Volume 20 Issue 27
Originally issued as E4



Global Journal of HUMAN-SOCIAL SCIENCE: E
Economics
Volume 20 Issue 4 Version 1.0 Year 2020
Type: Double Blind Peer Reviewed International Research Journal
Publisher: Global Journals
Online ISSN: 2249-460x & Print ISSN: 0975-587X

# Exploring the Nexus between Migrant Remittances and Economic Growth: A Study of Senegal

By Samuel Maxime Coly & Pierre Mendy

*Cheikh Anta Diop University of Dakar*

*Summary-* In this study, we assess the relationship between migrant remittances and economic growth in Senegal. The analysis utilized on an econometric approach using the ARDL bound testing method as an estimation technique. The estimation period is from 1980 to 2018. Overall, the estimates show a negative relationship between remittances and economic growth and an insignificant effect in the long run, while the nexus between economic growth and investment is positive in the long term. This provides the prospect of a study on the analysis of the impact on the economic growth of reallocation of remittances from consumption needs to savings-investment purposes.

*Keywords:* *migrant remittances; economic growth; ARDL.*

*GJHSS-E Classification:* *JEL Code: F24, E21, E22, F43, C68*



*Strictly as per the compliance and regulations of:*



© 2020. Samuel Maxime Coly & Pierre Mendy. This is a research/review paper, distributed under the terms of the Creative Commons Attribution-Noncommercial 3.0 Unported License http://creativecommons.org/licenses/by-nc/3.0/), permitting all non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

# Exploring the Nexus between Migrant Remittances and Economic Growth: A Study of Senegal

Samuel Maxime Coly [α] & Pierre Mendy [σ]

*Summary-* **In this study, we assess the relationship between migrant remittances and economic growth in Senegal. The analysis utilized on an econometric approach using the ARDL bound testing method as an estimation technique. The estimation period is from 1980 to 2018. Overall, the estimates show a negative relationship between remittances and economic growth and an insignificant effect in the long run, while the nexus between economic growth and investment is positive in the long term. This provides the prospect of a study on the analysis of the impact on the economic growth of reallocation of remittances from consumption needs to savings-investment purposes.**

*Keywords: migrant remittances; economic growth; ARDL.*

## I. Introduction

The increase in remittances over the past two decades to developing countries is generating growing interest among local authorities in migrants' countries of origin, as well as international organizations, such as: UN, World Bank, IMF, among others. Not only are the amounts involved very large in absolute and relative terms, but migrants have also proved to be real "development actors" through the financing of individual and collective projects through their regular remittances. Unrecorded flows through formal and informal channels are considered significantly important (Gammeltoft, 2002).

According to cross country comparative analyses and household survey data, migration and the resulting remittances improve household wellbeing in migrants' countries of origin. In other words, remittances contribute to a rise in investment in the health, education and small business sectors. In particular, they have a positive impact on the balance of payments in many developing countries, as well as on economic growth, through their direct implications for savings and investment in human and physical capital, as well as indirect effects through consumption (Adams and Page, 2005). These funds could have substantial multiplier effects when they increase household consumption levels, in this case rural households, as they are more likely to be spent on domestically produced goods (Ratha, 2003). Their positive development effects generally relate to the development of financial institutions that manage payments (Aggarwal et al., 2010), the use of remittances (Ratha, 2005) and the role of remittances as an alternative to debt that helps to ease individual credit constraints in countries where the financial system is less developed and microfinance is not widely available (Giuliano and Ruiz-Arranz, 2009). By increasing the amount of remittances flowing through the banking system, remittances are likely to lead to improved financial development and thus higher economic growth through one or both of the two channels: (1) increased economies of scale in financial intermediation, and/or (2) an effect on the political economy whereby a larger constituency (depositors) is able to pressure the government to carry out beneficial financial reform (Barajas et al., 2009).

However, attention should be paid to the positive impact of remittances in recipient economies because most of the remittances are sent through remittance agencies (Orozco et al., 2010). They are not considered financial intermediaries and do not necessarily participate in the development of the financial sector in the sense that they are not intended to provide credit. Also, remittances, like capital flows, can assess the real exchange rate and therefore generate an allocation of resources from the non-marketable sector. The overvaluation of the real exchange rate undermines long term economic growth, particularly for developing countries, in that they suffer from disproportionate tradeable goods production, weak institutions and market failures (Rodrik, 2007). Similarly, remittances, like capital flows, make it possible to assess the real exchange rate in recipient economies and, consequently, they generate an allocation of resources from the non-marketable sector they generate an allocation of resources from the non-marketable sector (Amuedo-Dorantes and Pozo, 2004; Bussolo et al., 2007). They can affect growth because of the appreciation of the real exchange rate and the associated negative impact on the marketable sector, otherwise known as Dutch disease, (Acosta et al., 2009). Remittances can also undermine productivity and growth in low income countries because they are easily

*Author α: Doctor in Economics, Cheikh Anta Diop University of Dakar; Researcher at the Research Laboratory on Institutions and Growth (LINC). e-mail: samuelmaxime.coly@ucad.edu.sn*

*Author σ: Senior Lecturer, Cheikh Anta DIOP University; Senior Researcher affiliated to the Research Laboratory on Institutions and Growth (LINC); Senior Researcher to the Mathematical Laboratory for Decision Making and Digital Analysis (LMDAN).*
*e-mail: pierre.mendy@ucad.edu.sn*



© 2020 Global Journals

spent on consumption that is likely to be dominated by foreign goods rather than productive investment (Lipton, 1980).

Considering the case studies and their divergent results, the consensus that emerges is that these relationships vary according to the contexts and areas where generalization is not possible. This could be partly explained by the fact that the multiple channels through which remittances affect growth can lead to negative and/or positive influences of these funds on long term economic activity. But also, by the fact that many countries still do not have the institutions and infrastructure that would allow them to channel remittances into activities that promote economic growth.

In the case of Africa, for example, there are still some grey areas. In this case, knowledge about the macroeconomic impacts of migrant remittances is still fragmented. Senegal, with $1.6 billion in remittances reported in 2015, is the third country after Nigeria and Ghana among the top 10 countries in Sub Saharan Africa that receive remittances from migrants. This makes Senegal a target country in the WAEMU zone. In 2014, the amount of transfers reported represented 10.3 per cent of GDP and stood at 12 per cent of GDP in 2015, (Word bank Factbook, 2016). Yet, looking at its profile, it can be noted that, in the specific case of Senegal, there is a paucity of work to empirically analyze the contribution of migrant remittances to macroeconomic aggregates such as economic growth. Most of the pioneering work has focused on microeconomic impacts such as those on poverty.

In addition, in several developing countries, these fund transactions have become an important and stable source of finance, and their amount exceeds that of foreign direct investment (FDI) and even official development assistance (ODA). On the basis of World Bank data (Word Bank, 2016), we can note that in Senegal from 2000 until today, remittances continue to increase with an average growth rate of 15 per cent over this period with a slight decline noted during the period of the 2008 financial crisis. Remittances from Senegalese migrants thus far exceed FDI and ODA, especially the latter, which have been steadily declining. It shows that remittances from migrants have not only become higher than FDI and ODA, but their growth more than compensates for the decline in the latter.

The objective of this article is to analyze the interactions between migrant remittances and economic growth in Senegal. The central assumption underlying this analysis is that the contribution of remittances to economic growth depends on how they are used in the receiving country.

The remainder of this article is structured as follows: section 2 presents a synthesis of recent empirical studies on the relationship between migrant remittances and economic growth; section 3 outlines the methodology and data; and section 4 describes and interprets the main findings, before concluding.

## II. Synthesis of Empirical Work in the Light of a Divergence of Visions

The existing literature reports two visions depending on the nature of the impacts of remittances on economic growth in countries of origin: an optimistic view of positive impacts and a pessimistic view that takes into account negative impacts.

*a) Positive impacts or optimists' vision*

There is generally evidence that there is a positive relationship between remittances and economic growth. McCaffrey (2007), studying the impact of migrant remittances on economic growth in developing countries, using a data set containing information on 152 low and middle income countries (according to World Bank classification) from 1990 to 2005, with 1,409 complete observations. By using two main statistical methods, ordinary least squares and Fixed Effects Estimation, he finds results suggesting that remittances have a positive impact on growth. However, he finds that remittances have a more positive impact in countries with certain characteristics such as low domestic credit availability, low capital formation and low inflation. More specifically for African countries, Anyanwu and Erhijakpor (2009), using panel data over the period 1990-2005, find, by using a two-step (IV) efficient generalised method of moments (GMM) estimation method, that remittances have a positive impact on economic growth. Azam and Khan (2011), making statistical analysis through simple log linear regression model and conducting method of least square by using annual time series data from Azerbaijan and Armenia between 1995 and 2010, conclude that migrant workers' remittances have a significant positive impact on economic growth.

On the other hand, one of the issues that has attracted interest is the sense of causality between remittances and economic growth, which does not seem to be unidirectional in all cases. For example, Siddique et al. (2012) studied the causal link between remittances and economic growth in three countries: Bangladesh, India and Sri Lanka. By using time series data over a 25 year period and employing the Granger causality test under a Vector Auto regression (VAR) framework, they find that the growth in remittances led to economic growth in Bangladesh; this result is later reinforced by Kumar and Stauvermann (2014). However, in India, they find that there does not appear to be a causal link between remittance growth and economic growth; but in Sri Lanka, they find a two way causality, in other words, economic growth influences remittance growth and vice versa. However, Paranavithana (2014), employing time series annual data over the 1977-2012 period, was able to demonstrate an empirical evidence



© 2020 Global Journals

based on the vector error correction model that there is no direct or indirect short term causality between remittances and economic growth in Sri Lanka. Imoro et al. (2014), for three of the largest recipients of funds in West Africa, Nigeria, Senegal and Togo, confirm, through a VAR regression associated with Granger's causality and cointegration tests on the time series data made of an annual data from 1980-2012, the existence of a unidirectional causal link in Nigeria and Senegal; in other words, remittances translate into economic growth while economic growth does not result in remittances. However, their results suggest that there is no causal link between remittances and economic growth in Togo.

However, even if there is evidence that remittances positively affect growth, it would appear that its impacts are channeled through investment channels that would be responsible for the effect on growth. The role of financial development in this circumstance has been widely explored. Ramirez (2012), using panel unit root and panel cointegration tests and the Fully Modified OLS methodology (FMOLS), estimates the impact of remittances on economic growth in selected higher (middle) and lower income countries in Latin America and the Caribbean over the period 1990-2007. The results show a sign of the term interaction between remittances and credit variables that suggests that remittances are a substitute for these variables. Indeed, the effect of remittances on both sets of countries is stronger when there is a financial variable (credit). Similar results have been found by Nusrate et al. (2015), who conclude, by using a system GMM and the fixed effects estimators for panel data analysis for 72 countries over the 1980-2009 period, that workers' remittances through financial development significantly accelerate economic growth. They also find that, in the face of financial liberalization and trade openness, the payment of workers significantly promotes economic growth. The empirical results of Luqman and Haq (2016) obtained by using a autoregressive distributed lag (ARDL) bound testing approach of cointegration, which is based on time series data over the period from 1972 to 2011, validate the hypothesis that the development of the local financial sector improves the contribution of remittances to economic growth in Pakistan.

*b) Negative impacts or pessimistic views*

In contrast to the above mentioned empirical findings, some studies have shown that remittances do not have a significant positive impact on economic growth. Karagoz (2009), using data from Turkey over the period 1970 to 2005 to identify the relationship between worker transfers and long term economic growth, finds, through cointegration tests, results that suggest that the relationship between workers' remittances and economic growth is negative and significant. Adouka et al. (2014) find similar results in the case of Algeria where they were able to show, using a vector error correction model (VECM) on data over the period (1970 – 2010), that remittances have a negative impact on the Algerian economy in the short and long term, since a 1 per cent increase in remittances would lead to a decrease of 0.02 per cent in GDP per capita in the short term and 0.006 percent in the long term. Similarly in Ethiopia, Rao and Tolcha (2016) studied the impact of remittances on economic growth using time series from 1981 to 2012 from the World Bank and the National Bank of Ethiopia. The results of estimates using an ARDL model show a negative impact on long term growth.

Moreover, it would even appear that remittances may even harm the long term growth of recipient economies due to a decline in labour supply and labour market participation rates. Indeed, various studies have shown that the receipt of remittances can determine the reduction in the effort that the person is willing to make in order to achieve a certain income, by replacing the income obtained by work. It affects the economic activity of many countries. For example, Acosta (2007), analysing the impact of remittances on labour availability in Latin America and the Caribbean by using a fixed effects probit on a 4 year rural panel survey, showed that men in rural areas who receive remittances are 4.6 per cent more likely to leave the labour market (9.9% for women) and those in urban areas by 5.7 per cent more likely to leave their work (10.7% for women). The higher percentage in urban areas is due to higher opportunities compared to rural areas; Also, men in rural areas from families receiving remittances tend to work 4.5 fewer hours per week (in the case of women 13.3 hours) and those in urban areas 5.5 fewer hours (women 8.6 hours). In summary, the impact of remittances on economic growth can be direct, or indirect, positive or negative depending on the cases studied.

## III. Methodology

*a) Theoretical framework of the Model*

This study is based on Solow's (1956) neoclassical basic model, which has been widely used in previous similar case studies (Garcia-Fuentes and Kennedy, 2009; Jayaraman, Choong and Kumar, 2010; Syed Tehseen Jawaid and Syed Ali Raza, 2012; Kumar and Stauvermann, 2014). Mankiw, Romer and Weil (1992) have incorporated human capital into the model.

The production function is defined as follows:

$$Y_t = AK_t^{\alpha} KH_t^{\beta} L_t^{1-\alpha-\beta} X_t^{\delta_i} e^{\varepsilon_i} \quad (1)$$

Where $Y_t$ is the overall production at time t, $A$ the level of technology, $K_t$ the stock of physical capital, $KH_t$ the stock of human capital and $L_t$ the labor force at time t. $X_t$ represents the vector of control variables that contribute to the adoption of new technologies, for example the main variable of interest in the study, the ratio of remittances to GDP. The parameters $\alpha$ and $\beta$



© 2020 Global Journals

are coefficients that capture the effects of associated variables (*K*, *KH* and *L*) on production. The parameter vector $\delta_i$ captures the growth effects driven by the variables included in $X_t$. The term $\varepsilon_t$ is a random disturbance that captures the aggregate effect of all other unobservable factors.

By dividing the two members of equation (1) by L, we obtain:

$$y_t = A\, k_t^{\alpha} kh_t^{\beta} X_t^{\delta}\, e^{\varepsilon_t} \quad (2)$$

Where, $y_t$ is the production per unit of labour force, $k_t$ is the physical capital per unit of labour force and $kh_t$ the human capital per unit of labour force.

By proceeding by a logarithmic transformation, equation (2) becomes:

$$\ln y_t = \ln A + \alpha \ln k_t + \beta \ln kh_t + \delta \ln X_t + \varepsilon_t \quad (3)$$

It can be assumed that the effect of the fallout of the control variables on economic growth is achieved through technological progress A.

The empirical model below is derived from equation (3) by generalizing and incorporating at the aggregate level the control variables included in X:

$$LGDP_t = a_0 + \alpha \mathrm{LGFCF}_t + \beta LKH_t + \delta_1 LGDP_{t-1} + \delta_2 LTR_i + \delta_3 LG_t + \delta_4 FDI_t + \varepsilon_t \quad (4)$$

All the variables in the model are presented in Table 3. The choice of these variables was guided by the theoretical and empirical literature and data availability.

*b) Data and Estimation technique*

- Data and description of variables

The period covered by the study runs from 1980 to 2018 and the data are mainly from the World Bank (WB) database updated in 2017.

The dependent variable in this study is the real GDP per capita growth rate (GDP). The main variable of interest (explanatory) is the ratio of remittances to GDP (TR). Remittances are expressed as a percentage of GDP, because as in McCaffrey (2007) the research question focuses on the interactions of the flow of remittances with economic growth rather than on the impact of marginal changes in this flow on growth. The coefficient and direction of interaction of remittances on growth is complex, depending on whether remittances are consumed or invested but also on the channels through which they impact on growth. Other independent variables include the traditional determinants of growth. The lagged real GDP per capita growth rate (GDPt-1) is used as a proxy for the initial real GDP growth rate. The impact of this first on GDP growth at time t is assumed to be positive. The physical capital stock or investment rate, defined here as the ratio of gross fixed capital formation to GDP (GFCF), is expected to have a positive effect on per capita growth, but the sign is more dependent on the type of scale returns that may be present. Since the work of Mankiw et al (1992), Barro (1991) and Barro (2000), there has been a general consensus on the positive role played by human capital in long term economic growth. Also, endogenous growth theory predicts that human capital accumulation should stimulate growth (Romer, 1986). Human capital (KH) is measured by the higher education enrolment rate (Barro, 2000). Openness is captured by capital flows measured by the ratio of FDI to GDP (FDI). In the theoretical literature, the FDI received is supposed to stimulate the growth of the host economy at several levels. However, empirical evidence on the effects of FDI on economic growth remains mixed. As in developing countries, government plays an important role in the allocation and allocation of resources. Thus, the ratio of public expenditure to GDP (G) is used to capture fiscal policy that is expected to have a positive impact on growth.



© 2020 Global Journals

*Table 1:* Description of the variables in the empirical model

| Variable | | Description | Sources |
|---|---|---|---|
| Economic growth | GDP | Proxy: Real GDP per capita | World Development Indicators |
| Physical capital stock | GFCF | Proxy: Gross fixed capital formation as a % of GDP | World Development Indicators |
| Human capital | KH | Proxy: Enrolment rate in higher education | UNESCO Institute for Statistics (UIS.Stat) |
| Transfers of funds | TR | Personal migrants' remittances as a % of GDP | World Development Indicators |
| Public expenditure | G | Public expenditure as a % of GDP | World Development Indicators |
| Foreign Direct Investments | FDI | Foreign Direct Investment as a % of GDP | World Development Indicators |

*Source: Authors*

Note that all variables have been log transformed according to equation 4 (except for the FDI variable which has negative values). The descriptive statistics of the variables, presented in Table 4, show a relatively low volatility across a relatively low standard deviation for the variables LGDP (0.32), LGFCF (0.15) and LG (0.17); while the volatility is relatively high for variables LKH (0.55), LTR (0.71) and LFDI (1.02).

*Table 2:* Descriptive statistics of variables

| Variable | Mean | Std.Dev | Min | Max |
|---|---|---|---|---|
| LGDP | 6.80 | 0.32 | 6.30 | 7.33 |
| LGFCF | 3.01 | 0.15 | 2.61 | 3.26 |
| LKH | 1.50 | 0.55 | 0.83 | 2.55 |
| LTR | 1.37 | 0.71 | 0.45 | 2.34 |
| LG | -1.87 | 0.17 | -2.07 | -1.40 |
| FDI | 1.20 | 1.02 | -0.99 | 2.98 |

*Source: Authors*

- Estimation technique

The model to be estimated, as specified above, is a long term dynamic linear model. One of the simplest techniques is for OLS to estimate the coefficients of each explanatory variable to assess their long term effects on economic growth. However, applying such a technique directly is likely to lead to fallacious results because the validity of this model requires the validation of a number of assumptions. One of the frequent constraints to the use of OLS is the stationary nature of the variables. The stationarity of the series guarantees better estimates.

The stationary properties of time series variables are examined by Phillip Perron unit root tests (PP) and Dickey Fuller augmented unit root tests (ADF). The results of the unit root tests (Table 3) show that the variable LGDP is integrated in order I(1). But given that the first difference of the logarithm of GDP (D(LGDP)) gives the GDP growth rate, we consider the latter (taken as the dependent variable) to be stationary. The variable LG is stationary. Unlike these variables, the rest of the explanatory variables LGFCF, LKH, LGFCF and the main variable of interest LTR, are integrated in order I(1).

*Table 3:* Stationarity analysis

| | ADF | | PP | | |
|---|---|---|---|---|---|
| Variables | Level | Difference 1st | Level | Difference 1st | Finding |
| LGDP | -0.69 | -5.25*** | -0.82 | -5.25*** | I(1) |
| LGFCF | -2.38 | -7.45*** | -2.73* | -8.85*** | I(1) |
| LKH | 1.05 | -5.82*** | 1.15 | -5.85*** | I(1) |
| LTR | -0.63 | -4.83*** | -0.33 | -4.83*** | I(1) |
| LG | -3.48** | | -3.22** | | I(0) |
| FDI | -1.14 | -11.66*** | -2.76* | -11.66*** | I(1) |

Significance: *** (1%) ** (5%) * (10%)

*Source: Authors*



© 2020 Global Journals

Given that not all series are stationary, the validity of OLS techniques is questioned. Consequently, cointegration by the ARDL (AutoRegressive Decaled Lag) method, which is a special case of autoregressive models with stepped delays, developed by Pesaran and Shin (1995) and Pesaran et al (2001), is required in this study for several reasons: On the one hand, the ARDL approach allows cointegration tests to be applied to The ARDL model in its general formulation is written:

$$\Delta Y_t = \beta_0 + \sum_{i=1}^{m} \beta_i \Delta Y_{t-i} + \sum_{i=0}^{q} \delta_i \Delta X_{t-i} + \varphi_1 Y_{t-1} + \varphi_2 X_{t-1} + \mu_t \quad (5)$$

The empirical model, as specified in equation (4), is estimated by the ARDL method using an autoregressive distributed offset. The error correction model (ECM) can be expressed as follows:

$$\Delta LGDP_t = \beta_0 + \sum_{i=1}^{m} \beta_i \Delta LGDP_{t-i} + \sum_{i=0}^{q1} \beta_2 \Delta LGFCF_{t-i} + \sum_{i=0}^{q2} \beta_3 \Delta LKH_{t-i} + \sum_{i=0}^{q3} \beta_4 \Delta LTR_{t-i} + \sum_{i=0}^{q4} \beta_5 \Delta FDI_{t-i} + \sum_{i=0}^{q5} \beta_{6j} \Delta LG_{t-i} + \delta Z_{t-1} + e_t \quad (6)$$

With $Z_{t-1}$ the error correction term

$$Z_{t-1} = LGDP_{t-1} - \alpha_0 - \alpha_1 LGFCF_{t-1} - \alpha_2 LKH_{t-1} - \alpha_3 LTR_{t-1} - \alpha_4 FDI_{t-1} - \alpha_5 LG_{t-1} \quad (7)$$

The ARDL (m, q) model that captures the short term and long term relationships from equation (5) and equation (6) of the error correction model can be specified as follows:

$$\Delta LGDP_t = \beta_0 + \sum_{i=1}^{m} \beta_{1i} \Delta LGDP_{t-i} + \sum_{i=0}^{q1} \beta_{2i} \Delta LGFCF_{t-i} + \sum_{i=0}^{q2} \beta_{3i} \Delta LKH_{t-i} + \sum_{i=0}^{q3} \beta_{4i} \Delta LTR_{t-i} + \sum_{i=0}^{q4} \beta_{5i} \Delta LFDI_{t-i} + \sum_{i=0}^{q5} \beta_{6i} \Delta LG_{t-i} + \sigma_0 LGDP_{t-1} + \sigma_1 LGFCF_{t-1} + \sigma_2 LKH_{t-1} + \sigma_3 LTR_{t-1} + \sigma_4 LFDI_{t-1} + \sigma_5 LG_{t-1} + \varepsilon_t \quad (8)$$

After determining the existence of cointegration between the variables, the following equation determines the long term relationship:

$$LGDP_t = \alpha_0 + \alpha_1 \sum_{i=1}^{q0} LGDP_{t-i} + \alpha_2 \sum_{i=0}^{q1} LGFCF_{t-i} + \alpha_3 \sum_{i=0}^{q2} LKH_{t-i} + \alpha_4 \sum_{i=0}^{q3} LTR_{t-i} + \alpha_5 \sum_{i=0}^{q4} LFDI_{t-i} + \alpha_6 \sum_{i=0}^{q5} LG_{t-i} + \varepsilon_t \quad (9)$$

With q the number of delays for each variable.

In addition, we can obtain a standardised equation that reflects the long term relationship using the method recommended by Bardsen (1989). By this approach, the long term coefficient (or long-term elasticities) of each explanatory variable in the ARDL model is obtained by assigning a negative sign to the ratio of the coefficient of each explanatory variable to the coefficient of the dependent variable lagged one period minus 1. The long term relationship is then written:

$$LGDP_t = \gamma_0 + \gamma_1 LGFCF_t + \gamma_2 LKH_t + \gamma_3 LR_t + \gamma_4 LFDI_t + \gamma_5 LG_t + \varepsilon_t \quad (10)$$



© 2020 Global Journals

With $\gamma_i = -\frac{\alpha_j}{\alpha_1 - 1}$ i= 0, 1, 2, 3, 4, 5 and j= 0, 2, 3, 4, 5

Furthermore, according to Pesaran and Pesaran (1997), short term dynamics are essential to test the stability of long term coefficients. Pesaran's (1997) test is equivalent to estimating the error correction models (ECMs) and applying the CUSUM and CUSUMSQ tests:

$$\Delta LGDP_t = \beta_0 + \sum_{i=1}^{m} \beta_{1i} \Delta LGDP_{t-i} + \sum_{i=0}^{q1} \beta_{2i} \Delta LGFCF_{t-i} + \sum_{i=0}^{q2} \beta_{3i} \Delta LKH_{t-i} + \sum_{i=0}^{q3} \beta_{4i} \Delta LTR_{t-i} + \sum_{i=0}^{q4} \beta_{5i} \Delta FDI_{t-i} + \sum_{i=0}^{q5} \beta_{6i} \Delta LG_{t-i} + TCE_{t-1} + \varepsilon_t \quad (11)$$

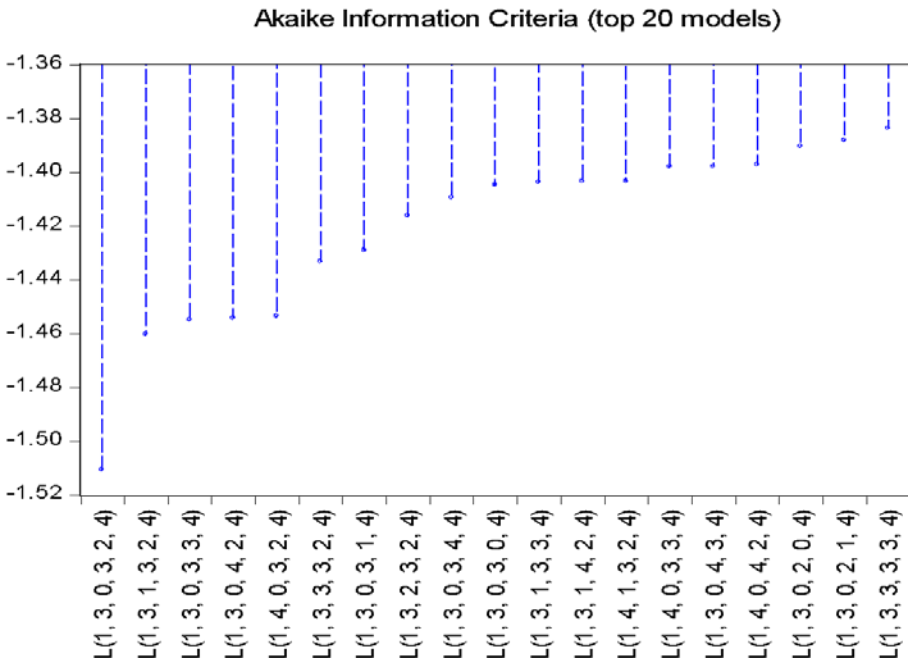
With TCE the error correction term calculated from the cointegration vector.

## IV. Empirical Results and Discussions

*a) Determination of the number of lag and cointegration test.*

- Determination of the number of lag in the representation ARDL (m,q).

Based on the Akaike Information Criteria, we can determine the optimal lag for each variable. The ARDL model performs $(p+1)^k$ regressions to obtain the optimal delay for each variable with p the maximum delay and k the number of variables in the equation. The ARDL (1, 3, 0, 3, 2, 4) model is selected because it offers the lowest Akaike Information Criteria value and therefore is the best model (figure 2). The order of variables is: LGDP; LGFCF; LKH; LTR; IDE and LG




*Source: Authors (estimations)*

*Figure 1:* Determination of the optimal lag

By the robustness tests that help to diagnose the estimated ARDL model (1, 3, 0, 3, 2, 4), all post estimation tests validate the model: there is normality of errors, there is no autocorrelation of errors, there is no heteroskedasticity and model is well specified (see table 4).



© 2020 Global Journals

*Table 4:* Diagnostic tests of the model ARDL (1, 3, 0, 3, 2, 4)

| Hypothesis tested | Type of Test | Value statistic | Probability |
|---|---|---|---|
| Normality | Jarque-Bera | 3.62 | 0.16 |
| Serial Correlation | Breusch-Godfrey | 0.44 | 0.65 |
| Heteroskedasticity | Breusch-Pagan-Godfrey | 0.74 | 0.73 |
| Specification | Ramsey (Fisher) | 2.36 | 0.15 |

*Note: from the P-Value, the null hypothesis cannot be rejected for all postestimation tests.*

- Cointegration test

The cointegration test makes it possible to determine the existence of a long term equilibrium using statistical procedures such as the Wald test. The null hypothesis tested is as follows:

$$H0: \sigma_0 = \sigma_1 = \sigma_2 = \sigma_3 = \sigma_4 = \sigma_5 = 0$$

It will be said that there is no long term relationship between the variables if the null hypothesis is rejected. On the other hand, if the null hypothesis is accepted, it means that there is a long term relationship between the variables. From the Wald test, the value of the F statistic (F-statistic) can be obtained and the null hypothesis test is thus implemented by comparing its value with the critical values provided by Pesaran et al (2001). If the F-statistic calculated from the Wald test is greater than the upper limit value, the null hypothesis is rejected, but if the calculated F-Statistic is less than the lower limit value, the null hypothesis is accepted.

The following table provides the critical values tabulated by Pesaran (2001) and Narayan (2005). Narayan tabulated critical values for small samples. According to the author, when the sample size is less than 100, the critical values provided by Pesaran and Pesaran (1997) and Pesaran et al (2001) may not be correct. The results provide evidence of a long term relationship between the variables in the model. Indeed, the value calculated of the F-Stistic by the Wald test (8.11) is higher than the limits above the 5 per cent threshold.

*Table 5:* Critical value for the cointegration relationship test

| | Narayan (2005) | | Pesaran (2001) | |
|---|---|---|---|---|
| | I(0) bound | I(1) bound | I(0) bound | I(1) bound |
| Critical value limits to 5% | 3.03 | 4.44 | 2.39 | 3.38 |
| K=5 | F-Statistics calculated: 8.11 | | | |

Since a long term relationship has been established, we can assume that there is a common long term trend between the variables. Thus, the long-term coefficients of the variables are considered statistically significant.

*b) Estimation of the model ARDL (1, 3, 0, 3, 2, 4) and Interpretations of results*

- Long term relationship (LT)

The results of the estimation of the long term relationship (table 6) show that the relationship between growth and the main interest variable, remittances, is not significant in the long run. In the absence of significance, no economic interpretation can be provided concerning the relationship between these two aggregates. However, we can be noted that the long term relationship between investment and economic growth is positive and significant at the 1 per cent threshold with a coefficient of 1.17 per cent. Investment is an important component of growth which, in the long terms influences demand through multiplier effects but also influences supply by increasing production capacities. Also, the results show a significant but negative long term relationship between foreign direct investment and growth at the threshold of 1 per cent with a coefficient of 0.16 percentage points. The negative sign refers to the fact that most of the capital invested is repatriated. The other control variables involved are not significant in the long term.



© 2020 Global Journals

*Tableau 6:* Estimation of the long term relationship

| Long Run Coefficients | | |
|---|---|---|
| Variable | Coefficient | Std. Error |
| LGFCF | 1.17*** | 0.32 |
| LKH | 0.13 | 0.09 |
| LTR | -0.09 | 0.19 |
| IDE | -0.16*** | 0.07 |
| LG | -0.01 | 0.04 |
| C | 1.63** | 0.64 |
| Significance at : *** (1%) ** (5%) * (10%) | | |

- Short term dynamics (ST)

The estimation results presented in Table 7 indicate a negative and significant coefficient of the error correction term (TCE). This coefficient indicates how quickly equilibrium is restored during the same period when the model is out of equilibrium following a shock; which guarantees an error-correction mechanism, and thus the existence of a long term relationship (cointegration) between variables.

We can also note that migrant remittances are negatively correlated with real GDP growth in the short term. These results may corroborate several previous studies. Chami, Fullenkamp and Jahjah (2005) have shown that remittances can be correlated with poor economic performance in the recipient country. This would tend to show that the objective of compensating for income losses following a deteriorated economic situation is one of the main reasons for income transfers. Indeed, they have developed a model that differentiates between transfers that serve as compensation and those that function as capital flows. They explain that remittances are not profit driven but compensatory transfers and should have a negative correlation with economic growth in contrast to profit driven capital flows that are positively correlated with economic growth.

In addition, the negative effect of remittances on real GDP per capita could be due to the increase in household purchasing power, which leads to an increase in final consumption demand. To this end, transfers are mainly intended for final consumption purposes (generally dominated by imported goods to the detriment of domestic production and sometimes even ostentatious), and not for productive investment and value added creation. In the case of Senegal, for example, a high proportion (69.8%) of remittances are for current consumption (BCEAO Survey, 2011).

With regard to the other explanatory variables, we can note that investment has a negative effect on economic growth in the short term. In contrast, for foreign direct investment, the negative relationship observed in the long term can only be observed for lagging 0; with lags 1, 2 and 3, the effect on growth remains positive and significant. On the other hand, public expenditure has a positive effect on economic growth in the short term.

*Tableau 7:* Estimation of Short term dynamics

| Short-term dynamics | | |
|---|---|---|
| Variable | Coefficient | Std. Error |
| D(LGFCF) | 0.18 | 0.18 |
| D(LGFCF(-1)) | -1.34*** | 0.27 |
| D(LGFCF(-2)) | -0.63*** | 0.19 |
| D(LKH) | 0.16 | 0.21 |
| D(LTR) | -0.44*** | 0.42 |
| D(LTR(-1)) | -0.35** | 0.57 |
| D(FDI) | -0.15*** | 0.43 |
| D(FDI(-1)) | 0.11*** | 0.15 |
| D(FDI(-2)) | 0.15*** | 0.16 |
| D(FDI(-3)) | 0.09*** | 0.03 |
| D(LG) | 1.63*** | 0.03 |
| D(LG(-1)) | 2.68*** | 0.04 |



© 2020 Global Journals

| | | |
|---|---|---|
| D(LG(-2)) | 1.31*** | 0.03 |
| TCE(-1) | -1.73*** | 0.20 |
| Significance at : *** (1%) ** (5%) * (10%) | | |

As indicated above, cumulative sum stability tests (CUSUM) and (square CUSUM or CUSUMSQ) are used to determine the structural and point stability of the parameters of the long term relationship equation. According to the results (Figures 4), it can be concluded that there is no instability in the coefficients because the curve of the CUSUM and CUSUMSQ statistics is within the critical bands of the 5 per cent confidence interval of the parameter stability; the long term relationship is thus structurally and punctually table.

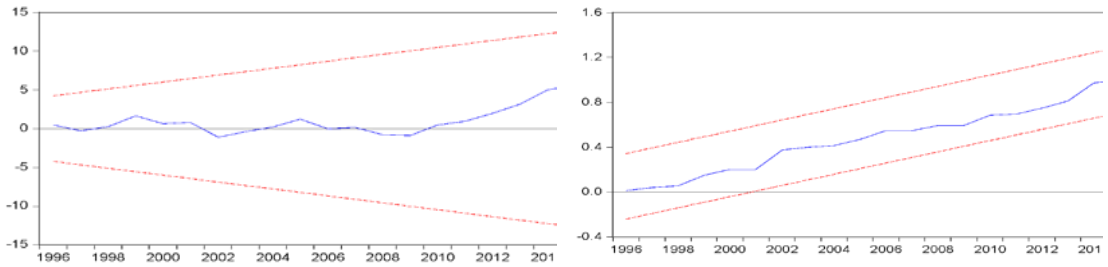



*Figure 2:* Test of Stability

## V. Conclusion

In this article, we have tried to study the long term and short term effects of migrant remittances on economic growth for a target country: Senegal. Other variables were also considered, such as government expenditure, foreign direct investment flows, which act as control variables, and the stock of human and physical capital, which are use variables of the Solow (1956) basic theoretical model. The study period is from 1980 to 2018.

The « ARDL Bound Testing » approach of Pesaran and Shin (1999) was applied and the results indicate the existence of a cointegration relationship between the variables, which refers to a long term relationship between them.

The estimation of the long term relationship shows show that the relationship between real GDP per capita growth in Senegal and remittances is not significant in the long run. The estimation of the error correction model (ECM), which also allows us to capture the short term dynamics, shows a negative relationship with growth at the 1 per cent threshold. This could be explained, on the one hand, by their objective of compensating for income losses following a deteriorated economic situation, thus playing a stabilizing role on the growth of developing economies and a role in mitigating shocks; on the other hand, by the fact that transfers are essentially intended for consumption, which are mostly made in imported goods, and not for investment purposes, which, moreover, through the results obtained, support the empirical evidence that the latter stimulate growth. Indeed, the estimation results show that investments have a positive impact on real GDP growth per capita in the long run.

In general, it can be concluded that, although remittances from migrants represent an important financial source, their use does not constitute a sustainable lever for economic growth. The investment channel could be the best way for remittances to boost growth, as long as it is accepted and proven that they have a positive effect on growth. This opens the prospect of a study on the analysis of the impact on economic growth of the reallocation of remittances from consumption needs to savings-investment purposes.

## References Références Referencias

1. Acosta, A. P., Baerg, N. R., and Mandleman, S.F. (2009). "Financial Development, Remittances, and Real Exchange Rate Appreciation." *Federal Reserve CRED of Atlanta, Economic Review*, Vol. 94, N° 1, 2009.
2. Acosta, A.P. (2007). "Entrepreneurship, Labour Markets, and International Remittances: Evidence from El Salvador." In: C. Özden & M. Schiff (Eds.), International Migration, Economic Development & Policy. World Bank and Palgrave Macmillan, 141-159.
3. Adams, R. and Page, J. (2005). "Do international migration and remittances reduce poverty in developing countries?" World Development, 33(10), 1645–1669.
4. Adouka, L., Belmimoun, A., Kerbouche, K. and Mokeddem, R. (2014). "The impact of migrants' remittances on economic growth empirical study: case of algeria (1970- 2010)." *European Scientific Journal,* May 2014 edition vol.10, No.13.
5. Aggarwal, R., Demirgüç-Kunt, A. and Martínez Pería M. S. (2010). "Do remittances promote financial



© 2020 Global Journals

development?" J. Dev. Econ. doi:10.1016/j.jdeveco.2010.10.005
6. Amuedo-Dorantes, C. and Pozo, S. (2004). "Workers' Remittances and the Real Exchange Rate: A Paradox of Gifts." *World Development*, Vol. 32, No. 8, 1407-17.
7. Anyanwu, J.C. and Erhijakpor A. E. (2009). "International Remittances and Economic Growth in Africa." *Global Development Studies (Special Issue on Global Labor Migration and Emerging Trends in Development Finance: An Assessment of the Economic and Social Impact of Migrant (Worker) Remittances in Sub Saharan Africa)*, Volume Five, Nos. 3-4.
8. Azam, M. and Khan, A. (2011). "Workers' Remittances and Economic Growth: Evidence from Azerbaijan and Armenia." *Global Journal of Human Social Science*, Vol. 11 No.7.
9. Barajas, A., Chami, R., Fullenkamp, C., Gapen, M. and Montiel, P. (2009). "Do Workers' Remittances Promote Economic Growth?" IMF Working Paper WP 09/153.
10. Bardsen, G. (1989). "Estimation of long-run coefficients in error-correction models." Oxford Bull Econ. Stat. 51: 345-350.
11. Barro, R. (1991). "Economic Growth in a Cross Section of Countries." *Quarterly Journal of Economics* 106: 407-43.
12. Barro, R.J. (2000). "Les facteurs de la croissance économique: une analyse transversale par pays." Paris: Economica.
13. Bussolo, H., Lopez, H. and Molina, L. (2007). "Remittances and the Exchange Rate." Working Paper, World Bank Policy Research.
14. Chami R., Fullenkamp, C. and Jahjah, S. (2005). "Are Immigrant Remittance Flows a Source of Capital for Development?" IMF Staff Papers 52, No. 1:55-81. Econ. Stat. 51: 345-350.
15. Gammeltoft, P. (2002). "Remittances and other financial flows to developing countries." CDR working paper for the study Migration-Development Links, Evidence and Policy Options, www.cdr.dk.
16. Garcia-Fuentes, P. A. & P. Lynn K. (2009). "Remittances and economic growth in Latin America and the Caribbean: The Impact of the human capital development." Southern Agricultural Economics Association, 2009 Annual Meeting, January 31-February 3, Atlanta, Georgia.
17. Giuliano, P. and Ruiz-Arranz, M. (2009). "Remittances, financial development, and growth." *Journal of Development Economics*, 90, 144–152.
18. Imoro, M., Nyeadi, J.D. and Yidana, N. (2014). "Remittances and Economic Growth Nexus: Empirical Evidence from Nigeria, Senegal and Togo." *International Journal of Academic Research in Business and Social Sciences,* October, Vol. 4, No. 10.
19. Jayaraman, T.K., Choong, C.K., and Kumar, R. (2010). "Role of Remittances in Tongan Economy." Migration Letters Vol. 7(2) pp 224-230.
20. Karagoz, K. (2009). "Workers' Remittances and Economic Growth: Evidence from Turkey." *Journal of Yasar University*, Vol. 4 No.13, pp. 1891-1908.
21. Kumar, R.R. and Stauvermann, P.J. (2014). "Exploring the nexus between remittances and economic growth: a study of Bangladesh." *International Review of Economics*, 61:399–415.
22. Lipton, M. (1980). "Migration from rural areas of poor countries: the impact on rural productivity and income distribution." World Development, 8, 1–24.
23. Luqman, M. and Haq, M. (2016). "Contribution of workers' remittances to economic growth in Pakistan: exploring the role of financial sector development." Migration and Development, 5:1, 37-54.
24. Mankiw, N.G., Romer, D., and Weil, D.N. (1992). "A Contribution to the Empirics of Economic Growth." *Quarterly Journal of Economics*, 107: 407-37.
25. McCaffrey, T. A. (2007). "The Effect of Migrant Remittances on Economic Growth." A Thesis submitted to the Graduate School of Arts and Sciences at Georgetown University, April 10.
26. Narayan, P. K. (2005). "The Saving and investment nexus for China: evidence from cointegration tests." Applied Economics 37, 1979-1990.
27. Nusrate, A. M., Sen, S., Sun, P. and Wu, L. (2015). "Migrant Workers' Remittances and Economic Growth: The Role of Financial Development." Munich Personal RePEc Archive MPRA, Paper No. 66992.
28. Orozco M., Burgess, E. and Massardier, C. (2010). "Remittance transfers in Senegal: preliminary findings, lessons, and recommendations on its marketplace and financial access opportunities. " International Labour Office, International Migration Programme.–Geneva: ILO.
29. Paranavithana, H. (2014). "Do Workers' Remittances Cushion Economic Growth in Sri Lanka?" *International Journal of Business and Social Science*, Vol. 5, No. 10(1), 44-56.
30. Pesaran, M.H. and Shin, Y. (1999). "An autoregressive distributed lag modelling approach to cointegration analysis." In: Strom, S. (Ed.), Econometrics and Economic Theory in the 20th Century: The Ragnar Frisch Centennial Symposium. Cambridge University Press, Cambridge.
31. Pesaran, M.H., Pesaran, B. (1997). "Working with Microfit 4.0: Interactive Econometric Analysis." Oxford, Oxford University Press.
32. Pesaran, M.H., Shin, Y. and Smith, R. (2001). "Bounds testing approaches to the analysis of level



© 2020 Global Journals

relationships." *Journal of Applied Econometrics*, 16, 289–326.
33. Ramirez, M.D. (2012). "Do financial and institutional variables enhance the impact of remittances on economic growth in Latin America and the Caribbean? A panel cointegration analysis." *International Advances in Economic Research,* 19, pp. 273–288.
34. Rao P. N. and Tolcha,T. D. (2016). "The Impact Of Remittances On Economic Growth In Ethiopia." *Indian Journal of Commerce and Management Studies*, Volume VII Issue 2.
35. Ratha, D. and Silwal, A. (2005). "Migration and Development Brief 24." World Bank.
36. Ratha, D. (2003). "Workers' Remittances: An Important and Stable Source of External Development Finance." In Global Development Finance, Striving for Development Finance. The World Bank, Washington, DC.
37. Rodrik, D. (2007). "The real exchange rate and economic growth: Theory and evidence." Mimeo. Harvard University.
38. Romer, P. (1986). "Increasing Returns and Long-Run Growth." *Journal of Political Economy*, 94(5): 1002-1037.
39. Siddique, A., Selvanathan, E. A., and Selvanathan S. (2012). "Remittances and Economic Growth: Empirical Evidence from Bangladesh, India and Sri Lanka." *The Journal of Development Studies*, 48:8, 1045-1062.
40. Solow R. M. (1956). "A contribution to the theory of economic growth." *The Quarterly Journal of Economics*, Vol. 70, No. 1.
41. Syed, T.J. and Syed, A.R. (2012). "Workers' remittances and economic growth in China and Korea: an empirical analysis." *Journal of Chinese Economic and Foreign Trade Studies*, Vol. 5 Iss 3 pp. 185- 193.



© 2020 Global Journals