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THE IMPACT OF REMITTANCES ON ECONOMIC GROWTH: EMPIRICAL EVIDENCE FROM SOUTH AFRICA¹

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THE IMPACT OF REMITTANCES ON ECONOMIC GROWTH: EMPIRICAL EVIDENCE FROM SOUTH AFRICA

Sheilla Nyasha² & Nicholas M. Odhiambo

Abstract

In this paper, we have empirically examined the impact of remittances on economic growth in South Africa over the period from 1970-2019. The study was motivated by the conflicting empirical findings that have emerged in the literature on the impact of remittance on economic growth in various countries. The study was also motivated by the need to find an empirical backing on the assertion that remittances are good for economic growth and can play a key role in lowering the inequality levels in developing countries. Using the autoregressive distributed lag (ARDL) bounds testing approach, the empirical results, contrary to expectations, have revealed that in South Africa, remittances have a negative impact on economic growth, irrespective of whether the regression analysis is conducted in the long run, or in the short run. The study, therefore, cautions policy makers when it comes to policies related to harnessing remittances for economic growth. The study argues that it is not only remittance inflows that matter, but also how the remittances are utilised to influence economic growth.

Keywords: Remittances; Economic Growth; South Africa

1. Introduction

South Africa has been struggling consistently with sustained low GDP growth rates since the global financial crisis of 2008. Even before the crisis, the growth rates were unstable, ranging between 5% and -2%, with a few outliers with growth rates of 7% (World Bank, 2019). As way of reducing unemployment, poverty and inequality levels and grow the economy inclusively, a number of policies and initiatives have been introduced in South Africa. Among such policies is the National Development Plan (NDP) introduced in 2011 (The National Planning Commission, 2011). The NDP mapped the growth path of South Africa until 2030, where economic growth is

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expected to grow by 5% per annum and where domestic investment as a ratio of GDP should be 30%.

To revive the NDP, the new South African President introduced Job and Investment Summits in 2018. The country also sent delegates on road shows overseas to attract foreign direct investment (FDI). All these efforts were towards growing the economy. Surprisingly, no attention was given to the role that remittances can play in achieving the national objective, given that the inflows had dramatically increased in the recent past. According to Ratha (2012), remittances are second to FDI but unlike FDI that succumbs to economic challenges, remittances are resilient to economic crises and they remain an important source of external financing for developing countries. Although remittances refer to inflows and outflows, in this study, unless specified, remittances refer to inflows.

Turning to empirical literature on the impact of remittances on economic growth could not offer much help in the case of South Africa because to the best of our knowledge, no study has been done on the impact of remittances on economic growth in South Africa despite the increasing importance of remittances worldwide and the increased flows into Africa and South Africa in the recent past. If there are studies that provided coverage on South Africa, the coverage was indirect as the studies focused on remittances and economic growth in Africa (see Fayissa and Nsiah, 2010; Nwaogu and Ryan, 2015).

Although a number of studies have been conducted on the role of remittance in African countries, very few studies have been conducted on the dynamic relationship between remittance and economic using modern time-series techniques (see, for example, Asongu and Odhiambo, 2020; Asongu *et al.*, 2019; Efobi *et al.*, 2019; and Asongu *et al.*, 2018).

Moreover, among the studies on the impact of remittances on economic growth done in Africa and elsewhere, the results have been conflicting – with some studies supporting the positive impact of remittances on economic growth (Fayissa and Nsiah, 2010; Yaseen, 2012; Goschin, 2014; Matuzeviciute and Butkus, 2016; Meyer and Shera, 2017; Olayungbo and Quadri (2019; Sutradhar, 2020), and some providing evidence of a negative impact of remittances on economic growth (see Chami *et al.*, 2005; Lipton, 1980; Ahlburg, 1991; Brown and Ahlburg, 1991; Jongwanich and Kohpaiboon, 2019;), while other studies concluded that remittances have no significant impact on economic growth (see Lim and Simmons, 2015; Jouini, 2015; Feeny *et al.*, 2014).

The inconsistency in the literature on the impact of remittances on economic growth and the non-availability of studies done on South Africa on the subject, on the one hand, and the urgent need by South Africa to find a lasting solution to chronic low levels of economic growth, on the other hand, makes this study important.

Against this backdrop, the objective of this study is to empirically examine the long-run and short-run impact of remittances on economic growth in South Africa during the period from 1970 to 2019. The study used the autoregressive distributed lag (ARDL) bounds testing approach to examine this linkage. This method is preferred to conventional methods as it is easier to compute with one equation yet it gives robust results even if some of the variables are endogenous. The paper is organised into five sections, where Section 2 analyses the dynamics of remittances and economic growth in South Africa; Section 3 reviews the literature on remittances and economic growth; Section 4 presents the estimation and empirical analysis techniques; and Section 5 provides the conclusion.

2. Remittances and Economic Growth Dynamics in South Africa

Remittances into South Africa have always been overshadowed by remittances from South Africa to other countries. As such when a discussion of remittances in South Africa occurs it is usually domestic remittances or remittance outflows. This notion is understandable since South Africa is the most developed country in Africa and has better opportunities than its African counterparts. The country is deemed 'by far' Africa's richest and most advanced country, according to AfrAsia Bank (2017). Its financial sector – both financial intermediaries and the financial markets – has no match in Africa; it competes with the top developed countries. Therefore, because of its opportunities, South Africa is home to a number of immigrants, with 75% of them originating from Africa (Statistics South Africa, 2016). Thus, the default topical issue on remittances becomes outflows rather than inflows.

Of late, the South African economy has been struggling to sustain a decent level of economic growth. The economy has not fully recovered from the aftermath of the global financial crisis of 2008; hence, economic growth rates have been consistently low while the unemployment rate has been consistently high for some time now – currently sitting at 1.4% and 27.1%, respectively, quarter-on-quarter, in the last quarter of 2018 (Statistics South Africa, 2019). Given the deteriorating economic fundamentals, coupled with heightened crime and corruption, South

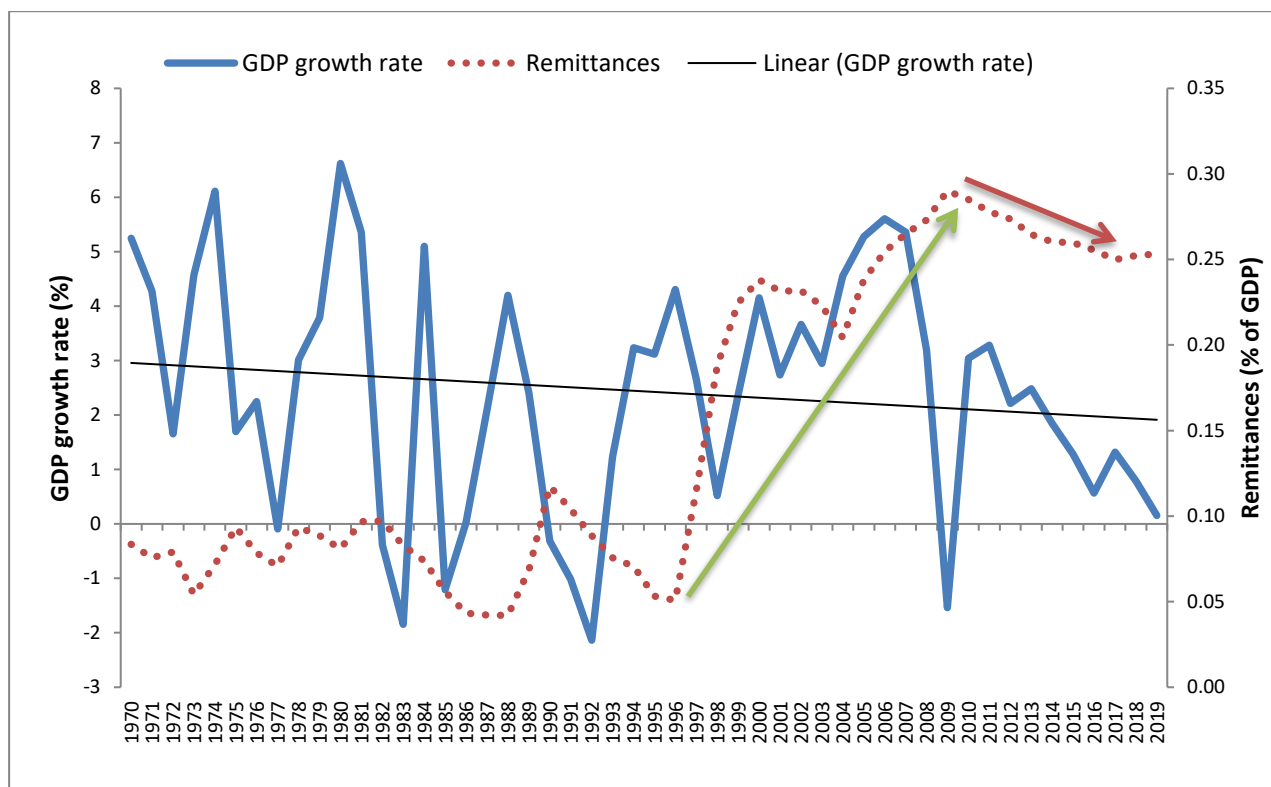
Africans are slowly finding other countries better destinations to raise their families. These destinations are New Zealand and Australia, among others.

From 1998, remittances to South Africa began their ascent, as more and more South Africans emigrated, from US\$258.6million, equivalent to 0.2% of GDP, to a peak of US\$1.2 billion, equating to 3% of GDP, 2011 (World Bank, 2020). Thereafter, the remittance inflows declined gradually to US\$755.4 million in 2016, before a mild recovery to US\$873.2 million in 2017.

The movement in remittance and economic growth appeared to be in tandem since the late 1990s. Between 1998 and 2011, both variables trended upward, only to follow the same downward trend between 2011 and 2019. Whether this trend was coincidental or there exists an underlying relationship remains to be tested.

From the economic growth front, South Africa's economic growth rate from 1970 to 2019 averaged 2.5% per annum, with the 1970s and the 2000s recording the highest average GDP growth rate of 3.3% and 3.6%, respectively. While the 1980s and the 2010's posted average growth rates of 2.2% and 2.0%, respectively, the 1990s was the worst performing decade with an average GDP growth rate of 1.4% (World Bank, 2020). Figure 1 tracks the performance and growth of the South African economy as measured by the annual growth rate of GDP and remittances as proxied by remittance inflow as a percentage of GDP during the 1970-2019 period.

Figure 1: Remittance and economic growth trends in South Africa (1970-2019)



Source: World Bank (2020)

Figure 1 reveals that overall the GDP growth rate for South Africa during the review period was unstable. Although the years from 1998 to 2007 experienced buoyant growth, they could not reverse the overall downward trend for the whole period, as indicated by the GDP growth rate trend line.

3. Literature Review

According to Fagerheim (2015), the level of remittance flows depends on migrants' ability to remit, their motivation and willingness. While a migrant's income level and saving capacity determines the ability to remit, the duration of migration and the family situation both at home and in the country of destination play a significant role in determining the motivation and willingness to remit.

The remittance corridor also has an effect on the level of remittance flows into the country (see Carling, 2008; Fagerheim, 2015; Pllana and Tmava, 2020). The cheaper and less regulated the corridor is, the higher the remittance flows as it becomes relatively easier to remit.

In the event that a remittance corridor is expensive and regulation laden, migrants usually use informal channels to remit. These informal channels usually involve sending money with relatives going home or with a bus driver in the case where remittance sending and receiving countries are bordering each other. Unfortunately, informal remittances go unrecorded. Remittances sent through informal channels are termed informal remittances while those sent through formal and well regulated channels are called formal remittances. Remittances can also be domestic or cross-border or international. The former is when remittance sender and recipient reside in the same country but in physically distanced areas and the latter is when the remitter and the recipient are in different countries. In this study, focus is on formal cross-border remittances.

Theoretically, remittances are good for economic growth. They boost economic activities in various ways. They act as a source of funds for investment financing (Catrinescu *et al.*, 2009). Even if they are used for consumption purposes, the multiplier effect on aggregate demand boosts the economy (see Pradhan *et al.*, 2008; Pillana and Tmava, 2020, among others). Stimulation of aggregate demand may also create employment; hence, theoretical literature views remittances as an avenue for employment creation (Organisation for Economic Co-operation and Development “OECD”, 2019). Another way remittances can positively impact the economic growth of a nation is through human capital investment – where remittances are used for health and education, which results in increased levels and quality of human capital in a remittance receiving country (see Barajas *et al.*, 2009). Further, Barajas *et al.* (2009) argues that as remittances are channelled to health and education, in the long run the recipient country will have a more skilled and healthier labour force.

Although it is commonly agreed that remittances have a positive impact on economic growth, Barajas *et al.* (2009) add a condition under which the former may have a detrimental effect on the latter. According to their argument, the more highly integrated an economy is with world financial markets and the more highly developed the domestic financial system, the less likely it is that remittance receipts will stimulate investment. Fayissa and Nsiah (2008) also presented their argument corroborating Barajas *et al.*’s condition, though in reverse. They claimed that remittances boost economic growth in countries where the financial systems are less developed by providing an alternative way to finance investment and help overcome liquidity constraints.

A review of empirical literature reveals that the impact of remittances on economic growth is not as obvious as commonly thought. Mixed results have been found by various studies. While the

most common result is consistent with remittance-economic growth theory, revealing the positive impact remittances have on economic growth, other studies, though just a handful, found the impact to be negative. Besides these two categories, there is also a section of literature that sees the impact of remittances on economic growth as insignificant.

Various channels through which remittances can translate to economic growth have been explored. Among them is the view by Fayissa and Nsiah (2010) that remittances positively impact economic growth by providing an alternative way to finance investment and help to overcome liquidity constraints. On the other hand, Stahl and Arnold (1986) and Goschin (2014) argue that the use of remittances for consumption has a positive effect on growth because of their possible multiplier effect. Others also argue the improvement in the wellbeing of a society due to import exposure enabled by remittances (see Rahman and Mustafa, 2010).

The positive impact of remittances on economic growth finds support from a number of studies. Pradan *et al.* (2008) investigated the effect of workers' remittances on economic growth in a sample of 39 developing countries using panel data from 1980-2004. The empirical results showed that remittances have a positive impact on economic growth.

Fayissa and Nsiah (2010) explored the aggregate impact of remittances on economic growth within the conventional neoclassical growth framework using panel data spanning from 1980 to 2004 for 36 African countries. Remittances were found to positively impact economic growth by providing an alternative way to finance investment and helping to overcome liquidity constraints.

Yaseen (2012) empirically assessed the impact of remittances on economic growth, using panel data set of nine MENA countries – Algeria, Egypt, Jordan, Libya, Morocco, Oman, Syria, Lebanon and Tunisia – during the period 2000-2010. Results indicated that remittances are positively and significantly correlated with economic growth. Cooray (2012), in the case of South Asia during the period from 1970 to 2008, incorporated migrant remittances among other variables into a growth model, and employed panel data to investigate the impact of migrant remittances on economic growth. Migrant remittances were found to have a significant positive effect on economic growth.

Barguelli *et al.* (2013) used a modified version of Giuliano and Ruiz-Arranz (2009) and panel data from 1990 to 2006 for two groups of countries to examine the impact of remittances on economic growth. The first group of countries consisted of the largest remittances-recipient

countries in terms of remittances to GDP ratio while the second consisted of countries recipient of the largest remittances in amounts. The results of the study revealed that remittances have direct and indirect effects on economic growth but only for the first group of countries.

Goschin (2014) used aggregate panel data covering ten countries in Central and Eastern Europe (CEE) over the 1995-2011 period; and they found a significant positive influence of remittances on both absolute and relative GDP growth in a panel of CEE countries. Imai *et al.* (2014), covering Asia and Pacific countries using 1980-2009 panel data, re-examined the effects of remittances on economic growth and found remittances to contribute to better economic performance.

Paranavithana (2014), incorporated workers' remittances among other variables into a growth model, and employed time-series annual data over the 1977-2012 period, in an attempt to empirically examine the impact of workers' remittances on economic growth in Sri Lanka. Using the vector error correction model, the results of the study indicated the existence of a positive direct and indirect relationship between workers' remittances and economic growth in the study country, in the long term.

Nwaogu and Ryan (2015) examined the relationship between remittances and economic growth in 53 African and 34 Latin American and Caribbean countries based on 1970-2009 data panel data analysis methods. They found a positive impact of remittances on economic growth. Mwangi and Mwenda (2015) set to empirically determinate the effect of international remittances on the economic growth in Kenya. Using time-series data for the 1993-2013 period, the results confirmed that in Kenya, international remittances have a positive impact on economic growth.

Matuzeviciute and Butkus (2016) empirically examined the impact of remittances on long-run economic growth using unbalanced panel data covering a sample of 116 countries with different development levels over the period 1990-2014. Although the impact was found to differ based on the country's economic development level and the abundance of remittances in the economy, the results showed that, in general, remittances have a positive impact on long-run economic growth in the study countries.

Majumder and Donghui (2016) examined the long-run impact of remittances on economic growth in Bangladesh during the period 1975-2013. Using the autoregressive distributed lag (ARDL) models, the findings of the study showed that there exists a statistically significant long

run positive relationship between remittance and economic growth in Bangladesh. Zafar *et al.* (2016) put the remittances-growth impact to the test in Pakistan. Using data stretching from 1985 to 2014 and Ordinary Least Square (OLS) method, the study found that there is a positive relationship between remittances and economic growth in Pakistan. An increase in remittances by 1% was found to cause a 6.68% growth in the economy.

Dastidar (2017) examined the empirical relationship between remittances and economic growth for a sample of 62 developing countries over the time period 1990-2014. The results of the study revealed that remittances seem to promote growth only in the ‘more open’ countries. It was concluded that remittances are in themselves not sufficient for growth but the extent of their benefit depends on domestic institutions and macroeconomic environment in the receiving country. Unlike the ‘less open’ countries, ‘more open’ countries have better institutions and better financial markets to take advantage of the remittances income and direct them into profitable investments which, in turn, accelerates the rate of economic growth in these countries.

Meyer and Shera (2017), aimed to observe the impacts of remittances on economic growth, using panel data set of six high remittances receiving countries – Albania, Bulgaria, Macedonia, Moldova, Romania and Bosnia Herzegovina – during the period 1999 - 2013. The results suggested that remittances have a positive impact on economic growth and that this impact increases at higher levels of remittances relative to GDP.

Abduvaliev and Bustillo (2019) empirically assessed the impact of remittances on economic growth and poverty reduction in 10 post-Soviet states using a panel data and found that remittances have a positive impact on economic growth. On average, a 1% increase in remittance was found induce a 0.25% rise in per capita GDP and a 2% decline in poverty severity.

Jongwanich and Kohpaiboon (2019) empirically assessed the impact of remittances on economic growth during the period from 1993 to 2013, using developing countries in Asia and the Pacific as a case study. The results of the study revealed that remittances have a positive impact on economic growth in economies where the ratio of remittances to GDP is less than 10%.

Olayungbo and Quadri (2019) investigated the relationship among remittances, financial development and economic growth in a panel of 20 sub-Saharan African countries over the period from 2000 to 2015. Using both Pooled Mean Group and Mean Group/ARDL estimations,

remittances and financial development were found to have positive effects on economic growth both in the short and the long run.

Sutradhar (2020) investigated the impact of workers' remittances on economic growth in four South Asian emerging countries using balanced panel data from 1977 to 2016. The results of the study revealed that remittances have a positive impact on economic growth in India.

On the other hand, the negative impact of remittances on economic growth is supported by studies done by, among others, Chami *et al.* (2005) who found migrants' remittances to have a negative impact on economic growth. Lipton (1980), Ahlburg (1991) and Brown and Ahlburg (1991) argued that remittances undermine productivity and growth in low-income countries because they are readily spent on consumption and are more likely to be dominated by foreign goods than on productive investments.

Jongwanich and Kohpaiboon (2019) empirically assessed the impact of remittances on economic growth during the period from 1993 to 2013, using developing countries in Asia and the Pacific as a case study. The results of the study revealed that remittances have a negative impact on economic growth in economies where the ratio of remittances to GDP 10% or higher.

Sutradhar (2020) investigated the impact of workers' remittances on economic growth in four South Asian emerging countries using balanced panel data from 1977 to 2016. The results of the study revealed that remittances have a negative impact on economic growth in Bangladesh, Pakistan and Sri Lanka. The results further indicated a joint significant and negative impact of remittances on economic growth in four study countries.

Besides the two views discussed, there is the third view, which sees no significant impact of remittances on economic growth. This view is consistent with studies by Lim and Simmons (2015), using 1990-2012 data from the Caribbean Community; Jouini (2015) in Tunisia during the period from 1970 to 2010 using ARDL cointegration techniques; and Feeny *et al.* (2014) based on 1971-2010 data from 136 developing countries.

Although the empirical literature on the impact of remittances on economic growth is mixed, the scale tilts in favour of the positive impact of the former on the latter. Panel data based studies also seem to be more prevalent than time-series based studies. Table 1 summaries the empirical literature reviewed in this study.

Table 1: A Summary of Studies on the Impact of Remittances on Economic Growth

Author	Region/Country of study	Data Type Used	Findings
Pradan <i>et al.</i> (2008)	39 developing countries	Panel	Positive
Fayissa and Nsiah (2010)	36 African countries	Panel	Positive
Yaseen (2012)	Nine countries	Panel	Positive
Cooray (2012)	South Asia	Time-series	Positive
Barguelli <i>et al.</i> (2013)	Two groups of countries	Panel	Positive
Goschin (2014)	Ten countries in Central and Eastern Europe (CEE)	Panel	Positive
Imai <i>et al.</i> (2014)	Asia and Pacific countries	Panel	Positive
Paranavithana (2014)	Sri Lanka	Time-series	Positive
Nwaogu and Ryan (2015)	53 African, 34 Latin American and Caribbean countries	Panel	Positive
Mwangi and Mwenda (2015)	Kenya	Time-series	Positive
Matuzeviciute and Butkus (2016)	116 countries	Unbalanced panel	Positive
Majumder and Donghui (2016)	Bangladesh	Time-series	Positive
Zafar <i>et al.</i> (2016)	Pakistan	Time-series	Positive
Dastidar (2017)	62 developing countries	Panel	Positive
Meyer and Shera (2017)	Six high remittances receiving countries	Panel	Positive
Abduvaliev and Bustillo (2019)	10 post-Soviet states	Panel	Positive
Jongwanich and Kohpaiboon (2019)	developing countries in Asia and the Pacific	Panel	Positive In economies where the ratio of remittances to GDP is less than 10%.
Olayungbo and Quadri (2019)	20 sub-Saharan African countries	Panel	Positive
Sutradhar (2020)	four South Asian emerging countries	Panel	Positive In India
Lipton (1980)			Negative
Ahlburg (1991)	Tonga and Western Samoa	Survey	Negative

Author	Region/Country of study	Data Type Used	Findings
Brown and Ahlburg (1991)	Pacific region - Tonga and Samoa	Survey	Negative
Chami <i>et al</i> (2005)	113 countries	Panel	Negative
Jongwanich and Kohpaiboon (2019)	developing countries in Asia and the Pacific	Panel	Negative In economies where the ratio of remittances to GDP is 10% or higher
Sutradhar (2020)	four South Asian emerging countries	Panel	Negative In Bangladesh, Pakistan and Sri Lanka
Feeny <i>et al.</i> (2014)	136 developing countries	Panel	Neutral
Jouini (2015)	Tunisia	Time-series	Neutral
Lim and Simmons (2015)	Caribbean Community	Survey	Neutral

4. Estimation and Empirical Analysis Techniques

4.1 Approach Adopted

The objective of this study is to empirically assess the impact of remittances on economic growth in South Africa during the period from 1970 to 2019. The study was driven by the conflicting empirical findings that have emerged in the literature on the impact of remittance on economic growth, on the one hand, and the need to find an empirical backing on the assertion that remittances are good for economic growth in South Africa, on the other hand. In an effort to achieve the study objective, the autoregressive distributed lag (ARDL) bounds testing approach was utilised (see Pesaran and Shin, 1999; Pesaran *et al.*, 2001).

This method was found to be the most suitable for the study given the numerous advantages it has over the conventional approaches, such as the residual-based technique by Engle and Granger (1987) and the Full-Maximum Likelihood (FML) test by Johansen (1988) and Johansen and Juselius (1990). The ARDL-bounds testing approach does not impose the restrictive assumption that all the variables under study must be integrated of the same order. It normally provides unbiased estimates of the long-run model and valid t-statistics even when some of the regressors are endogenous (Odhiambo, 2008; Nyasha and Odhiambo 2018). Unlike the conventional cointegration methods that estimate the long-run relationships within a context of a system of equations, this procedure utilises only a single reduced-form equation, (see also Nyasha and Odhiambo, 2020); and has superior small sample properties, making it appropriate even when the sample size is small. Therefore, the ARDL approach is considered to be suitable

for analysing the underlying relationship in this study. The method has also gained traction among researchers in recent years.

4.2 Empirical Model Specification

In this study, while economic growth is approximated by the annual growth rate of real GDP, remittances are proxied by the ratio of remittance inflows to GDP. This is a commonly used measure of remittances as it takes cognisance of country size and is more stable than remittance inflows in US dollars or local currency (see Meyer and Shera, 2017). The coefficient of remittances is expected to be positive.

To fully specify the model and control for the effects of other key variables that affect economic growth, six control variables are added to the remittance-growth model. These are financial development, domestic investment, domestic savings, household consumption, trade openness and inflation rate. Their selection was purely based on economic theory that acknowledges their impact on economic growth and emerging empirical evidence supporting the theory (see Shaw, 1973; McKinnon, 1973; Ang and McKibbin, 2007; Abu-Bader and Abu-Qarn, 2008).

Financial development is proxied by domestic credit to the private sector by banks as a percentage of GDP. As the financial sector develops, the economy is expected to grow; hence its impact on economic growth is expected to be positive. Domestic investment is measured by gross domestic investment as a percentage of GDP. It reflects the level of domestic investment taking place in an economy. The a priori expectation is positive so is that of domestic savings, as proxied by gross domestic savings as a percentage of GDP.

Household final consumption expenditure as a ratio of GDP is used to proxy the level of household expenditure. The more the household spends, especially on durable goods, the more the economy expands – hence this variable is expected to have a positive impact on economic growth. While trade openness is expected to also have a positive impact on economic growth, inflation rate is expected to have a negative impact. The former is proxied by the sum of imports and exports as a ratio of GDP while the latter is approximated by annual percentage changes in consumer price index.

The ARDL-based model employed in this study to empirically assess the impact of remittances on economic growth, taking into account the explained variables, is expressed as (see Odhiambo, 2016):

$$\begin{aligned}
\Delta y_t = & \pi_0 + \sum_{i=1}^n \pi_{1i} \Delta y_{t-i} + \sum_{i=0}^n \pi_{2i} \Delta RE_{t-i} + \sum_{i=0}^n \pi_{3i} \Delta FD_{t-i} + \sum_{i=0}^n \pi_{4i} \Delta DI_{t-i} \\
& + \sum_{i=0}^n \pi_{5i} \Delta DS_{t-i} + \sum_{i=0}^n \pi_{6i} \Delta HC_{t-i} + \sum_{i=0}^n \pi_{7i} \Delta TO_{t-i} + \sum_{i=0}^n \pi_{8i} \Delta IN_{t-i} + \theta_1 y_{t-1} \\
& + \theta_2 RE_{t-1} + \theta_3 FD_{t-1} + \theta_4 DI_{t-1} + \theta_5 DS_{t-1} + \theta_6 HC_{t-1} + \theta_7 TO_{t-1} \\
& + \theta_8 IN_{t-1} + \mu_t \dots \dots \dots (1)
\end{aligned}$$

Where:

y = economic growth

RE = Remittances

FD = Financial development

DI = Domestic investment

DS = Domestic savings

TO = Trade openness

π_0 = constant;

π_1 - π_8 ; θ_1 - θ_8 = respective regression coefficients;

Δ = difference operator;

n = lag length; and

μ_t = white noise-error term

Following the ARDL model specified in equations (1) the associated error-correction model is specified as (see Odhiambo, 2013):

$$\begin{aligned}
\Delta y_t = & \pi_0 + \sum_{i=1}^n \pi_{1i} \Delta y_{t-i} + \sum_{i=0}^n \pi_{2i} \Delta RE_{t-i} + \sum_{i=0}^n \pi_{3i} \Delta FD_{t-i} + \sum_{i=0}^n \pi_{4i} \Delta DI_{t-i} \\
& + \sum_{i=0}^n \pi_{5i} \Delta DS_{t-i} + \sum_{i=0}^n \pi_{6i} \Delta HC_{t-i} + \sum_{i=0}^n \pi_{7i} \Delta TO_{t-i} + \sum_{i=0}^n \pi_{8i} \Delta IN_{t-i} \\
& + \phi_1 ECM_{t-1} + \mu_t \dots \dots \dots (2)
\end{aligned}$$

Where:

ECM = Error-correction term

$\emptyset$ = coefficient of the error-correction term

All other variables and characters are as described in equation 1.

4.3 Data Source

The annual time-series data, covering the period from 1970 to 2019, utilised in this study were sourced from World Bank Economic Indicators (World Bank, 2020).

4.4. Empirical Results

4.4.1 Stationarity Tests

Prior to the analysis all the variables in the model are subjected to two stationarity tests –the Phillips-Perron (PP) and the Dickey-Fuller Generalised Least Square (DF-GLS) unit root tests. While in conventional data analysis methods, stationarity tests are mandatory to eliminate spurious regressions, in this instance, stationarity tests are only important to ensure that the variables are integrated of either order zero or one or both but not higher than one – to fulfil the condition of the applicability of ARDL bounds testing approach to data analysis (see Nyasha and Odhiambo, 2015). Table 1 details the results of stationarity tests.

Table 2: Results of Stationarity Tests

Variable	Phillips-Perron (PP)		Dickey-Fuller Generalised Least Square (DF-GLS)	
	Without Trend		Without Trend	
	Variables in Levels	First Difference	Variables in Levels	First Difference
y	-2.641	-4.551***	-2.712	-4.712***
RE	-0.752	-4.221***	-1.035	-4.172***
FD	-1.261	-7.821***	-1.080	-7.863***
DI	-1.154	-4.551***	-1.459	-4.206***

DS	-1.224	-5.943***	-0.867	-5.424***
HC	-1.731	-6.109***	-1.628	-5.803***
TO	-2.042	-7.662***	-1.847	-6.727***
IN	-1.985	-7.300***	-1.677	-6.177***

Note: *** denotes stationarity at 1% significance level

Stationarity test results reported in Table 1 reveal that all the variables are stationary after first differencing – confirming the suitability of the chosen approach to data analysis. Therefore, the study proceeds to the testing of cointegration among the variables in the model using the ARDL bounds testing approach.

4.4.2 Bounds F-Test for Cointegration

In this section, the long-run relationship between the variables in the specified model is examined.

The null hypothesis of no cointegration, expressed as:

$$H_0: \theta_1 = \theta_2 = \theta_3 = \theta_4 = \theta_5 = \theta_6 = \theta_7 = \theta_8 = 0$$

is tested against the alternative hypothesis of cointegration, expressed as:

$$H_1: \theta_1 \neq \theta_2 \neq \theta_3 \neq \theta_4 \neq \theta_5 \neq \theta_6 \neq \theta_7 \neq \theta_8 \neq 0.$$

The calculated F-statistic is compared with Pesaran *et al.*'s (2001) critical values. Cointegration of variables is confirmed when the calculated F-statistic is above the upper bound level, leading to the rejection of the null hypothesis of no cointegration. Should the calculated F-statistic fall below the lower bound level, the null hypothesis of no cointegration cannot be rejected and it is concluded that the variables are not cointegrated. Results of the cointegration test may sometimes be conclusive. This happens only when the calculated F-statistic falls within the upper and the lower bound levels. The results of the bounds F-test for cointegration in this study are reported in Table 3.

Table 3: Bounds F-test for Cointegration

Dependent Variable	Function	F-statistic	Cointegration Status
y	F(y RE, FD, DI, DS, HC, TO, IN)	4.775***	Cointegrated

Asymptotic Critical Values						
Pesaran <i>et al.</i> (2001), p.300 Table CI(iii) Case III	1%		5%		10%	
	I(0)	I(1)	I(0)	I(1)	I(0)	I(1)
	2.96	4.26	2.32	3.50	2.03	3.13

Note: *** denotes statistical significance at 1% level

As shown in Table 3, cointegration results confirm the existence of a long-run equilibrium relationship among the variables in the model. This is confirmed by the computed F-statistic of 4.779 which is above the upper bound critical value of 4.26, at 1% significance level.

4.4.3 Coefficient Estimation

Following the establishment of cointegration among the variables, the study proceeds to coefficient estimation using the ARDL approach. Optimal lag length of ARDL(1,0,0,0,0,0,0) was selected based on Akaike information criterion (AIC). Table 4 reports the results of the selected model. Panel A of the table shows long-run coefficients while Panel B displays short-run coefficients.

Table 4: Empirical Results of the Estimated ARDL Model

Panel A: ARDL(1,0,0,0,0,0,0) – Estimated long-run coefficients [Dependent variable: real GDP growth rate (y)]		
Regressor	Coefficient	T-ratio
C	-17.257	-0.705
RE	-0.491**	-2.685
FD	0.402*	2.276

DI	-0.525***	-3.984
DS	0.563***	2.877
HC	0.264	0.736
TO	0.218***	3.372
IN	-0.437***	-2.897
Panel 2: ARDL(1,0,0,0,0,0,0) – Estimated short-run coefficients [Dependent variable: real GDP growth rate (Δy)]		
Regressor	Coefficient	T-ratio
ΔRE	-0.372***	-2.775
ΔFD	0.274**	2.235
ΔDI	-0.472***	-4.650
ΔDS	0.542**	2.658
ΔHC	0.207	0.698
ΔTO	0.223***	3.067
ΔIN	-0.301***	-3.441
ECM(-1)	-0.878***	-6.997
R-squared 0.736 F-statistic[Prob] 12.502 [0.000] SE of Regression 1.467 Akaike Info. Criterion -86.196		
R-bar-squared 0.690 DW statistic 2.215 Residual Sum of Squares 80.783 Schwartz Bayesian Criterion -96.443		

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

Surprisingly, the regression results reported in Table 4 reveal that the coefficient of remittances is negative and statistically significant at 5% and 1% levels in the long run and short run, respectively. These results imply that in South Africa, remittances are detrimental to economic growth, irrespective of whether analysis is done in the short run or in the long run. Although contrary to our expectations, the results are not unusual (see, Lipton, 1980; Brown and Ahlburg, 1991; Ahlburg, 1991; Chami *et al.*, 2005). A possible explanation for these results could be that most of the remittances to South Africa are used for household consumption purposes, especially of non-durable goods, rather than channelled to productive activities that will eventually have a positive impact on economic growth. This assertion could be correct as evidenced by household consumption that was found to have a statistically insignificant impact on economic growth both in the long run and in the short run. Another possible explanation by Barajas *et al* (2009) is that the more highly integrated an economy is with world financial markets and the more highly developed the domestic financial system, just like South Africa, the less likely it is that remittance receipts will stimulate investment by relaxing credit constraints. This is echoed by Fayissa and Nsiah (2008) who concluded that remittances boost growth in countries where the financial systems are less developed.

Other results show that financial development, domestic savings, and trade openness have a positive impact on economic growth, as expected – both in the long run and in the short run. The outcome that was expected as well was that of inflation, which came out negative – implying that inflation rate is negatively related to economic growth and any increases in the former will cause the latter to fall. The results also apply irrespective of the time horizon.

However, the results of two variables were unexpected. Household consumption was expected to have a positive impact on economic growth in the study country since it is the household final consumption expenditure that constitutes over 60% of GDP while domestic investment is just about 20% of GDP. Contrary to expectations, household consumption was found to be statistically insignificant in explaining economic growth in South Africa. Another unexpected outcome was registered by the domestic investment, which was expected to be positive but turned out to be consistently negative both in the long run and in the short run. Although these results were unexpected in this study, they are consistent with results of other previous studies (see Karim *et al.*, 2013, among others).

Nevertheless, the error-correction term was found to be negative and statistically significant as expected. This confirms the existence of a long-run equilibrium relationship among the variables in the model. As such, should there be a shock in the South African economy the equilibrium position will be attained again at a rate of 88.8%. The model was also well specified, as evidenced by R-squared of 0.728, implying that 72.8% of variation in the model is explained by the variables in the model.

The model was also subjected to a series of diagnostic tests on serial correlation, functional form, normality and heteroscedasticity. The results show that the model passed the relevant diagnostic tests. Table 5 summarises the results.

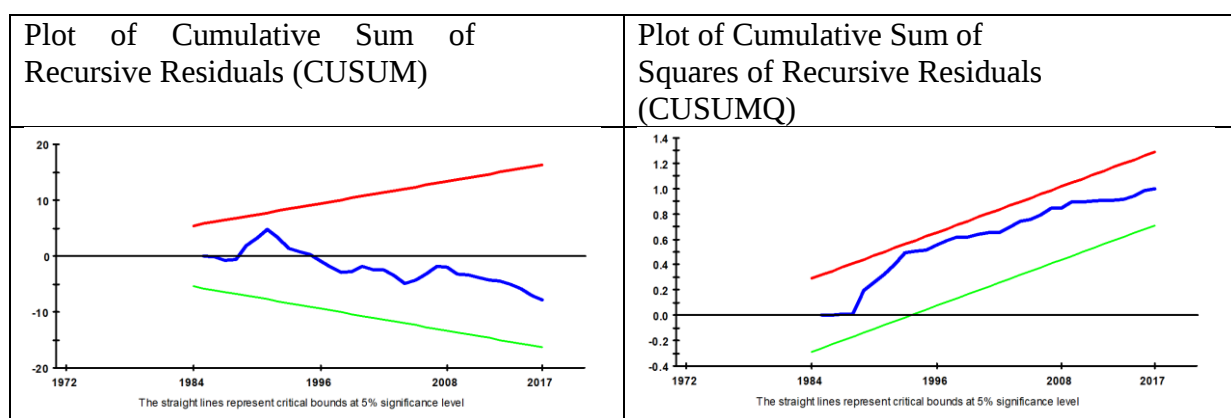
Table 5: Diagnostic Tests

LM Test Statistic	Results	Probability
Searial Correlation CHSQ(1)	0.986	0.330
Functional Form CHSQ(1)	0.101	0.650

Normality CHSQ(1)	3.761	0.260
Heteroscedasticity CHSQ(1)	2.341	0.126

As part of model diagnostics, Cumulative Sum of Recursive Residuals (CUSUM) and the Cumulative Sum of Squares of Recursive Residuals (CUSUMSQ) graphs were also used to analyse the stability of the model. The results are displayed in Figure 2, and they reveal that there is stability and that there is no systematic change identified in the coefficients at 5% significance level over the study period. Therefore, based on these graphs, it can be concluded that the parameters in this model are stable over the sample period.

Figure 2: Plot of CUSUM and CUSUMQ



5. Conclusion

In this study, the impact of remittances on economic growth in South Africa during the period from 1970 to 2019 was assessed. The ECM-based ARDL bounds testing approach was used to examine this linkage. The study was motivated by the conflicting empirical findings that have emerged in the literature on the impact of remittance on economic growth in various countries. The study was also motivated by the need to find an empirical backing on the assertion that remittances are good for economic growth and can play a role in lowering the inequality levels in South Africa. Contrary to expectations, the empirical results of this study revealed that remittances have a negative impact on economic growth in South Africa, irrespective of whether the regression analysis is conducted in the long run or in the short run. A possible explanation behind these results could be that remittances are channelled towards consumption of non-durable goods instead of being directed to the consumption of durable goods and to productive economic activities. The study, therefore, cautions policy makers when it comes to policies

related to harnessing remittances for economic growth. The study argues that it is not only remittance inflows that matter, but also how the remittances are utilised to influence economic growth. Though contrary to expectations, these findings are consistent with some previous studies such as those of Ahlburg (1991), Brown and Ahlburg (1991), and Chami *et al.* (2005), amongst others.

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