deviation, implying high volatility and a low standard deviations implying otherwise.

Table 9: Volatility of the cyclical components (*of remittances*)

Botswana	Lesotho	Malawi	Mozambique	South Africa	Swaziland	Zambia
0.252417	1.784438	0.101248	0.127035	0.013175	0.432353	0.064575

Source: Authors' computations

As can be inferred from Table 9, the region as is illustrated from the countries used depicts low volatility in remittance inflows. This is very evidently reflected in the values of the standard deviations with the highest being 1.784438.

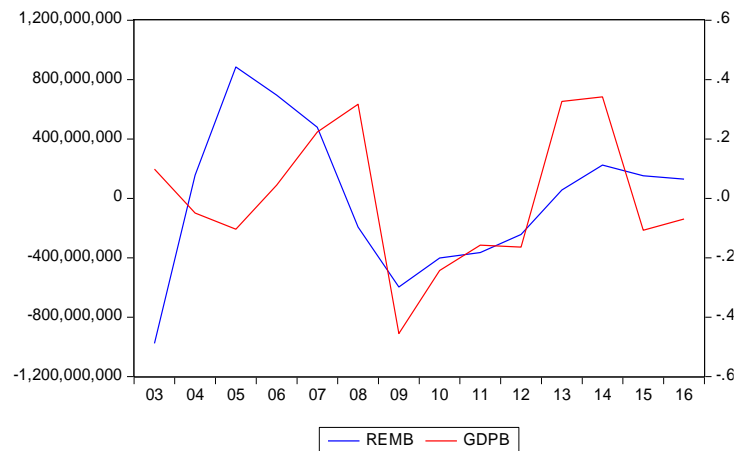
5.2.8 Cyclical tests - Detrended series of the HP filter

To analyze for cyclical behavior, the Hodrick Prescott (HP) filter was used with detrended series. Thereafter, correlation tests were estimated to determine whether there is pro or counter cyclical behavior. Detrended series of remittance inflows were generated as were detrended series of Real GDP flows using the Hodrick Prescott (HP) filter. However, the emphasis is on remittances and the generated cycles are illustrated below.

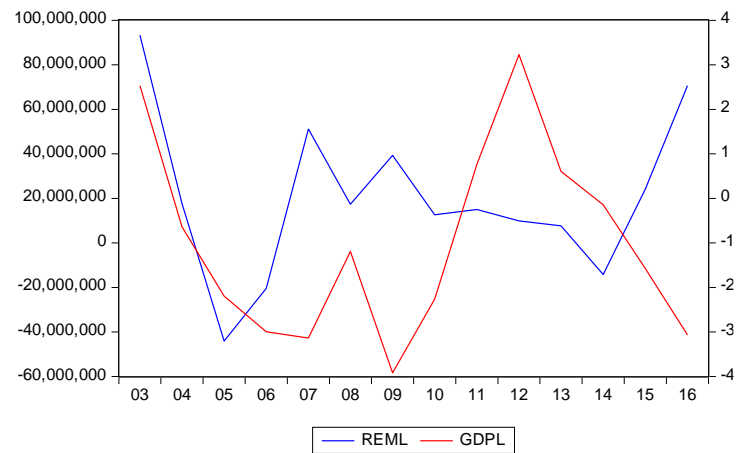
Figure 12 (a-g)

Cyclical flows of remittance and real GDP

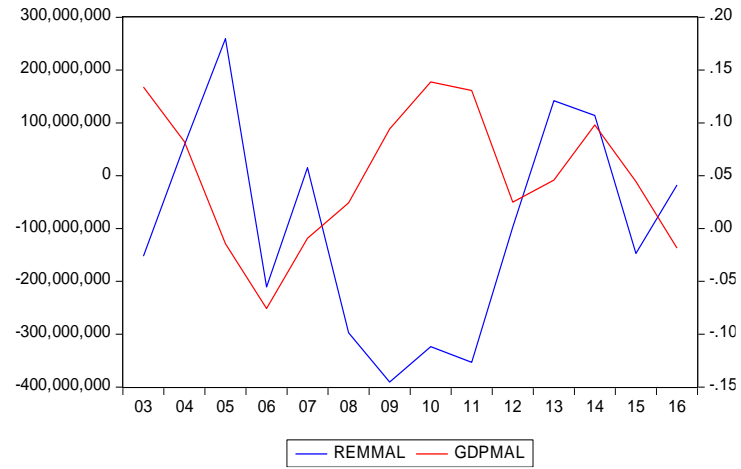
(a)



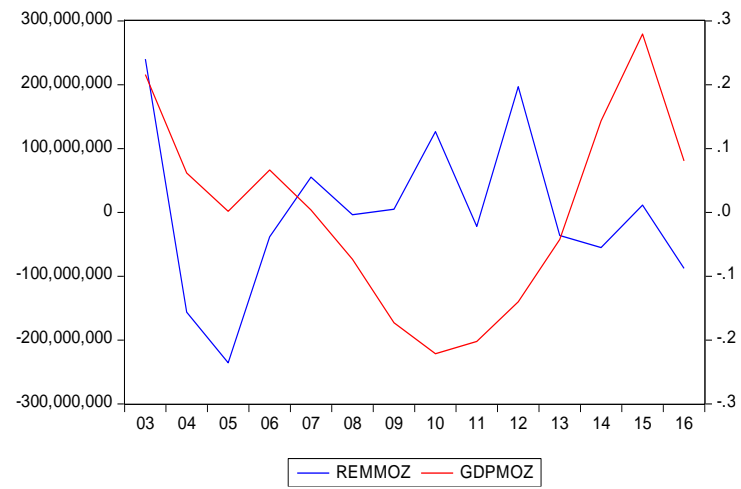
(b)



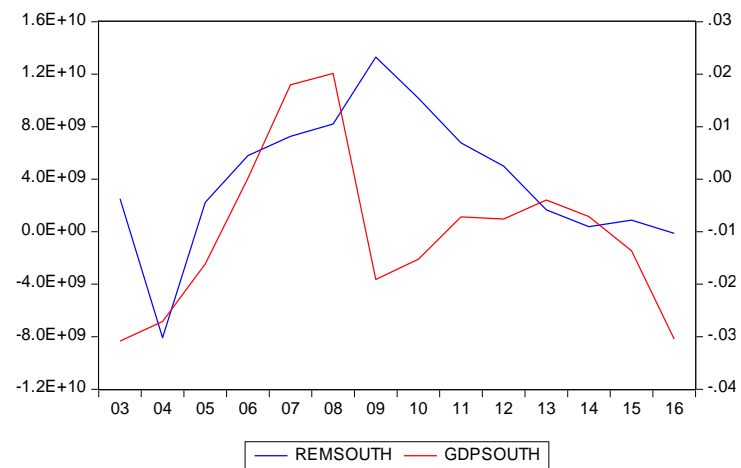
(c)

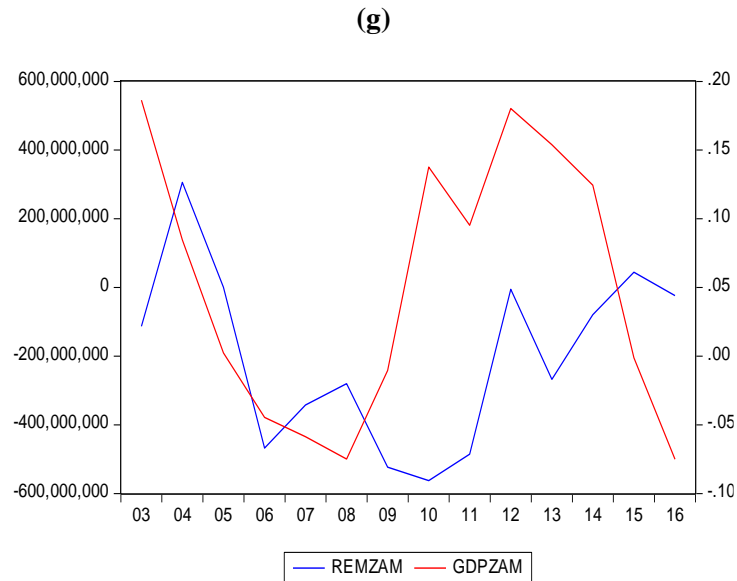
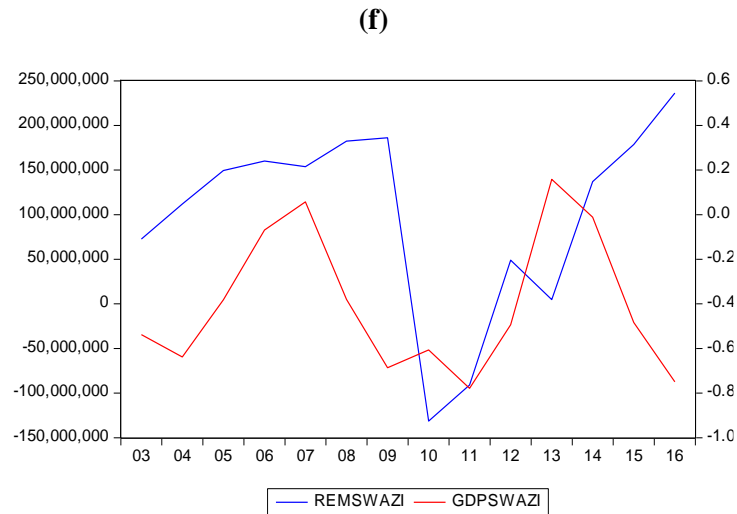


(d)



(e)





Source: Authors' computations

From Figure 12 (a – g) illustrated above, cyclical flows of remittances are evident in the region which are generally smooth with spikes here and there. However, it is not evident as to whether the cyclical behavior is pro or counter cyclical. To get further insight into this, cross correlation tests were then applied.

5.2.9 Cross correlation tests

As mentioned, whether there was pro or counter cyclical behavior was not evident from just observing the figures above. This is important to help know if remittances could counter

recessions. Therefore cross correlation tests of the cyclical components of remittance inflows and real GDP of the respective countries were applied. This particular test was done as opposed to just graphic illustrations to get some figures to substantiate the findings. The results of the tests are presented in Tables 10-16.

Table 10: Correlation tests between the cyclical components of remittance and GDP in Botswana.

I	REMBOTS,GDPBOTS(-i) - lag	REMBOTS,GDPBOTS(+i) - lead
0	0.268	0.268
1	0.064	0.411
2	0.005	0.187
3	-0.056	-0.171
4	-0.118	-0.680

Source: Authors' computations.

As illustrated in Table 10, at period zero, there is the same degree of correlation (0.268). As the years go by, the degrees of correlation vary. However, as the signs in corresponding periods are the same, it can be concluded that there is pro cyclicality present and that remittances cannot be used to counter recessions as the lag values are all smaller than the lead values.

Table 11: Correlation between the cyclical components of remittance and GDP in Lesotho.

I	REMLES,GDPLES(-i) - lag	REMLES,GDPLES(+i) - lead
0	0.094	0.094
1	-0.164	0.170
2	-0.398	0.038
3	-0.066	0.041
4	0.410	0.172

Source: Authors' computations.

As is illustrated in Table 11, from period one to three the signs in corresponding periods differ. It can therefore be concluded that, counter cyclicality is present. After the first period, it is noticed that the lag values became greater than the lead values and given that counter cyclicality is generally observed it can be concluded that yes remittances could be used to counter recessions. However, the process and or transmission may take some time.

Table 12: Correlation tests between the cyclical components of remittance and GDP in Malawi.

I	REMMAL,GDPMAL(-i) - lag	REMMAL,GDPMAL(+i) - lead
0	-0.344	-0.344
1	-0.030	-0.497
2	0.430	-0.462
3	0.596	-0.250
4	0.513	0.063

Source: Authors' computations.

As illustrated in Table 12, there exists both pro and counter cyclicality though pro cyclicality is more dominant because as in most years, the signs are the same. Before counter cyclicality

is observed it is noticed that the lag value is lower than the lead value and at that point, believed remittances cannot be used to address recessions. However, counter cyclicalities take effect and after a period, noticed that the lag is greater than the lead for subsequent periods. Therefore, remittances could then counter recessions. However, this is short lived as pro cyclicalities take effect.

Table 13: Correlation tests between the cyclical components of remittance and GDP in Mozambique

I	REMMOZ,GDPMOZ(-i) – lag	REMMOZ,GDPMOZ(+i) - lead
0	-0.089	-0.089
1	-0.463	-0.222
2	-0.396	-0.083
3	-0.060	0.279
4	0.134	0.310

Source: Authors' computations.

Table 13 generally reflects pro cyclicalities with only one period showing otherwise. Generally during the times of pro cyclicalities, the lag values are greater than the lead values. Therefore, remittances cannot be believed to be the remedy for a recession which is further highlighted in the last two periods as the lag values are lower than the lead values.

Table 14: Correlation tests between the cyclical components of remittance and GDP in South Africa.

I	REM RSA, GDPRSA(-i) - lag	REM RSA, GDPRSA(+i) - lead
0	0.421	0.421
1	0.574	0.229
2	0.373	-0.016
3	0.180	-0.296
4	-0.005	-0.315

Source: Authors' computations.

As is illustrated in Table 14, pro cyclicality is the general trend. However, it is noted that at the first instance of counter cyclicality, the lag value does exceed the lead value. Unfortunately, this is short lived and is followed by the lead being greater than the lag values which is then followed by pro cyclicality again. It can therefore be surmised that remittances here are not the best remedy for recessions.

Table 15: Correlation tests between the cyclical components of remittance and GDP in Swaziland.

I	REMSWAZI, GDPSWAZI(-i) – lag	REMSWAZI, GDPSWAZI(+i) - lead
0	0.126	0.126
1	0.499	0.045
2	0.540	-0.337
3	-0.027	-0.539
4	-0.487	-0.171

Source: Authors' computations.

As can be inferred from Table 15, pro cyclicality is very evident with only one period showing otherwise. It is also noticed that a majority of the lag (current) values are greater than the lead (future) values. However, given the dominance of pro cyclicality, the likelihood of remittances remedying recessions is very low.

Table 16: Correlation tests between the cyclical components of remittance and GDP in Zambia.

I	REMZAM, GDPZAM(-i) - lag	REMZAM, GDPZAM(+i) - lead
0	0.117	0.117
1	0.519	-0.281
2	0.606	-0.390
3	0.324	-0.583
4	0.254	-0.597

Source: Authors' computations.

As illustrated in Table 16, counter cyclicality is evident with four of the five periods reflecting it. From period one to two, the lag values are greater than the lead values but that then changes from the third period. It can therefore be inferred that remittances could be a remedy for recessions especially in the short run and it could spill over to longer periods if channeled appropriately.

As a majority of the countries show, pro cyclicality seems to be prominent. This finding similar to that of Giuliano and Ruiz-Arranz (2005), who concluded that remittances were more pro-cyclical in countries with shallower financial systems as is the general situation in Southern African. However, there are several periods of counter cyclicality that make it hard to out-rightly conclude pro cyclicality as being the definite trend. It is also noted that due to the pro cyclical nature and magnitude of the cross correlation values, remittances may not be

a definite solution to counter recessions. But it might also take a while to affect growth or development with them as the relationship could be through other transmissions and not be direct.

Chapter 6 Conclusion and recommendations

6.1 Introduction

This chapter concludes the study with reference to the literature reviewed. It further goes on to give recommendations and alludes to other perspectives that could be looked at to further the study.

6.2 Summary of the study and conclusion

The main objective of the study was to analyze select macroeconomic determinants of Remittances in Southern Africa. The macroeconomic determinants used included: remittances themselves, the inflation rate, GDP growth rate, the nominal exchange rate, broad money and age dependency ratio. To get a more holistic perspective while analyzing macroeconomic determinants of remittances, volatility and cyclicity characteristics and or behavioral patterns of remittances were analyzed. In this regard, it is believed that better insight was obtained around the phenomenon of interest.

The unit root tests were first estimated and it was found that all the variables apart from LNAGED became stationary at first difference at 5% level of significance and are therefore of order of integration one. As aforementioned, LNAGED was the only variable that did not become stationary at first difference but rather at second difference and is therefore of order of integration two. Thereafter, a stability check was estimated to check the stability of the variables to be used in the model. As all the dots (roots) were within the circle it was concluded that the variables to be used in the model were stable and satisfied the stability condition. The Residual Serial Correlation LM test was estimated as another diagnostic test to ensure the validity of the overall model to be estimated, which led to the conclusion that suitable estimates could be made.

Several panel co-integration tests were estimated to observe whether there was any long run association or relationship among the variables. As a majority of the tests could not reject the null hypothesis, the study concluded that there was no cointegration and therefore, there was no long run relationship or association between the variables. After the cointegration test was applied, both the fixed and random effects model was estimated. After which, the Hausman test was applied to pick which of the two aforementioned tests would be appropriate to use. The result of the Hausman test showed that the Random effect estimators were appropriate. Therefore, it is from the random effects estimators that inferences were made. This was done in accordance with the main objective of analyzing macroeconomic determinants in the region.

From the estimation results, the only significant variables were GDP growth and the exchange rate which represented changes/improvements in the home countries economic environment and costs of remitting respectively. The results imply that, the inflation rate (mere economic environmental conditions), previous remitting behavior, the dependency ratio (dependency) and broad money (market sophistication) do not influence the receiving of remittances in the selected Southern African countries. These results were not expected as it would be expected that a poor economic environment (which one would argue has been prevalent in the region) will see remittances flow into the economy as migrants try to support those left behind (of course this is also dependent on the fact that migrants left family behind) and otherwise. However, as changes/improvements in the economic environment is significant, the economic environment of the home country relative to the host country could play a vital role in the home countries as the changes reflect to an extent the economic environment. After the model estimation, one more diagnostic test was applied to see if the aforementioned issues from the estimation results would be problematic. The study

concluded that the estimates found were valid and suitable to make inferences from as the diagnostic tests revealed no issues.

The check for volatility using the standard deviation measures – for its simplicity was done. It was concluded that there existed low volatility in remittance inflows. This was very evidently reflected in the values of the standard deviations, with the highest being 1.784. Whereas, to analyze for cyclical behavior, the Hodrick Prescott (HP) filter was used with detrended series of remittance inflows generated as were detrended series of Real GDP flows. Cyclical flows of remittances were evident in the region, which were generally smooth with spikes here and there. However, it was not evident as to whether the cyclical behavior was pro or counter cyclical. To get further insight into this, cross correlation tests were then applied. It was found that a majority of the countries prominently exhibited, pro cyclical behavior. However, there were several periods of counter cyclical behavior that made it hard to out-rightly conclude pro cyclical behavior as being the definite trend as was the case with the HP filter test. Due to the pro cyclical nature and magnitude of the cross correlation values remittances may not be a definite solution to counter recessions but as Larney (2016) asserted, this does not diminish their importance as there may be other transmissions that are not direct that would counter recessions or spur growth.

6.3 Recommendations

As pro cyclical behavior seems to be prominent with some periods of counter cyclical behavior it is hard to out-rightly conclude pro cyclical behavior as being the definite trend. However, as aforementioned, due to the pro cyclical nature and magnitude of the cross correlation values remittances may not be a definite solution to counter recessions but that it may also take a while to affect growth or development as the relationship may be indirect.

However, there is tremendous potential for using remittances to encourage development in countries and more so in the region since a lot of migration is within the region coupled with the relative substantial amount that remittances make up in comparison to the gross domestic product (GDP) in some countries like Lesotho (approximately 30%). Policy makers may be more concerned with what happens in their respective countries as opposed to regional levels. But today's integrated society, given integration objectives, subjects policy makers to look beyond their own countries and work together and or have some form of standard or benchmark. Therefore, even with different economic and financial levels across countries in the region, recommendations can be made across and targets set to be achieved to make the most of remittance inflows.

It is recommended that a balance between a regulatory regime that minimizes issues like money laundering and general financial abuse, and one that facilitates the flow of remittances is struck. Informal channels (which as aforementioned seem prevalent in the region) are generally used as a means to transfer remittances as they are cheaper and better suited to transferring funds to remote areas where formal channels do not operate, and offer the advantage of the native language. Informal channels, however, can be subject to abuse. Strengthening the formal remittance infrastructure by offering the advantages of low cost, expanded reach, and language can shift flows from the informal to the formal sector and both sender and recipient countries could support migrants' access to banking by providing them with identification tools.

Secondly, exorbitant fees in the region as aforementioned (the region has some of the highest costs of sending remittances for example in the third quarter of 2015 it cost about 19% of U.S. \$200 to send remittances from South Africa to Zambia and 17.4% from South Africa to Botswana; whereas in comparison to other developing countries out of Africa, it cost 6.70%

from Brazil to Bolivia and 4.4% from Chile to Peru), charged by money transfer agents are a drain on hard-earned remittances. The aforementioned further reiterated by the findings of a positive and significant relationship between remittance inflows and the nominal exchange rate. These fees especially affect the poor. It is difficult to see why remittance fees should be so high, and why they should increase when the amount of transfer increases. It appears that the regulatory framework is flawed. Fixing this problem would involve policy coordination in both source and destination countries. Facilitating remittance flows would require using the existing financial infrastructure, such as postal savings banks, commercial banks, or microfinance institutions in rural areas. Also, given that the average cost declines as remittances increase, there may be scope for policy measures that alleviate cash constraints and enable migrants to send larger amounts of funds (though less frequently), thereby saving on remittance costs.

Furthermore, reliable data on remittances are key to understanding the impact of development, yet available data leaves much to be desired. Informal remittances are large and unknown. But even recorded data are also incomplete. A major effort will be necessary to improve data on remittances. This effort would have to go beyond simply gathering information. It would require investigating the relationship between migration stock and remittance flows, migrant workers' remittance behavior in major remittance-source countries, and the way remittances respond to changes in the source and destination economies.

Last but not least, a majority of developing countries offer tax incentives to attract remittances and tap into the Diaspora. The side effect of such incentives, of course, is that remittances may then be used for tax evasion and money laundering. However, by tapping into the Diaspora (migrants with an affinity for their homelands) - who are investing in their

homelands with only “pure” intentions (by assumption) - it is recommended that diaspora resources be mobilized. A few African countries have established government agencies to encourage Diasporas to invest, assist local communities, and provide policy advice and or have improved the engagement to their embassies abroad with the diaspora community. In particular, investment promotion agencies in Ethiopia, Ghana, Nigeria and Uganda have started to target diaspora potential investors providing them with information and linkage opportunities. The African Diaspora Program which was launched by the World Bank in 2007 is an example of an approach or framework to adopt to utilize the Diaspora.

6.4 Further research

Learning more about the best ways to capture and make use of remittances would require reconsidering how financial inflows are received in countries. In addition, policymakers would need much more research on how to use remittances so they positively contribute to migrants’ home communities and countries. The study could therefore be extended in several ways. Firstly, by applying a structural VAR model in order to resolve the issue of causality involved with the potential endogeneity between the variables. Secondly, a key issue that has received little attention in the existing literature on the effects of home income shocks on remittances is whether the increased remittances comes from existing migrants or is a result of increased migration due to income shocks at home particularly in southern Africa – is another perspective that can be looked at to further this paper. Thirdly, transmission perspectives of how remittances can be translated to boost growth could be looked at as their pro-cyclical nature might not make them the best tool on their own as a counter to recessions.

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Appendix A.

List of variables and countries used for the analysis

VARIABLE	DESCRIPTION	SOURCE
Remittances	Personal remittances, received (% of GDP)	World Bank Development Indicator (World Bank)
GDP Growth	GDP growth (annual %)	World Bank Development Indicator (World Bank)
Inflation	Inflation, GDP deflator (annual %)	World Bank Development Indicator (World Bank)
Nominal exchange rate	National Currency per US Dollar, End of Period	International Financial Statistics (International Monetary Fund – IMF)
Broad money	Broad money (% of GDP)	World Bank Development Indicator (World Bank)
Age dependency ratio	Age dependency ratio (% of working-age population)	World Bank Development Indicator (World Bank)

***Countries in the sample include**

Botswana, Lesotho, Malawi, Mozambique, South Africa, Swaziland and Zambia.

Appendix B.

Test output tables

Auto LM test

VAR Residual Serial Correlation LM Tests

Null Hypothesis: no serial correlation at lag
order h

Date: 03/01/18 Time: 21:52

Sample: 2003 2016

Included observations: 81

Lags	LM-Stat	Prob
1	26.16941	0.8857
2	25.05144	0.9146
3	45.93378	0.1241
4	28.30084	0.8163
5	35.12101	0.5102
6	31.60259	0.6778
7	43.89404	0.1718
8	33.52278	0.5870
9	21.02667	0.9779
10	41.12603	0.2561
11	31.79612	0.6688
12	37.84576	0.3850

Probs from chi-square with 36 df.

Residual cross-section dependence test

Residual Cross-Section Dependence Test

Null hypothesis: No cross-section dependence (correlation) in residuals

Equation: Untitled

Periods included: 12

Cross-sections included: 7

Total panel (unbalanced) observations: 82

Note: non-zero cross-section means detected in data

Test employs centered correlations computed from pairwise samples

Test	Statistic	d.f.	Prob.
Breusch-Pagan LM	20.25376	21	0.5052
Pesaran scaled LM	-1.195270		0.2320
Pesaran CD	0.831435		0.4057