Economics Bulletin

Volume 37, Issue 2

Do remittances enhance the economic growth effect of private health expenditures in West African Economic and Monetary Union?

Komivi Afawubo
CEREFIGE –Univ. of Lorraine and CRESE EA3190-Univ. of Bourgogne Franche-Comté

Mawuli kodjovi Couchoro
CERFEG-University of Lomé, Togo

Abstract

In this paper, we empirically analyze the relationship between private health expenditures and economic growth in West African Economic and Monetary Union (WAEMU), and the extent to which remittances moderate this relationship in a panel of WAEMU countries over the period 2000-2014. We use an endogenous growth model employing Fully Modified Ordinary Least Squares (FMOLS) and Ordinary Least Squares (OLS) methods. Our empirical results show that remittances have a positive and significant effect on economic growth. However, an increase in private health expenditures negatively affects the economic growth rate. Health expenditures may not lead to an increase in the level of human skills and an accumulation of human capital, and this situation decelerates economic growth. Furthermore, the interaction between remittances and private health expenditures has a negative effect on economic growth. These findings can be explained by the fact that the financing of private health expenditure through remittances is insufficient and inefficient and thus does not contribute to improving health status and building up human capital, which would play a part in economic growth.

Citation: Komivi Afawubo and Mawuli kodjovi Couchoro, (2017) "Do remittances enhance the economic growth effect of private health expenditures in West African Economic and Monetary Union?", *Economics Bulletin*, Volume 37, Issue 2, pages 1247-1264
Contact: Komivi Afawubo - komivi.afawubo@univ-lorraine.fr, Mawuli kodjovi Couchoro - couchoro@hotmail.com.
Submitted: February 21, 2017. **Published:** June 05, 2017.

1- Introduction

The motivation behind migration is not just to change the destiny of migrants, but also to improve the livelihood and living conditions of families remaining in the homeland. This is done through remittances. For many developing countries, remittances represent a major share of international capital flows, surpassing foreign direct investment (FDI), export revenues, and foreign aid (Giuliano and Ruiz-Arranz, 2005, Fayissa and Nsiah, 2008). Even in a situation of economic and financial crisis in the migrants' country of residence, monetary flows tend to remain stable, unlike economic development assistance and investment. Remittances from migrants to their families in sub-Saharan Africa were US$ 21.5 billion in 2010, despite a slight decline in 2009 due to the global financial crisis (Ashta et al, 2014). According to the Migration and Remittances Factbook 2011(Collection Statistics 2011World Bank on migration and remittances), Nigeria received as much as US$10billion, followed by Sudan (US$3.2 billion), Kenya (US$1.8 billion), Senegal (US$1.2 billion), South Africa (US$1 billion), Uganda (US$800 million), Lesotho (US$500 million), Ethiopia (US$387 million), Mali (US$385 million), and Togo (US$385 million). In terms of percentage of gross domestic product, the highest recipients in 2009 were Lesotho (25% of GDP), Togo (10.3%), Cape Verde (9.1%), Guinea-Bissau (9.1%), Senegal (9.1%), Gambia (7.9%), Liberia (6.2%), Sudan (5.6%), Nigeria (5.6%), and Kenya (5.4%).

In the past, the economic impacts of remittances have been disregarded because the theoretical strand suggests that workers' remittances are mainly used for consumption purposes and, hence, have a minimal impact on investment. In addition, remittances are widely viewed as compensatory transfers between family members who have lost skilled workers due to migration.

Nowadays, the positive and negative impacts of remittances on economic growth have been relatively well documented in the literature. Thus, besides monetary gains, remittances are associated with greater human development outcomes across a number of areas such as health and education, which are a component of human capital.

The economic growth theory suggests that economic growth rate is proportional to the rate of capital accumulation at a given level of technology. In addition, labor as a factor of production contributes to economic growth. Therefore, the growth rate can be changed through human capital. The primary components for the accumulation of human capital are education, health, R&D and technological improvements.

As far as health is concerned, several funding sources exist, including public and private financing. The context of structural adjustment programs implemented in developing countries, particularly in WAEMU countries since 1980, has led to the state's total withdrawal from many areas, including health. This has been followed by the stopping of state subsidies, resulting in management of health needs and health expenditure by the private sector. Regarding private funding, studies show that remittances constitute a significant share of these resources. Despite the significant increase in the share of remittances in total international capital flows, and the fact that the relationship between remittances and growth has been well documented in the literature, the role of private health expenditure in this relationship has not been adequately studied, especially in WAEMU.

This study explores the aggregate impact of private health expenditure on the economic growth effect of remittances in WAEMU countries. Using OLS and FMOLS methods and based on a panel of countries over the period 2000-2014, the results indicate that private health expenditure constrains the growth effect of remittances in WAEMU. The earnings sending back by migrants to their families in order to finance health expenditures are not benefit and do not accelerate economic growth.

Likewise, WAEMU countries could sufficiently promote the attraction and the allocation of remittances to help households to finance their health expenditure in order to promote economic growth.
The remainder of this paper is organized as follows: the next section is devoted to the literature review, section 3 presents the growth model, section 4 provides data and estimation procedure, section 5 is devoted to the empirical results and discussion, section 6 to the threshold robustness estimation, then, distinguishing the effects on economic growth of the share of public and private in the total of health expenditures while section 7 concludes.

2- Literature review

Remittances' impacts

Over the years, remittances have emerged as an important source of external development finance (Hasan 2006). Yang (2008) identified that when developed countries facilitate employment opportunities for workers from overseas, this contributes to stimulating human capital investment and entrepreneurship at household level in developing countries (Lianos and Pseiridis 2009). In addition, livelihoods in developing countries are prone to many kinds of risk, such as health shocks, which reduce work capacity (Hamid et al. 2011), and income loss due to climatic conditions. Studies conclude that remittances weaken the competitiveness of the recipient country, which becomes burdened with an external deficit and an imbalance of payments (Kireyev, 2006; Lueth and Ruiz-Arranz, 2007); alternatively remittances can have an overall negative effect on economic growth because they reduce the supply of labor (Chami et al, 2005).
A category of studies stipulates that transfers are merely compensatory revenues, which are often used to finance consumer spending, and have no significant effect on economic activity in migrants' countries of origin (Piracha et al, 2006; Chami et al, 2005, 2009).
In theory, remittances make a significant impact on households at micro level, and on economic growth at macro level.
At micro level, broad segments of society would experience extreme poverty without these resources. It is considered that these transfers have a significant impact on poverty reduction, on funding for housing, education and other basic needs, and even on investment and entrepreneurship (Ashta et al, 2014). Remittances have thus become an important source of income insurance for most migrants' families (Ashta et al, 2014); World Bank, 2006; Acupan and Agbola, 2010). Indeed, the money sent by migrants to their families facilitates investment in both production and consumption goods, which would not otherwise have been possible due the high amount of cash involved in such initiatives (Yang 2008).
At macro level, economic growth due to remittances is explained by two strands of argument (Agbola, 2013): i) remittances stimulate economic growth by promoting trading opportunities within the economy; ii) the flow of remittances creates a mechanism whereby migrants become financial intermediaries and this reduces the financial constraints and imperfections in financial markets with the consequence that it raises long-run growth through higher rates of capital accumulation (Mundaca, 2009).
The results of the impact of growth on transfers are quite varied, complex and still unknown, especially in the long run (Kapur, 2004). Human capital is, however, recognized as one of the main channels of transmission in this relationship. Studies that attempt to highlight the link between remittances and economic growth through human capital have focused on education and training aspects and production of ideas (Madsen, 2012). Generally, low-income

households face financial constraints and are therefore unable to borrow to finance schooling for their children. Remittances could help liquidity constraints relaxing, thus households in recipients countries may obtain the necessary resources to educate their descendants
In addition, health investments can increase the profitability of other investments in human capital, such as schooling. Better health can improve learning outcomes, which in turn increase the profitability of investment in education and are likely to encourage schooling. It is also likely that better health increases life expectancy production following education, which in turn increases the returns on education.

Health and economic growth

Good health status has a beneficial impact on economic growth and results in positive effects on the level of skills acquired by the population (Halıcı-Tülüce et al, 2016). Health is itself a component of human capital because healthier individuals are more productive and more able to adapt to technological innovations. It can be claimed that better health status has an impact on working conditions. Healthy employees work better and are thus more productive than others. People in good physical condition have a strong incentive to develop their knowledge and skills. Intuitively, illness and disability negatively affect hourly wages, especially in developing countries where most work consists of manual labor.
Significant microeconomic data also suggest a positive relationship between health and wages (Bloom 2001). According to the World Health Organization (WHO, 2005), fifty percent of economic growth differentials between developed and developing nations are attributable to ill health and low life expectancy. The standard analysis of investments in human capital admits all of these possibilities. A growing number of studies have attempted to establish the precise relationship between health and economic output using indicators such as healthcare expenditure (McCoskey and Seldon 1998). Although this indicator presents some limits, because total medical expenditures include all kinds of medical care, such as cosmetic surgery, several cross-country studies show a positive correlation between GDP and healthcare expenditure (Hansen and King 1996, Blomqvist and Charter 1997, Barro 1998, Roberts 1999, Hitiris and Posnett, 1992).
In contrast, high healthcare expenditure may be an indicator of bad health status, because significant levels of bad health lead to investments in the health sector rather than in highly productive sectors that increase the economic growth rate (Halıcı-Tülüce et al, 2016).

Remittances, health spending and economic growth

Remittances can affect health, and thus economic growth, by relaxing liquidity constraints that would otherwise restrict access to health care (Amuedo-Dorantes and Pozo, 2009). Kanaiaupuni and Donato (1999) and López-Cordova (2004) find that remittances significantly reduce infant mortality. In their studies of the impact of remittances in Mexico, Amuedo-Dorantes et al (2007) and Valero-Gil (2008) find that remittances increase health expenditure in the country. Another study by Amuedo-Dorantes and Pozo (2009) also finds that in Mexico's case, international remittances raise health care expenditures. For every 100-peso increment in income from remittances, approximately six pesos are spent on health.
The sensitivity of healthcare expenditure to variations in the level of international remittances is almost three times greater than its responsiveness to changes in other sources of household income.
Unfortunately, there is little literature on the impact of public and private health expenditure on economic growth. Kwak (2009), in his comparative study of private and state health expenditure, finds that government health expenditure has 30% more impact on economic growth than private health expenditure, regardless of a country's income level. The study also

shows that government health expenditure and other health factors largely controlled by the government, such as access to improved sanitation, are statistically significant in explaining the variance in healthy life expectancy and adult mortality in developing countries. This suggests that private health expenditure is less efficient than government health expenditure in improving and maintaining the health of the general population per dollar spent.

For developing countries, the results show that higher government health expenditure in terms of GDP is linked to better health, whereas higher private health expenditure in terms of GDP is linked to worse health among the population.

Moreover, Halıcı-Tülüce et al (2016), in studying the relationship between health expenditure and economic growth and using panel data consisting of low- and high-income countries, find that while in low-income countries the share of public health expenditure is as positive and significant as in high-income countries, private health expenditure has a negative impact. They explain this situation by the fact that private investments in health infrastructure are not used in an active way. This may result in a negative relationship between private health expenditure and fixed capital investment.

In contrast, private health investments are more productive, according to Bhattacharya and Qiao (2007), when accompanied by complementary tax-financed public health programs.

Since private health expenditure is not used in an active way and thus can be less efficient, especially in developing countries, it could be a constraint to the growth effect of remittances, given that a significant share of remittances are spent on health.

In addition, Hildebrandt and McKenzie (2005) find that one result of Mexican adult migration is reduced infant mortality and higher birth weights, but that children in migrant households receive less preventative care (such as breastfeeding and vaccinations), which affects future health. Moreover, Chauvet et al (2013) find that remittances decrease mortality, but observe a greater countervailing impact of a medical brain drain, which increases mortality.

3- Growth model for WAEMU

The empirical analysis in this paper relies on the endogenous growth model of Romer (1990) and Grossman and Helpman (1991), which is also used by Borensztein et al. (1998). In line with the extant literature, we extend the economic growth model of Borensztein et al. (1998) and specify a macroeconomic endogenous growth model for WAEMU as follows:

$$\begin{aligned}\Delta GDP_{it} &= \alpha_0 + \alpha_1 \Delta FDI_{it} + \alpha_2 \Delta \mathrm{Re}\,mit\tan ces_{it} + \alpha_3 \Delta Healthex_{it} + \alpha_4 \Delta HIV_{it} + \\ &\alpha_5 \Delta Trade_{it} + \alpha_6 \Delta Investment_{it} + \alpha_7 \Delta Tertiary_{it} + \alpha_8 \Delta Inflation_{it} + \alpha_9 \Delta Labor_{it} + \\ &Polstab_{it} + \mu_t + \eta_i + \varepsilon_{it}\end{aligned} \quad (1)$$

From equation 1 GDP_{it} is the GDP of each WAEMU country i at time t as a proxy for rate of economic growth, FDI_{it} is foreign direct investment, net inflows, $\mathrm{Re}\,mit\tan ces_{it}$ is remittances flow to WAEMU, $Trade_{it}$ is exports plus imports, $Inflation_{it}$, inflation rate is based on Consumer Price Index (CPI), $Investment_{it}$ is WAEMU's investment and is derived taking gross fixed capital formation as a proxy, $Healthex_{it}$ is private health expenditure, which includes direct household (out-of-pocket) spending, private insurance, charitable donations, and direct service payments by private corporations, $Health\exp rivate_{it}$, is the share of public in the total health expenditures, $Health\exp ublic_{it}$ is the share of public in the total health expenditures, $Labor_{it}$ is the labor force between the ages of 15–64, $Polstab_{it}$ is Political

Stability and Absence of Violence, terrorism measures, perceptions of the likelihood of political instability, and/or politically-motivated violence, including terrorism, μ_t is a time specific effect, η_i is an unobserved country-specific fixed effects and ε_{it} is the error term.

While private health expenditure have the potential to affect economic activity through the accumulation of the channels, in a second set of regressions, we examine whether remittances are largely sufficient to cover the expenses of recipient households, especially health spending, and whether the remaining remittances could be reinvested in human capital accumulation that to contribute to economic growth. The hypothesis we would like to test is whether the level of remittances relative to health expenditure in the recipient country is sufficient to contribute to economic growth. To this end, we interact the remittances variable with private health expenditure and test for the significance of the interacted coefficient.

The interaction term $\Delta Healthex_{it} * \Delta \mathrm{Re}\, mit \tan ces_{it}$ employed in this study is incorporated into the model to investigate the spillover effects of capital flows (remittances) on the development of private health expenditure. In other words, we employ this interaction term to test whether private health expenditure takes advantage in remittances in order to accelerate the economic growth in WAEMU. We estimate the following regression:

$$\begin{aligned} \Delta GDP_{it} = {} & \alpha_0 + \alpha_1 \Delta FDI_{it} + \alpha_2 \Delta \mathrm{Re}\, mit \tan ces_{it} * \alpha_3 \Delta Healthex_{it} + \alpha_4 \Delta HIV_{it} + \\ & \alpha_5 \Delta Trade_{it} + \alpha_6 \Delta Investment_{it} + \alpha_7 \Delta Tertiary_{it} + \alpha_8 \Delta Inflation_{it} + \alpha_9 \Delta Labor_{it} + \\ & Polstab_{it} + \mu_t + \eta_i + \varepsilon_{it} \end{aligned} \qquad (2)$$

4- Data and estimation procedure

All of the data series employed in the analyses were obtained from World Bank's World Development Indicators (World Bank, 2015), except for the political stability variable, which was obtained from Worldwide Governance Indicators (WGI).

The data set is annual and spans the period 2000–2014. An important econometric issue in the estimation of economic growth models is the causal relationship between private health expenditure and economic growth. A number of previous empirical studies have found reverse causality between private health expenditure and economic growth (Halici-Tülüce, Dogan and Dumrul (2016). To address the issue of reverse causality, this study estimates the model using the Fully Modified Ordinary Least Squares (FMOLS) estimator developed by Phillips and Hansen (1990). The FMOLS method not only accounts for potential endogeneity inherent in the economic growth model, it is also robust and overcomes problems of omitted variables and measurement errors, eliminates sample bias, corrects for serial correlation, and allows for heterogeneity of the long-run parameters. Prior to estimating the economic growth model, we investigate the properties of the panel data employed in the analyses. This is because, as noted by Engle and Granger (1987), a failure to account for nonstationarity of the data series may result in spurious results.

Panel unit root tests (PURT) and cointegration analyses

We investigate the stationarity of the data series by determining whether they exhibit a unit root. We use the Augmented Dickey Fuller (ADF) test attributed to Dickey and Fuller (1979) and the Phillip–Perron (P–P) test attributed to Phillip and Perron (1988) to test for stationarity in the data series. In the presence of a nonstationary data series, we proceed to test for stationarity in the first difference of the variable. If the first difference of the variable is found

to be stationary, then we conclude that the variable is integrated of order one (i.e. I(1)) and therefore has a unit root.

Table 1 reports the panel unit root test results. These results show that all of the variables are integrated with order one, I(1). By differentiating the variables first, the PURT results indicate that all the data series exhibit stationary processes.

Following this, we conclude, based on the PURT, that all of the variables are not cointegrated in levels I(0) but are cointegrated I(1) in first difference. These unit root test results provide empirical evidence of the presence of a nonstationary data series and the potential adverse consequences of neglecting it.

As highlighted by Engle and Granger (1987), Ordinary Least Square (OLS) estimates of nonstationary time series that are not cointegrated may produce spurious results. Consequently, we examine the cointegrating relationships between the variables in the economic growth model. Although the Engle and Granger two-step approach to testing for cointegration has been used extensively in the econometric literature (Engle and Granger, 1987), we note that Pedroni's cointegration procedure is more reliable than the Engle and Granger approach because it does not assume the existence of at most one single cointegrating vector. We conclude that a long-run cointegrated relationship exists between economic growth and the explanatory variables as specified in Equation 1 according to the results reported in Table 2.

Table 1.Panel Unit Root Test (PURT) results

	Levin, Lin & Chut*	Im, Pesaran and Shin W-stat	ADF - Fisher Chi-square	PP - Fisher Chi-square
		Level		
Remittances	-4.574***	-3.979***	111.879***	105.352***
FDI	-8.923***	-9.491***	235.466***	243.82***
Inflation	-0.900	-8.598***	225.998***	320.572***
Healthex	2.395	-1.561**	84.710**	121.791***
Healthexpublic	2,151	1.117	16,166	14,774
Healthexprivate	2,836	-3.867***	2,718	2,405
Trade	1.975	-2.102**	93.294**	109.068***
Investment	0.641	-1.501**	77.780**	105.825***
Tertiary	-2.411***	1.219	72.962	84.238**
Gdp	-0.748	-3.192***	93.911***	83.332**
Labor	-0.430	-9.598***	25.908***	50.502***
Hiv	-3.134***	-1.206	75.036	48.900
		First difference		
Remittances	-6.16***	-8.07***	93.89***	170.70***
FDI	-7.65***	-8.35***	99.93***	187.73***
Inflation	-7.40***	-8.97***	107.24***	214.14***
Healthex	-7.60***	-8.69***	104.51***	186.81***
Healthexpublic	-26,35***	-18.67***	1132,98***	1134,79***
Healthexprivate	-26,36***	-16.92***	262,07***	261,378***
Trade	-14.57***	-18.83***	201.32***	288.79***
Investment	-28.44***	-14.52	-25.84***	575.23***
Tertiary	-14.42***	-8.55	-15.02***	323.41***
Gdp	-17.99***	-12.84***	-17.66***	392.73***
Labor	-9.81***	-1.10	-15.91***	417.85***
Hiv	-18.96***	-13.65***	-15.78***	325.24

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

Table 2.Panel cointegration test results

Method	Coefficients
Panel v-Statistic	0.34
Panel rho-Statistic	-1.66**
Panel PP-Statistic	-2.41***
Panel ADF-Statistic	-2.01***
Group rho-Statistic	-1.25***
Group PP-Statistic	-2.65***
Group ADF-Statistic	-2.08***

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

5- Empirical results and discussion

Having found a long-run relationship between economic growth and its determinants, we proceed to estimate the endogenous growth model for WAEMU. Table 3 reports the empirical results of the economic growth model estimated by OLS and dynamic FMOLS estimators. As noted earlier, the FMOLS estimator produces better results than the OLS estimator as it corrects for the endogeneity problem associated with reverse causality between private health expenditure and economic growth. However, the results of the OLS estimates are fairly similar to those of the FMOLS estimates, suggesting that endogeneity is not a serious econometric problem for these estimates.

The first FMOLS results show that private health expenditure is negatively correlated with economic growth. Health is an important aspect of human capital formation and can therefore have some impact on economic growth. The best-known mechanism is when improved health care leads to an increased level of human skills and an accumulation of human capital, which in turn accelerates economic growth.

However, in some cases, namely in WAEMU, an increased investment in private health expenditure have a negative effect on economic growth.

This is because health structures and systems in these countries are not sufficiently developed or are ineffective in directing private health expenditure to ensure adequate care for patients.

This situation occurs when healthcare spending does not contribute to making people healthier so that they can work harder, better and longer and also think more clearly (Bloom and Canning 2000; Amiri and Ventelou 2012).

When the other mechanism takes place, healthcare spending does not promote higher life expectancy (Acemoglu and Johnson 2006, p.7). Similarly, healthcare spending does not encourage a relationship between labor market participation, worker productivity, savings and population age structure, which has a negative effect on the economic growth rate (Bloom et al. 2005). The maternal mortality ratio, the health system inexistent, the health information system is poorly structured, human resources for health with low quality training, and inexistent quality health infrastructure are not conducive to excellent health care for better health status. It is in this sense that HIV is negatively correlated with economic growth in the WAEMU (Afawubo and Mathey, 2014).

On the other hand, an increased remittances, labor force, tertiary education and political stability lead to economic growth.

In the second FMOLS ($\Delta Healthex_{it} * \Delta \mathrm{Re}mit\tan ces_{it}$ interaction model), remittances positively and significantly affect economic growth. However, the interaction of private health expenditure and remittances is negatively correlated with economic growth in WAEMU.

The positive effects of remittances on the accumulation of human capital (Borraz, 2005; Hanson and Woodruff, 2003; Calero and al., 2008; Yang, 2008; Bansak and Chezum, 2009)

and on economic growth (Giuliano and Ruiz - Arranz, 2008; Catrinescu and al., 2009) have been well demonstrated.

Remittances are likely to increase access to private healthcare services in developing countries when individuals can receive remittances to finance their healthcare expenditure. However, private financing of health expenditure does not favor the accumulation of physical capital and in turn does not contribute to economic growth. Thus, although remittances have positive impact on economic growth, their uses to finance health care expenditures seems very less and is not favorable to economic growth. Financing of health spending through remittances in WAEMU is not efficiently allocated. This does not contribute to the formation of human capital and hence has a negative effect on economic growth. Consequently, the interaction between private health expenditure and remittances constrains the growth effect of remittances.

Table 3.Results of OLS and FMOLS estimates of economic growth model for WAEMU

Variables	OLS	FMOLS	OLS	FMOLS
Constant	-0.37(-1.15)	1.32(0.21)	0.12(0.17)	2.16(0.71)
D(FDI)	0.01(0.07)	0.14**(2.41)	0.19*(1.67)	0.18**(2.01)
D(REMITTANCES)	0.67(1.42)	0.65***(3.18)	0.17*(1.82)	0.16***(2.92)
D(HEALTHEX)	-3.57(-1.27)	-0.45**(-2.08)	-0.39(-1.21)	-0.78(-1.24)
D(HEALTHEX)*D(REMITTANCES)			-0.27*(-1.85)	-0.26**(-1.89)
D(INFLATION)	-0.16(-0.86)	-0.06*(-1.85)	-0.64(-1.41)	-0.57*(-1.86)
D(LABOR)	0.73**(1.97)	1.12***(2.73)	0.02(0.03)	0.02(0.03)
D(TERTIARY)	0.04***(2.38)	0.08***(5.75)	0.06***(2.93)	0.06**(2.42)
D(TRADE)	0.07(1.35)	0.08***(3.78)	0.09*(1.85)	0.08**(2.24)
D(INVESTMENT)	0.25**(2.04)	0.26***(3.66)	0.15(0.93)	0.18(1.56)
D(HIV)	-0.94(-0.34)	-0.89(-0.42)	-0.46(-0.15)	-0.28(-0.08)
POLSTAB	0.72**(1.92)	0.98**(2.58)	0.27(0.54)	0.19(0.29)
Observations	110	110	110	110
R^2	0.34	0.16	0.29	0.11

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

The OLS model results are in line with those of the FMOLS model in the sense that private health expenditure multiplied by remittances ($\Delta Healthex_{it} * \Delta \mathrm{Re}mit\tan ces_{it}$) does not promote the accumulation of human capital to accelerate the economic growth in WAEMU. The gap between remittances and private healthcare expenditure is considerable according to Figure 1. Health investment from remittances is not conducive to human capital accumulation in order to stimulate economic growth.

It should be noted that the explanatory variables that contribute to economic growth in the FMOLS model are economic openness, labor force, tertiary education and investment. However, inflation does not favor economic growth.

Would it be an issue of the low level of private health expenditure as percentage of GDP would explain its negative correlation with economic growth? To answer this question we conduct a robust analysis depending on the level of private health expenditure. In addition, we make another robustness by distinguish two types of health expenditures namely public and private health expenditures and we explore which type of expenditure is more efficiency on economic growth.

6- Robustness check: threshold estimation and distinguishing the effects on economic growth of the share of public and private in the total of health expenditures

Firstly, in light of the main results of the empirical analysis, a simple robustness test consists of splitting the sample according to the level of private health expenditure (above and below median private health expenditure) and comparing, on the one hand, the effect on economic growth and, on the other hand, how the interaction of remittances with each level of private health expenditure impacts the economic growth across the sub-samples.

We expect to find that private health expenditure to have a positive and significant impact on economic growth where the level of private expenditure is high and above the median; the interaction between remittances and private health expenditure is also likely to have a positive effect on economic growth in this sub-sample. However, in sub-samples where the level of private expenditure is below the median, the signs of the relationship are likely to be negative. We split the sample exogenously according to the median level using the following equation.

$$\begin{pmatrix} \Delta GDP_{it} = \alpha_0 + \alpha_1 \Delta FDI_{it} + \alpha_2 \Delta \mathrm{Re}\, mit\, \tan ces_{it} + \alpha_3 \Delta Healthex_{it} + \\ \alpha_4 \Delta HIV_{it} + \alpha_5 \Delta Trade_{it} + \alpha_6 \Delta Investment_{it} + \alpha_7 \Delta Tertiary_{it} + \\ \alpha_8 \Delta Inflation_{it} + \alpha_9 \Delta Labour_{it} + Polstab_{it} + \mu_t + \eta_i + \varepsilon_{it} \\ \Delta GDP_{it} = \alpha_0 + \alpha_1 \Delta FDI_{it} + \alpha_2 \Delta \mathrm{Re}\, mit\, \tan ces_{it} * \alpha_3 \Delta Healthex_{it} + \\ \alpha_4 \Delta HIV_{it} + \alpha_5 \Delta Trade_{it} + \alpha_6 \Delta Investment_{it} + \alpha_7 \Delta Tertiary_{it} + \\ \alpha_8 \Delta Inflation_{it} + \alpha_9 \Delta Labour_{it} + \\ Polstab_{it} + \mu_t + \eta_i + \varepsilon_{it} \end{pmatrix} \quad (3)$$

The analysis is repeated for observations below and above the median of $Healthex_{it}$ separately and the results are reported in Table 4 (without interaction) and in Table 5 (with interaction).

In Table 4, the impact of private health expenditure is positive and significantly associated with economic growth for the sample with high private health expenditure (above the median level). Furthermore, in the sample below the median level, private health expenditure is negatively correlated with economic growth. When the share of private health expenditure in GDP is high, this leads to an increase in the level of human skills, and this situation accelerates economic growth. In contrast, when the share of private health expenditure in GDP is low, private health expenditure negatively affects economic growth. An increase in private health expenditure will enhance the welfare of the population in the long run and result in a healthy labor force, thus boosting productivity and ultimately accelerating economic growth.

The results of the interaction model are reported in Table 5 and confirm the results in Table 3. The impact of remittances interacting with health expenditure is positively and significantly correlated with economic growth for the sample in which health expenditure is above the median level. However, the correlation is negative and significant for the sample in which health expenditure is below the median level, both in the OLS and FMOLS models.

Some theories suggest outcomes in line with our results. They propose that remittances lead to additional incomes that facilitate development by way of increased consumption of goods related to health. Lopez-Cordova (2004), focusing on Mexico, found a positive effect of remittances on health. Hildebrandt and McKenzie (2006) also found a positive effect of migration in terms of reduced child mortality and increased birth weight. They established that positive health outcomes are firstly the result of an increase in income, which allows households to consume more health-improving goods and medical care, and secondly greater health knowledge, which is transferred from migrants to household members and improves

health practices. Lastly, a study by Duryea et al. (2005) found that remittances have a positive effect on infant survival through improved living conditions, while Frank and Hummer (2002) showed that membership of a migrant household reduces the risk of low birth weight.
WAEMU's health policies need to establish and develop effective and appropriate health systems that should encourage more efficient reallocation of the links between household health expenditure and remittances. It is also highly recommended that WAEMU countries implement policies to encourage appropriate health spending to build a healthier and more productive society to support economic growth and development.

Table 4. Results of OLS and FMOLS estimates of marginal impact of remittances on growth below and above the median level of health expenditure in WAEMU

	OLS Below median	FMOLS Below median	OLS Above median	FMOLS Above median
Constant	-0.35(-0.87)	-0.35(-1.44)	-0.28(-0.28)	-0.32(-0.59)
D(FDI)	0.57(1.37)	0.58**(2.39)	0.00(0.02)	0.00(0.04)
D(REMITTANCES)	0.75*(1.89)	0.66*(1.88)	0.05(0.09)	0.16(0.52)
D(HEALTHEX)	-2.19*(-1.86)	-2.07**(-2.33)	3.46*(1.88)	2.75**(2.04)
D(HIV)	-5.37(-1.27)	-5.40**(-2.08)	-3.32(-1.21)	-1.79(-1.23)
D(TRADE)	0.01(0.14)	0.02(0.41)	0.01(0.11)	0.03(0.94)
D(INFLATION)	-0.21**(-2.19)	-0.19***(-3.49)	-0.06(-0.45)	-0.05(-0.78)
D(INVESTMENT)	0.22(1.21)	0.21*(1.91)	0.38*(1.84)	0.32**(2.37)
D(LABOR)	0.16(0.61)	0.16(1.03)	0.37(0.96)	0.33*(1.86)
D(TERTIARY)	0.05***(2.42)	0.05***(3.89)	0.11(0.79)	0.08(1.03)
POLISTAB	0.21(0.23)	0.43(0.69)	0.53(0.51)	0.42(0.72)
Observations	64	64	46	46
R^2	0.42	0.46	0.17	0.18

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

Table 5. Results of OLS and FMOLS estimates of marginal impact of remittances on growth below and above the median level of health expenditure with interaction in WAEMU

	OLS Below median	FMOLS Below median	OLS Above median	FMOLS Above median
Constant	-0.09(-0.15)	-0.22(-0.44)	-0.27(-1.19)	-0.26(-0.67)
D(FDI)	0.11(0.54)	0.11(1.26)	0.53**(2.23)	0.52(1.36)
D(REMITTANCES)	0.23*(1.88)	0.66*(1.88)	0.72(1.14)	0.66(0.13)
D(HEALTHEX)	-1.02*(-1.88)	-0.24**(-2.59)	0.09*(1.94)	0.08**(2.25)
D(REMITTANCES)*D(HEALTHEX)	-0.06(-0.07)	-0.01(-0.02)	2.64*(1.88)	2.92***(3.37)
D(HIV)	-1.96(-0.95)	-0.84(-0.61)	-3.26*(-1.85)	-2.93(-0.64)
D(TRADE)	0.04(0.66)	0.05*(1.85)	0.03(0.63)	0.03(0.45)
D(INFLATION)	-0.08(-0.64)	-0.08(-1.19)	-0.17***(-3.25)	-0.18**(-2.40)
D(INVESTMENT)	0.38**(1.99)	0.36***(3.36)	0.26**(2.29)	0.27(1.23)
D(LABOR)	0.35**(2.77)	0.25(1.50)	0.05(0.36)	0.07(0.29)
D(TERTIARY)	0.01(0.11)	0.01(0.15)	0.05***(4.23)	0.05***(2.65)
POLISTAB	0.12(0.15)	0.03(0.06)	0.09(0.16)	0.25(0.24)
Observations	64	64	46	46
R^2	0.18	0.17	0.19	0.18

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

Secondly, for the robustness purpose, we distinguish two types of health expenditures namely public and private health expenditures. The goal is to explore which of the two expenditure affects more economic growth on the one hand and to investigate whether a large or less share of remittances is more devoted to which health spending (public or private) and if this interaction (health spending and remittances) contributing ultimately to growth economic.

The results of this approach are reported in tables 6 [private health expenditure (HEALTHEXPRIVATE) and remittances effects on economic growth) and tables 7(public health expenditure (HEALTHEXPUBLIC) and remittances effects on economic growth] respectively. Note that HEALTHEXPRIVATE is the proportion of private in overall health expenditures and HEALTHEXPUBLIC is the proportion of public in overall health expenditures.
The results in table 6 show that the proportion of private in overall health expenditures is negatively correlated with economic growth.

Although households spend to finance their health care in this region, it should be noted that the medications market is full of pharmaceutical products that not meet standards from production to distribution channel. Thus, most of the drugs are adulterated, making households sick again.
In addition, for lack of medical resources in health centers, medical care is of lesser quality and the diagnostics of the health workers are not always excellent. Most of the households that not benefit from good quality of care are not healthy in favor to the formation of productive human capital and consequently private health expenditure has a negative effect on economic growth. This result is in line with Halıcı-Tülüce, N.S., Doğan, İ. & Dumrul, C.(2016).

On the other hand, the effect of the interaction between remittances and private health expenditure is also negative on economic growth. This result could be explained by the fact that, the share of remittances devoted to health expenditure would be slightly lower. Hence, the use of remittances for health expenditures is less growth enhancing than alternative remittance uses.

The tables 7 show the effect of the share of public in overall health expenditures on economic growth. We find a positive relationship between the two variables. This result can be explained by the fact that public health expenditures are used to improve health infrastructure, to strengthen the capacity of health personnel and to reduce the cost of access to basic health care through subsidies.
Moreover, most of what government programs cover is the medical care that is crucial for survival, healthfulness, and the well-being of the citizens and labor force. Further, it is hypothesized that government health expenditures matter more for developing countries because citizens are less able to afford even basic medical care on their own, thus placing a larger burden on the government.
Thus, the amount of public health expenditures spends on the health care for citizens, in the form of government paid medical care, public vaccination programs in the case of WAEMU, has a more direct influence on economic growth than private health expenditures.
This result is in line with other studies such as those of Kwak (2009), Novignon and al, (2012), Bloom and Canning (2003), Bloom and Canning (2004), and Gyimah-Brempong and Wilson (2004) which highlight the positive link between public health expenditure and economic growth.
The major policy recommendation that emerges from the result is the need for WAEMU policy makers is to increase the public health budget allocation.
Finally, health workers must have training and retraining so that they can be more efficient and more workers should be recruited into the health sector and also improving health infrastructures so as to bring about growth not only in the sector but in the whole economy.

Table 6.Results of OLS and FMOLS estimates of private health expenditure and remittances effects on economic growth model for WAEMU

Variables	OLS	OLS	FMOLS	FMOLS
Constant	6.99(0.06)	-5.91(-0.40)	7.00(0.045)	4.26(1.52)
D(FDI)	0.07(0.57)	0.03(0.28)	0.00(0.045)	0.02(0.16)
D(REMITTANCES)	0.02(0.07)	0.35(1.23)	0.06(0.26)	0.27(0.75)
D(HEALTHEXPRIVATE)	-0.02***(-2.65)	-0.00**(-1.98)	-0.01*(-1.92)	-0.03*(-1.95)
D(REMITTANCES)* D(HEALTHEXPRIVATE)		-0.01(-0.72)		-0.01(-0.74)
D(HIV)	-1.39*(-1.73)	-1.78(-1.52)	-1.87***(-2.62)	-1.89***(-2.63)
D(TRADE)	0.03(1.01)	0.06*(1.85)	0.06**(2.26)	0.06**(2.28)
D(INFLATION)	-0.21(-1.28)	-0.12(-1.73)	-0.09(-1.22)	-0.08(-1.13)
D(INVESTMENT)	0.15(1.42)	0.12(1.33)	0.09(1.11)	0.09(1.07)
D(LABOR)	0.09(0.54)	0.13(0.75)	0.12(0.83)	0.15(0.98)
D(TERTIARY)	0.07(1.28)	0.03(0.58)	0.05(1.47)	0.06(1.49)
POLISTAB	0.43***(3.46)	0.10***(3.67)	0.17***(3.76)	0.19***(3.77)
Observations	110	110	110	110
R^2	0.46	0.35	0.33	0.34

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

Table 7.Results of OLS and FMOLS estimates of public health expenditure and remittances effects on economic growth model for WAEMU

Variables	OLS	OLS	FMOLS	FMOLS
Constant	-8.55(-0.59)	-8.51(-0.35)		
D(FDI)	0.03(0.24)	0.03(0.38)	-0.03(-0.33)	0.01(0.10)
D(REMITTANCES)	0.09(0.35)	0.05(0.13)	0.09(0.44)	0.32(0.74)
D(HEALTHEXPUBLIC)	0.04**(2.05)	0.27*(1.69)	0.32***(3.46)	0.79***(2.93)
D(REMITTANCES)* (HEALTHEXPUBLIC)		-0.10(-0.13)		-0.74(-0.79)
D(HIV)	-0.89(-1.09)	-0.89(-0.68)	-0.98(-1.48)	-0.84(-1.20)
D(TRADE)	0.06*(1.62)	0.06(1.15)	0.07***(2.97)	0.08***(2.91)
D(INFLATION)	0.22(1.33)	0.21(0.98)	0.13**(1.96)	0.13*(1.82)
D(INVESTMENT)	0.19*(1.82)	0.19**(2.00)	0.15**(1.96)	0.14(1.61)
D(LABOR)	0.17(1.01)	0.17(0.68)	0.13(1.01)	0.05(0.39)
D(TERTIARY)	0.09(1.55)	0.09(1.05)	0.06*(1.89)	0.06*(1.72)
POLISTAB	0.36***(3.46)	0.35***(2.76)	1.79***(3.57)	1.75***(3.29)
Observations	110	110	110	110
R^2	0.49	0.49	0.39	0.38

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

7- Conclusion

Understanding the determinants of economic growth is a key issue for the global economy and especially for developing countries aiming to reduce their poverty level.

Health is a crucial factor in the accumulation of human capital, which could be achieved through more efficient health expenditures. Thereby, health expenditure can affect economic growth through certain mechanisms. The best known of these mechanisms is that improved health standards may result in a higher level of human skills, which may in turn promote economic growth.

In this paper, we have empirically analyzed the relationship between private health expenditure on economic growth in eight WAEMU countries given that the structural adjustment programs implemented in these countries have led to support for health needs and health expenditure by the private sector. Then our research analyzes whether financing private health spending through remittances could contributes to economic growth.

Our empirical analysis relies on an endogenous growth model. We used an OLS model in addition to the FMOLS method, which is robust, to account for potential endogeneity inherent to the economic growth model and to overcome potential problems of omitted variables, measurement errors, serial correlation, allow for the heterogeneity of long-run parameters.

Our empirical analysis brings out two main interesting results. The first important result is that private health expenditures deter economic growth in our sample countries. The second important result is that the interaction of remittances with private health expenditures also has a negative effect on economic growth. The share of remittances allocated to health expenditures are very less and unlikely to be used in an active way. This result was strengthened by the those including a threshold estimation. The sample in which health expenditure was below the median shows a negative growth effect of remittances' interaction with private health expenditure. While the sample above the median level of health expenditure is positive and significant.

The results of this paper provide strong empirical evidence for the need to improve health systems in WAEMU.

The governments of this region must control the health care products from which private expenditure is allocated so that these products do not harm the health of the population. This includes the development of adequate and effective health structures to enable optimum use of private health expenditures. Another recommendation is that governments in these countries should establish economic policies that make it possible for remittance income to effectively support private health spending, resulting in human capital accumulation that will ultimately contribute to economic growth in WAEMU.

WAEMU countries must develop policies to enhance the level of necessary private health expenditure financed by remittances that to encourage capital formation and consequently economic growth. Finally, WAEMU policy makers must to increase the public health budget allocation in order to improve the health of the population.

Table 8.Description statistics

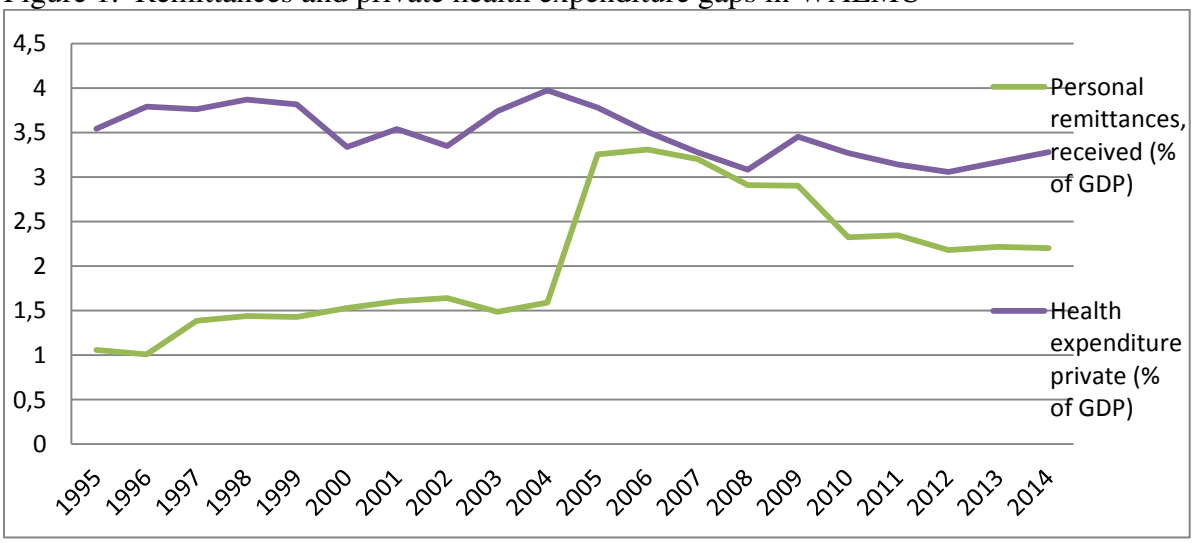
	REMITTANCES	FDI	HEALTHEX	TRADE	INVESTMENT	LABOR	INFLATION	GDP	TERTIARY	HIV	HEALTHEXPRIVATE	HEALTHEXPUBLIC
Mean	4.27	2.58	3.47	63.67	18.47	71.83	2.48	1.42	48.4	0.13	41.44	58.55
Median	11.49	19.37	5.44	125.02	38.89	83.59	11.30	11.34	64.66	0.63	42.88	57.11
Maximum	0.80	-0.90	2.05	30.73	4.01	51	-3.50	-9.05	10.1	0.01	60.27	82.75
Minimum	2.98	1.92	3.38	60.19	19.28	72.54	2.20	1.14	41	0.11	17.24	39.72
Std. Dev.	3.27	3.13	0.91	19.50	7.98	8.09	2.79	3.41	3.65	0.12	10.64	10.64

Table 9. Correlation matrix

	Variables	1	2	3	4	5	6	7	8	9	10	11	12
1	REMITTANCES	1											
2	FDI	-0.004*	1										
3	GDP	0.059**	0.108*	1									
4	HEALTHEX	0.001*	-0.057	-0.005*	1								
5	TRADE	0.537**	0.177	0.142**	-0.363	1							
6	INFLATION	-0.118	-0.061	-0.037*	0.091	-0.079	1						
7	TERTIARY	0.068	0.106	0.104	0.409	0.542	0.674	1					
8	HIV	-0.061	0.031	-0.001*	0.007	0.008	0.324	-0.072*	1				
9	INVESTMENT	0.231*	0.256*	0.202**	-0.223*	0.207	0.029	0.109*	0.567	1			
10	LABOR	0.543	0.982**	0.051*	-0.231	-0.452	-0.009*	0.072	0.124*	0.221*	1		
11	HEALTHEXPUBLIC	-0.3348	-0.8533	0.2785	0.851	0.650	0.286	-0.663	0.163	0.785	0.124	1	
12	HEALTHEXPRIVATE	0.786	-0.034	0.300	-0.146	0.421	0.376	-0.131	0.025	0.260	0.428	0.585	1

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

Figure 1. Remittances and private health expenditure gaps in WAEMU



Sources: World Bank data

Table 10. Variables definition

Variables	Indicator Name
TERTIARY	School enrollment, tertiary (% net) , (WDI)
INFLATION	Inflation, consumer prices (annual %),(WDI)
LABOR	Labor force participation rate, total (% of total population ages 15-64) (modeled ILO estimate), (WDI)
HEALTHEX	Health expenditure, private (% of GDP), (WDI)
HEALTHEXPUBLIC	Share of public in the total health expenditure (%) (WDI)
HEALTHEXPRIVATE	Share of private in the total health expenditure (%) (WDI)
REMITTANCES	Personal remittances, received (% of GDP), (WDI)
FDI	Foreign direct investment, net inflows (% of GDP) , (WDI)
GDP	GDP per capita (annual %),(WDI)
INVESTEMENT	Gross fixed capital formation (% of GDP), (WDI)
TRADE	Trade (% of GDP), (WDI)
HIV	Prevalence of HIV, total (% of population ages 15-49) , (WDI)
POLISTAB	Political Stability and Absence of Violence/Terrorism measures perceptions of the likelihood of political instability and/or politically motivated violence, including terrorism. (WGI)

8- References

Acemoglu D. and Johnson S. (2006) "Disease and Development: The Effect of Life Expectancy on Economic Growth." *Working paper* no.12269 (June), NBER, Cambridge, MA

Acupan A. B. and Agbola, F. W. (2010) "International labour migration, remittances and poverty alleviation in the Philippines", *Academy of Taiwan Business Management Review* 6, 1-12

Afawubo K. and Mathey S. (2014) "Education and employment effects on HIV/ AIDS prevalence rate and economic growth: Empirical investigation in ECOWAS", *Applied economics letters* 21,11, 755-759

Agbola F. W. (2013) "Does human capital constrain the impact of foreign direct investment and remittances on economic growth in Ghana?", *Applied Economics*, 45:19, 2853-2862, DOI: 10.1080/00036846.2012.676735

Amiri A. and Ventelou B. (2012) "Granger causality between total expenditure on health and GDP in OECD:Evidence from the Toda-Yamamoto approach", *Economics Letters*,116, 3

Amuedo-Dorantes C. and Pozo S. (2009) "New evidence on the role of remittances on healthcare expenditures by Mexican households", *Review of Economics of the Household* 9,1, 69-98

Amuedo-Dorantes C., Pozo S. and Sainz T. (2007) "Remittances and Healthcare Expenditure Patterns of Populations in Origin Communities: Evidence from Mexico". *Integration and Trade journal* 27,159 -184

Ashta A., Couchoro M. and Musa A. S. M. (2014) "Dialectic evolution through the social innovation process: from microcredit to microfinance", *Journal of Innovation and Entrepreneurship* 3, 4

Bansak C. and Chezum, B. (2009) "How Do Remittances Affect Human Capital Formation of School- Age Boys and Girls?", *American Economic Review* , 99,2, 145-148

Barro R. J. (1998) "Determinants of Economic Growth: A Cross-Country Empirical Study", MIT Press Books, The MIT Press, edition 1, volume 1, number 0262522543

Barro Robert J. (2008) "Determinants of Economic Growth: A Cross-Country Empirical Study". Cambridge, MA: The MIT Press, 1997. Xii 1145 pp

Bhattacharya J. and Qiao X. (2007) "Public and private expenditures on health in a growth model", *Journal of Economic Dynamics and Control*, 31(8), 2519-2535

Bleakley H. (2007) "Disease and Development: Evidence from Hookworm Eradication in the American South", *The Quarterly Journal of Economics* 122, 1, 73-117

Blomqvist A.G. and Carter R. A. L. (1997) "Is health care really a luxury?", *Journal of Health Economics*,16, 207-229

Bloom, G. (2001) "Equity in health in unequal societies: meeting health needs in contexts of social change", *Health Policy* 57, 3,205-24

Bloom, D., and Canning D. (2003) "The Health and Poverty of Nations: From Theory to Practice," *Journal of Human Development*, 4, 1, 47–71.

Bloom, D., Canning, D. and Sevilla J. (2004), "The Effect of Health on Economic Growth: A Production Function Approach",*World Development*, 32, 1, 1-13.

Bloom, D.E., Canning, D. and Chan, K. (2005) "Higher Education and Economic Development in Africa", Draft Report prepared for the World Bank, Washington D.C.: The World Bank

Bloom, D.E. and Canning, D., (2000) "The Health and Wealth of Nations", Science,287,1207-09

Borraz, F., (2005) "Assessing the Impact of Remittances on Schooling: the Mexican Experience", *Global Economy Journal*, De Gruyter, 5,1

Calero C., Bedi A. S. and Sparrow R. (2008) "Remittances, Liquidity Constraints and Human Capital Investments in Ecuador", IZA Discussion Papers 3358, Institute for the Study of Labor (IZA), Bonn, Germany

Catrinescu, N., Leon-Ledesma, M., Piracha, M. and Quillin, B. (2009) "Remittances, Institutions,and Economic Growth", *World Development*, Elsevier, 37,1,81-92

Chami ,R, Cosimano, T. F., and Gapen, M.T. (2006) "Beware of Emigrants Bearing Gifts: Optimal Fiscal and Monetary Policy in the Presence of Remittances", IMF Working Paper 06/61 (Washington: International Monetary Fund)

Chami, R., Hakuraand, D. and Montiel, P. (2009) "Remittances: An Automatic Stabilizer?", IMF Working Paper 09/91

Chauvet, L., Gubert, F. and Mesplé-Somps, S. (2013) "Aid, Remittances, Medical Brain Drain and Child Mortality Evidence using Inter and Intra-Country Data", *Journal of Development Studies*, 49(6)

Dickey, D. A. and Fuller, W. A. (1979) "Distribution of the estimators for autoregressive time series with a unit root", *Journal of the American Statistical Association* 74,427-31

Duryea, S., Lopez-Cordova, E. and Olmedo A. (2005) "Migrant remittances and infant mortality: evidence from Mexico", mimeo, IADB, Washington, DC

Engle R. F. and Granger C. W. J. (1987) Co-integration and error correction: representation, estimation, and testing, *Econometrica* 55, 251-76

Fayissa B, Nsiah C. (2008) "The impact of remittances on economic growth and development in Africa", Department of Economics and Finance, Working paper Series, February

Frank, R. and Hummer, R. A. (2002) "The other side of the paradox: the risk of low birth weight among infants of migrant households within Mexico", *International Migration Review* 36, 746-65

Giuliano, P. and Ruiz-Arranz, M. (2005) "Remittances, Financial Development, and Growth", IMF Working Paper 05/234 (Washington: International Monetary Fund)

Giuliano, P. and Ruiz-Arranz, M. (2009) "Remittances, financial development, and Growth", *Journal of Development Economics*. 90, 144-152

Gyimah-Brempong, K., and Wilson, M. (2004), "Health Human Capital and Economic Growth in Sub-Saharan African and OECD Countries", *The Quarterly Review of Economics and Finance*, 44, 2, 296–320.

Halıcı-Tülüce, N. S., Dogan, I. and Dumrul, C. (2016) "Is income relevant for health expenditure and economic growth nexus? " *International Journal of Health Economics and Management* 16, 23-49

Hanson G. and Woodruff C. (2003)" Emigration and educational attainment in Mexico", University of California at San Diego, Mimeographed

Hasan R. A. (2006)"Harnessing remittances for economic development of Bangladesh", Working Paper Series No.1, Dhaka: INAFI Bangladesh

Hansen P., and King A. (1996) "The determinants of health care expenditure: a cointegration approach", *Journal of Health Economics*, 15, 127-137

Hildebrandt N. and McKenzie D. (2005) "The effects of migration on child health in Mexico", World Bank Policy Working Paper, No. 3573

Hitiris, T. and Posnett, J. (1992) "The determinants and effects of health expenditure in developed countries". *Journal of Health Economics* 11,173-181

Kanaiaupuni, S. M. and Donato, K. (1999) "Migradollars and Mortality: The Effect of U.S. Migration on Infant Survival in Mexico", *Demography* 36,3,339-353

Kapur, D., (2004) "Remittances:The New Development Mantra?", *G24Discussion Paper*,No 29.

Ke, X, Saksenaa P and Hollyb, A. (2011) "The Determinants of Health Expenditure: A Country-Level Panel Data Analysis", Working Paper of the Results for Development Institute.

Kireyev, A. (2006) "The Macroeconomics of Remittances: The Case of Tajikistan", IMF Working Paper, 6,2,1-26.

Kwak, R. (2009) "The Relative Role of Public and Private Health Expenditure for Economic Growth: A Solow Growth Model Expansion", Honors theses, University of Vanderbilt.

Lianos ,T., and Pseiridis, A. (2009) "On the occupational choices of return migrants", *Entrepreneurship and Regional Development*, 21,2, 155-181

Lopez-Cordova, E. (2004) "Globalization, migration and development: the role of Mexican migrant remittances", INTAL-ITD, Working Paper No. 20, Inter-American Development Bank, Washington, DC.

Lueth, E. and Ruiz-Arranz, M. (2007) "Are Workers' R emittances a Hedge against Macroeconomic Shocks?, The Case of Sri Lanka", *Asia Pacific Development Journal*, 14,1,, 25-39

Madsen, J. B.(2012)" Health, Human Capital Formation and Knowledge Production: Two Centuries of International Evidence, NBER Working Paper, No w18461.

McCoskey. S.K, and Selden T.M., (1998) Health care expenditures and GDP: Panel data unit root test results, *Journal of Health Economics*, 17: 369-376

McKenzie, D. J. and Rapoport ,H. (2006)" Migration and education inequality in rural Mexico", INTAL-ITD, Working Paper 23, Inter-American Development Bank, Washington, DC

Mundaca, G. (2009) "Remittances, Financial Markets Development and Economic Growth: The Case of Latin America and Caribbean", *Review of Development Economics*, 13, 2, 288-303

Phillips, P. C. B. and Hansen, B. E. (1990) "Statistical inference in instrumental variables regression with I(1) processes", *Review of Economic Studies*, 57, 99-125

Phillips, P. C. B. and Perron, P. (1988) "Testing for a unit root in time-series regression", *Biometrika* 75, 335-46

Piracha, M., Catrinescu, N., Leon-Ledesma, M. and Quillin, B. (2006) "Remittances, Institution and Economic Growth", Discussion paper, serie IZA DP, N° 2193

Roberts J. (1999) Sensitivity of elasticity estimates for OECD health care spending: analysis of a dynamic heterogeneous data field, *Health Economics* 8: 459-472

Romer P. M. (1986), "Increasing returns and long-run growth", *Journal of Political Economy* 94, 1002-37

Romer ,P. M. (1990)" Endogenous technology change", *Journal of Political Economy* 98,71-102

Romer, P.M. (1992) "Increasing returns and new developments in the theory of growth", NBER Working Papers No. 3098, National Bureau of Economic Research, Inc

Root, F. and Ahmed, A. (1979) "Empirical determinants of manufacturing direct foreign investment in developing countries", *Economic Development and Cultural Change*, 27,751–67

Rozelle, S., Taylor, J. E. and de Brauw, A. (1999) "Migration, remittances and agriculture productivity in China", *American Economic Review* 89, 287-91

Sadik, A. T. and Bolbol, A. A. (2001) "Capital flows, FDI, and technology spillovers: evidence from Arab countries", *World Development* 29, 2,111-25

Valero-Gil, J. (2008) "Remittances and the household's expenditures on health", MPRA Paper 9572, University Library of Munich, Germany

World Bank (2006) "Global Economic Prospects 2006 Economic Implications of Remittances and Migration", The World Bank Group, New York

Yang, D. (2008) “International Migration, Remittances, and Household Investment: Evidence from Philippine Migrants' Exchange Rate Shocks”, *Economic Journal*, 118(528): 591-630