

Article

Remittances, Development Level, and Long-Run Economic Growth

Kristina Matuzeviciute * and Mindaugas Butkus *

Department of Economics, Šiauliai University, Šiauliai LT-77156, Lithuania

* Correspondence: matuzeviciute@gmail.com (K.M.); mindaugo.butkaus@gmail.com (M.B.)

Academic Editor: Jacques Poot

Received: 13 June 2016; Accepted: 22 November 2016; Published: 1 December 2016

Abstract: This paper seeks to enrich the field of research on the topic of the impact of remittances on long-run economic growth. Using an unbalanced panel data covering a sample of 116 countries with different development levels over the period 1990–2014, we studied the interaction between remittances and the level of economic development, as well as its impact on long-run economic growth—because the impact of remittances could be influenced by the development level of the receiving countries. In parallel, we explored the hypothesis about diminishing a country’s capacity to use remittances for promoting long-run economic growth as the abundance of remittances increases. To control the endogeneity while estimating the impact of remittances on long-run economic growth, we used OLS (ordinary least squares) with FD (first differences) transformation and FE (fixed effects) approaches and other controls of long-run growth. Our results showed that in general remittances have a positive impact on long-run economic growth, but the impact differs based on the country’s economic development level and the abundance of remittances in the economy.

Keywords: remittances; long-run economic growth; development level

JEL Classifications: F24; F43; O11

1. Introduction

International migration leads to various social, economic, and cultural consequences. One of the migration channels of economic growth is remittances. The growing flows of remittances have attracted the interest of researchers and policymakers; thus this requires the understanding of their impact on long-run economic growth. Most of the studies on remittances focus on three main issues. The first group focuses on the direct impact of remittances on income distribution and individual well-being. The second group focuses on the impact of remittances on the country’s trade and current account balance. The third group of research examines the impact of remittances on the national economic growth.

According to the data of World Development Indicators (WDI) in 2014, 528 billion USD of remittances were transferred worldwide through official channels compared with only 68 billion USD transferred in 1990. For many developing countries remittances represent a significant share of the country’s GDP (in Tajikistan, Kyrgyz Republic, Nepal, Tonga, Moldova, Liberia, Haiti, and Gambia they represent more than 20 percent). The magnitude of remittances suggests that they can have a significant impact on economic growth.

Although there are a lot of scientific papers investigating various aspects of the relationship between remittances and economic growth, little attention has been paid to empirical evidence analysing the impact on long-run growth in countries with different economic development levels and different remittances-to-GDP ratios. So we aimed to analyse the importance of remittances

in promoting long-run economic growth, paying special attention to the evaluation of relationship between remittances, development level, remittances-to-GDP ratio, and long-run growth.

Researchers have found both positive [1–13] and negative [14–16] impacts of remittances on economic growth. Also, there are studies that show that no impact of remittances on economic growth [17]. So there is no conclusive answer about their impact on economic growth: the situation of contrasting findings possibly results from multiple channels through which remittances can affect economic growth. The impact of remittances depends on a country's socioeconomic conditions [18–20], and the channels through which this impact of remittances on economic growth manifests itself are complex and are likely to be country-specific [21]. It is important to find out which factors shape this impact so that this process could be properly adjusted. Special attention is usually paid to the financial development of the country [21,22]. As a universal theory or model explaining the interaction between remittances and a country's economic growth has not yet been created, our research provides insight about the potential channels through which remittances affect long-run growth, and aims to analyse how development level and the abundance of remittances in the economy, as two socioeconomic conditions, shape the impact of remittances on long-run growth.

This paper seeks to evaluate the relationship between remittances and long-run economic growth and also a country's capacity to use remittances for promoting long-run economic growth. Using panel data from 116 countries with different development levels and remittances-to-GDP ratios, this paper provides an econometric evaluation of the impact of remittances on long-run economic growth. The research shows that remittances have a positive impact in the analysed countries, but it depends on the country's development level and remittances-to-GDP ratio.

The rest of the paper is organized as follows: Section 2 presents the background of the relationship between migrants' remittances and long-run economic growth. Section 3 presents the data and model specifications. Section 4 presents the estimation results. Section 5 summarises the findings. The last section concludes the paper.

2. Literature Review

The scientific literature identifies various channels through which remittances have an impact on economic growth. Remittances promote economic growth by increasing household income [23]. Increasing income creates the opportunity to boost consumer spending, accumulation of assets, promotion of self-employment, and investment in small business. Moreover, emigration and remittances contribute to human capital accumulation [24]. A positive impact of emigration on growth is more likely in developed countries, which usually have a higher ability to transfer knowledge and skills when emigrants return to the country of origin, or to divert remittances in order to create new opportunities in the private sector. A negative impact of emigration results if the developing countries of origin suffer from brain drain and start to depend on remittances [25]. There are some studies that analyse whether the level (measured as remittances-to-GDP ratio) and growth of remittances are related to a higher level of economic growth [26,27]. Estimations of economic relationships in a non-remittance-dependent setting model show that remittances have a positive impact on GDP growth, but these results are sensitive to the selection of explanatory variables. Our empirical study in this paper aims to supplement previous research and provide empirical evidence on a country's diminishing capacity to use remittances for promoting long-run economic growth as the abundance of remittances is increasing.

At the macroeconomic level, the impact of remittances occurs within the multiplier effect through a household's consumption of goods and services; investment in human capital, which improves labour productivity; and investment in gross capital formation [28]. Despite the positive impact of remittances, they cannot ensure long-run economic growth or solve structural economic problems, such as unstable political climate and economic policies, or corruption, which is common in developing countries [29]. Some studies found that remittances influence economic growth in less developed countries because they fill the gap of foreign currency shortage [30]. The other reason for a positive impact is that remittances provide an alternative way to finance investments and help

overcome liquidity constraints [11]. Figure 1 shows the impact of remittances on economic growth at a macroeconomic level.

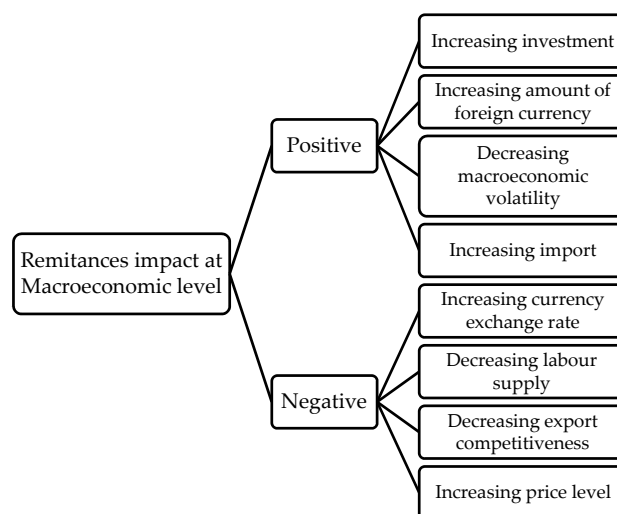


Figure 1. The macroeconomic impact of remittances on economic growth. Source: own compilations based on the listed scientific literature.

Only by ensuring the stable political and economic environment of the receiving country can remittances ensure economic growth, because this money will be used not for personal consumption, but for investment in productive activities or business [31]. The impact of remittances on the country's economic growth depends on the financial system and the financial market development [21], as well as on the specific economic conditions [21] in the receiving country. Remittances may affect economic growth by decreasing volatility, because remittances do not exhibit too much volatility against changes in the economy [32]. Giuliano and Ruiz-Arranz [21] find that remittances are typically pro-cyclical for the remittance-receiving country, while Frankel [33] and Bettin et al. [20] find that they are typically countercyclical.

Remittances promote additional expenditures in the country, and this influences the opportunity to invest more [34]. Remittances are the source of foreign currency, encouraging higher savings and economic growth [35–38]. If remittances create a higher demand than the country is able to meet they also increase imports, which create a variety of goods and services. In this case, it worsens the prosperity of households that do not receive remittances [36]. The impact of remittances on economic growth is relatively sensitive to country-specific conditions, through which the effects of remittances are differentiated in size and possibly in nature. The impact of remittances depends highly on public policy, controlling the flow of remittances and creating a favourable environment for the use of remittances in productive investment [39].

The impact of remittances on a country's economic growth is analysed at various levels: individuals or households (micro-), and country (macroeconomic). In this paper we analyse the macro-level impact. Previous research analyses the impact of remittances on the economic growth in major remittance recipients, such as India, China, the Philippines, Mexico, Nigeria, Egypt, Pakistan, Bangladesh, Vietnam, and the Ukraine. Most of the studies have generally found that remittances had a positive impact on economic growth. Table 1 provides research on the impact of remittances on economic growth at the macro level.

Table 1. Summary of research on the impact of remittances on economic growth.

Author	Research Period	Research Sample	Research Methods	Research Results
Feeny et al. [40]	1971–2010	136 developing countries	Ordinary Least Squares	Remittances have no impact on per capita income growth
Nwaogu, Ryan [41]	1970–2009	53 African, 34 Latin American and Caribbean countries	Dynamic spatial-lag model	Positive impact of the remittances on economic growth
Tahir et al. [42]	1977–2013	Pakistan	Autoregressive Distributed Lag Model	Remittances have a significant positive impact on economic growth
Olubiyi [43]	1980–2012	Nigeria	VECM Granger causality	Unidirectional causality
Zizi [44]	1995–2011	CEE countries	Panel regression	Remittances have positive impact on economic growth
Kumar, Vu [45]	1980–2012	Vietnam	Autoregressive distributed lag (ARDL) co-integration, Granger causality	Bidirectional causality between remittances and economic growth
Imai et al. [46]	1980–2009	Asia and Pacific countries	Panel data analysis	Remittances have positive impact on economic growth
Nyeadi, Atiga [47]	1980–2012	Ghana	Johansen and Juselius co-integration test, Granger causality test	Unidirectional causality from remittances to economic growth
Kumar, Stauermann [48]	1979–2012	Bangladesh	ARDL co-integration, Granger causality test	Positive in the long run, bidirectional causality
Salahuddin, Gow [49]	1977–2012	Bangladesh, India, Pakistan and the Philippines	Panel co-integration tests, Pooled Mean Group (PMG) regression	Positive in the long run, statistically insignificant impact in the short run
Lim, Simmons [50]	1990–2012	Caribbean Community and Common Market	Panel co-integration test	No significant relationship between remittances and economic growth in the long run
Jouini [51]	1970–2010	Tunisia	ARDL co-integration	No impact on the economic growth in the long run and bidirectional causality between remittances and growth in the short run

As shown in Table 1, the impact of remittances on the country's economic growth occurs through different factors in the receiving country. Barajas et al. [17], Chamiet al. [14], IMF [16], and Kasnauskienė and Buzytė [52] find a zero or negative relation between remittances and long-run economic growth. Faini [53,54], Catrinescu et al. [55], Giuliano, Arranz [21], Jongwanich [9], Pradhan et al. [12], Cooray [56], and Lartey et al. [57] find a positive effect, while other studies find that the impact varies according to a country's educational attainment, financial market depth, and quality of institutions [21,58,59]. Glytsos [60,61] finds that remittances have an asymmetric impact on economic growth. Other studies have examined the impacts of remittances on various factors of growth: Edwards, Ureta [62], Hildebrandt, McKenzie [63], López-Córdova [64], Gitter, Barham [65], Amuedo-Dorantes et al. [66], and Acosta et al. [67] analysed the impact on human capital; Demirgüç-Kunt et al. [68] were concerned with the impact on financial development of increasing resources for health and education; Chami et al. [14] and Jackman et al. [69] examined the impact on investment volatility; Narayan et al. [70] found that remittances lead to inflation; and Pozo [71] investigated the impact on the real exchange rate. Remittances promote economic growth by providing additional foreign exchange and financing business investments [72,73]. Remittances can also reduce domestic macroeconomic volatility, thereby encouraging greater domestic investment [17].

Overall, the results of the aforementioned research are inconclusive. The results vary depending on the selected variables, country, and time series criteria. Clemens and McKenzie [74] propose that when measuring remittances' influence on economic growth it is important to pay attention to measurement error, statistical power, and the effect of emigration on domestic labour stocks. Remittances are one of the sources of household income. Their impact on economic growth depends on the economic situation in the country and the possibility of using remittances. Remittances increase

investment in physical capital and that leads to an increase in the domestic investment rate. The other channel through which remittances affect economic growth is accumulation of human capital. Also, remittances have an impact on economic growth via financial systems in the receiving country as a source of financial funds.

3. Data and Methodology

3.1. Source and Brief Analysis of Data

This subsection describes the data on remittances, economic development, and long-run economic growth, as well as the control variables used in growth regressions. In this part we also provide an initial analysis of the collected data, emphasizing the dynamics of remittances.

There is no one common definition for *remittances* among policymakers and academics, but in general we can define remittances as the sum of three elements in the IMF's Balance of Payment Statistics Yearbook (BOPSY): migrant transfers, compensation of employees, and workers' remittances. This is also used as the standard definition in the World Development Indicators (WDI) and the WB's Global Development Finance databases.

The data series for remittances in this study covers a sample of 116 countries (the list is reported in Appendix A) for the 1990–2014 period, which accounts for about 70 percent of world remittance flows, as shown in Figure 2.

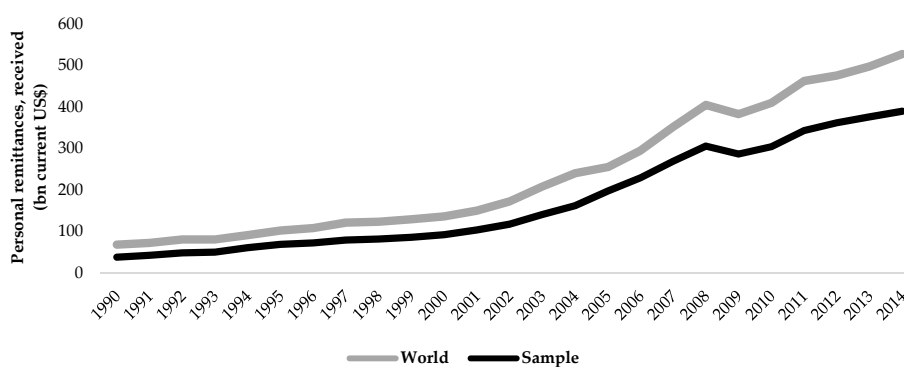


Figure 2. Remittance flows. Source: own calculations using World Development Indicators.

According to the World Bank statistics, in recent years more than 250 million people, or 3.4 percent of the world population, live outside their country of birth. The growth of emigration during the analysed period is about 59 percent. It is estimated that remittances sent back to the country of origin increased to 528 billion USD in 2015 compared with 68 billion in 1990. This is related to the increasing number of migrants.

Remittances remain one of the most important sources of total international capital flows. For many developing countries, remittances represent a significant part of international capital flows (on average 27 percent of FDI during the analysed period; see Figure 3).

Remittances as a share of GDP are relatively small, but the share has doubled during the analysed period (1990—0.3 percent of GDP; 2014—0.7). In the aggregate, recorded remittances have grown faster than foreign direct investment and GDP. The growth of remittances during the analysed period is more than 670 percent. The highest growth rate was recorded in 2007 and it was driven by large economic growth around the world. The decrease of remittances during 2008–2009 was caused by difficult economic conditions in major remittance source countries. After the economic crisis, remittances started to grow but the growth rate remained volatile. After several years of rapid growth, remittance flows began to slowdown and even decrease in 2008. This slowdown deepened in 2009 in response to the global economic crisis, which affected most of the countries. After recovery in 2010, remittances started to grow. The main driver of growth in remittance flows was the expansion of incomes in the

destination countries and faster recovery after economic crisis in developed countries. The motivation to migrate remains strong and improving conditions in the labour market in the destination countries have increased the flows of remittances, but the slowdown of remittance growth during the last few years shows uneven economic recovery in developed countries.

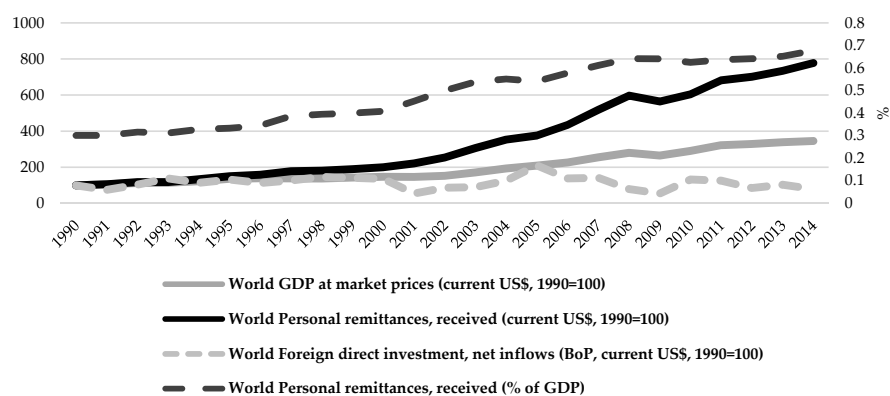


Figure 3. Comparison of world GDP, remittances, and FDI growth. Source: own calculations using World Development Indicators.

Compared to previous studies (see Table 1), we are able to include not only a certain group of countries but also a much larger number of developing and developed countries from different regions of the world (see Table 2).

Table 2. Countries in the research sample.

Region of the World	Number of Countries out of Total in Region	Part of the Sample, %	Income Group	Number of Countries out of Total in Income Group	Part of the Sample, %
East Asia & Pacific	16 out of 36	14	High income: non-OECD	17 out of 47	14
Europe & Central Asia	29 out of 57	25	High income: OECD	18 out of 32	15
Latin America & Caribbean	25 out of 41	22	High income	35 out of 79	29
Middle East & North Africa	11 out of 21	9	Upper middle income	36 out of 53	33
North America	1 out of 3	<1	Lower middle income	33 out of 51	28
South Asia	7 out of 8	6	Low income	12 out of 31	10
Sub-Saharan Africa	27 out of 48	23			
Total	116 out of 214	100	Total	116 out of 214	100

The growth of remittances varies among regions during the analysed period, and regional growth ratios have been extremely volatile over the past three periods of analysis. As is shown in Figure 4, remittances to South Asia, Europe, and Central Asia increased over 2010–2014. Countries in the region were benefitting from economic recovery in the EU but the growth of remittances is slow due to slow economic growth in the EU, the deterioration of the Russian economy, and the depreciation of the euro and the rouble. The slowdown of remittance growth in Central Asia was caused by the economic downturn in Russia, a major remittance source country, which resulted in increasing unemployment for migrants, and the decline of the rouble's value reduced real income. South Asia is projected for a growth of remittances due to the improving economic prospects in the United States. By contrast, the remittances-to-GDP ratio in Sub-Saharan Africa decreased by 1 percentage point. This was mainly caused by the economic situation in destination countries, because remittances to the region were

mainly sent from the USA, the United Kingdom, France, and Australia. The other reason is that over 65 percent of migration is intra-regional migration in Sub-Saharan African countries, which also are still developing.

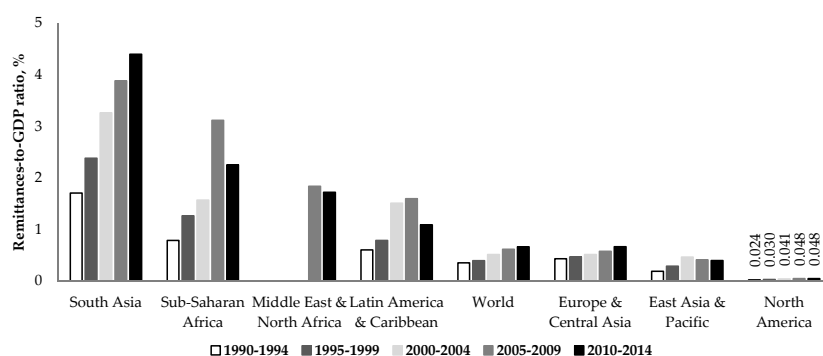


Figure 4. Remittances-to-GDP ratio in different regions of the world (period averages). Source: own calculations, using World Development Indicators.

The decrease of remittances to Latin America and the Caribbean region was caused by the slowdown in the U.S. economy, especially in the construction sector, during 2010–2014, which affected the employment and incomes of immigrants in the USA; also, tighter enforcement of immigration rules in the United States is likely to have caused a shift in remittance flows through informal channels. The growth of remittances in East Asian and Pacific countries has remained stable since 2000, with little decrease during the last period of analysis due to the slow economic growth in the Euro Area and declining values of the euro, the Japanese yen, and other source-country currencies against the U.S. dollar.

Remittances are a very important capital source for developing countries (see Figure 5). During the analysed period, they were equivalent to on average 2.76 percent of the cumulated GDP of low-income countries and 3.66 percent in lower-middle-income countries. This is relative to high-income countries where the remittances-to-GDP ratio was only 0.24 percent because people usually migrate from low- to high-income countries and money in the form of remittances flows in the opposite direction.

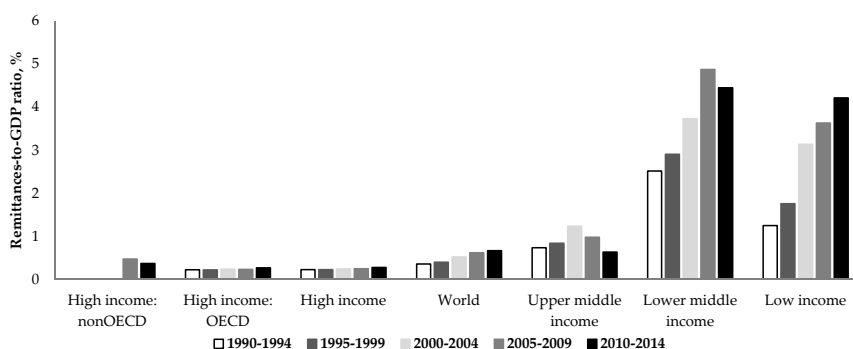


Figure 5. Remittances-to-GDP ratio in different groups of countries by income (period averages). Source: own calculations, using World Development Indicators.

As a percentage of GDP, however, the top recipients of remittances during the analysed period (calculating average remittances-to-GDP ratio) were Lesotho (44.7 percent), Moldova (20.6 percent), Lebanon (20.4 percent), Bosnia and Herzegovina (20.1 percent), and Jordan (17.7 percent).

In all regressions, the dependent variable is the long-run growth rate of output, measured as the growth of the real GDP per capita in constant PPP (Purchasing Power Parity) dollars over a five-year period. Data were collected from the WDI (a list of variables and definitions is provided in Appendix B). All regressions employ personal received remittances to proxy for migrants' international transfers.

The economic development level of the country is measured by the real GDP per capita in constant PPP dollars. We use remittances-to-GDP ratio to proxy for the abundance of remittances in the country's economy.

Our set of controls includes the following: *Fiscal balance*, defined as the ratio between central government tax revenue and expense, is expressed in percent; *Investment* ratio, defined as the ratio of gross fixed capital formation to GDP; *Openness* of international trade, defined as the ratio of the sum of exports plus imports of goods and services to total output; *Consumer price index* to measure the price level and *inflation*; *Population* and its *growth*; and finally several indicators to proxy the country's financial development and the ability to facilitate channels for economic growth—first, financial system *Liquid liabilities* divided by GDP (we consider it the most general way to measure the development level of financial system because it includes central bank, commercial banking sector, and other financial institutions), and second, *Credit* provided by the commercial banking sector to GDP, which measures how much this sector developed and contributes to economic growth. All variables are specified in natural logs.

3.2. Econometric Model of Remittance Impact on Long-Run Economic Growth

To empirically explore remittances' impact on long-run economic growth, taking into account the country's development level and abundance of remittances in the economy, we use an unbalanced panel (cross-country, time series) data consisting of 116 countries. Referring to the previous empirical studies on cross-country long-run economic growth, we divide the period 1990–2014 into five non-overlapping five-year spans. We use five-year periods because shorter ones can be influenced by business cycle fluctuations, and now they are controlled by using five-year averages. Although data are available on a yearly basis, GDP changes over longer periods are a better proxy for the long-run economic growth.

We will start our analysis by estimating the impact of remittances on long-run economic growth using the pooled OLS (ordinary least squares) approach. In the beginning we will not include the interactions between remittances and economic development level or between remittances and remittance abundance in the economy variables in the first equation. We will start by estimating the following equation:

$$\begin{aligned} \text{dev}_{it} = & \alpha + \beta_1 \text{dev}_{it-1} + \beta_2 \text{rem}_{it} + c_1 \log(\text{invGDP}_{it}) + c_2 \log(\text{fb}_{it}) + c_3 \log(\text{opn}_{it}) + c_4 \log(\text{cpi}_{it}) \\ & + c_5 \log(\text{pop}_{it}) + c_6 \log(\text{crdGDP}_{it}) + c_7 \log(\text{m2GDP}_{it}) + \mu_t + \eta_i + \varepsilon_{it}, \end{aligned} \quad (1)$$

where dev_{it-1} denotes the (logarithm of) initial level of GDP per capita, rem_{it} is equal to logarithm of remittances, from invGDP_{it} to m2GDP_{it} are control variables as described in the previous subsection, μ_t is a time-specific effect, η_i is an unobserved country-specific fixed effect, and ε_{it} is the error term.

Equation (1) can be alternatively written with the long-run growth rate as a dependent variable for estimation using pooled OLS as:

$$\text{lgrwth}_{it} = \text{dev}_{it} - \text{dev}_{it-1} = \alpha + (\beta_1 - 1)\text{dev}_{it-1} + \beta_2 \text{rem}_{it} + \text{cCON}_{it} + \mu_t + \eta_i + \varepsilon_{it}, \quad (1a)$$

where $(\beta_1 - 1)$ is the convergence coefficient and CON_{it} is the matrix of control variables presented in the Equation (1). We are interested here in testing whether the marginal impact of remittances on long-run economic growth, β_2 , is statistically significant.

In the second equation, we explore the impact of remittances on long-run economic growth through the economic development level. Here we are testing the hypothesis that the development level of the recipient country shapes the impact of remittances on long-run growth. In order to achieve this, we include the interaction between the variables of remittances and initial economic development level in the equation and tested the significance of the interacted coefficient. In order to ensure that the interaction term does not proxy remittances or the level of development, these variables are also included separately in the regression. A negative coefficient of interaction term would indicate that remittances are more efficient in promoting long-run economic growth in less developed countries. In such a case we would have evidence to support the idea that remittances influence economic

growth because they fill the gap of foreign currency shortage, provide alternative way to finance investment, and help overcome liquidity constraints in less developed countries. On the other hand, a positive interaction would imply that the growth effects of remittances are enhanced in more developed countries. This would support the notion that the impact of remittances highly depends on public policy, which creates a favourable environment for the use of remittances in productive investment. Only by ensuring the stable political and economic environment of the receiving country can remittances contribute to economic growth, because they will be used not for personal consumption, but for investment in productive activities or business. Despite the potentially positive marginal impact of remittances, they cannot ensure long-run economic growth or solve structural economic problems such as the unstable political climate and economic policies, or corruption, which is common in developing countries. The regression can be estimated as follows:

$$\text{dev}_{it} = \alpha + \beta_1 \text{dev}_{it-1} + \beta_2 \text{rem}_{it} + \beta_3 (\text{rem}_{it} \cdot \text{dev}_{it-1}) + \text{cCON}_{it} + \mu_t + \eta_i + \varepsilon_{it}. \quad (2)$$

In parallel, we explore the hypothesis about diminishing country's capacity to use remittances for promoting long-run economic growth as the abundance of remittances is increasing limiting incentives to use internal growth potential. In order to achieve this, in the third regression we want to examine whether the relationship between remittance flow and long-run economic growth depends on the abundance of remittances in the receiving country. To test that, we interacted the variable of remittances with an indicator of remittance abundance in the economy (remint_{it} measured as remittances-to-GDP ratio) and tested the significance of the interacted coefficient. In order to ensure that the interaction term does not proxy for remittances or the level of remittance abundance in the economy, these variables are also included separately in the regression. A negative coefficient of interaction term would give evidence that the impact of remittances on long-run economic growth decreases as the abundance of remittances increases. On the other hand, a positive interaction would imply that the growth effects of remittances increase as the abundance of remittances in the country grows. The regression can be estimated as follows:

$$\text{dev}_{it} = \alpha + \beta_1 \text{dev}_{it-1} + \beta_2 \text{rem}_{it} + \beta_3 (\text{rem}_{it} \cdot \text{remint}_{it}) + \beta_4 \text{remint}_{it} + \text{cCON}_{it} + \mu_t + \eta_i + \varepsilon_{it}. \quad (3)$$

Equations (2) and (3) can also be rearranged as Equation (1) with the long-run growth rate as a dependent variable for estimation using pooled OLS:

$$\text{lgrowth}_{it} = \alpha + (\beta_1 - 1) \text{dev}_{it-1} + \beta_2 \text{rem}_{it} + \beta_3 (\text{rem}_{it} \cdot \text{dev}_{it-1}) + \text{cCON}_{it} + \mu_t + \eta_i + \varepsilon_{it} \quad (2a)$$

$$\text{lgrowth}_{it} = \alpha + (\beta_1 - 1) \text{dev}_{it-1} + \beta_2 \text{rem}_{it} + \beta_3 (\text{rem}_{it} \cdot \text{remint}_{it}) + \beta_4 \text{remint}_{it} + \text{cCON}_{it} + \mu_t + \eta_i + \varepsilon_{it}. \quad (3a)$$

Our first sets of OLS regressions, with or without the interactions with economic development level or abundance of remittances in the economy, do not address issues regarding endogeneity. Theoretically, however, it is plausible, and also very likely, that the magnitude of remittances, the economic development level, or the remittances-to-GDP ratio is correlated with country-specific effects. This would lead to an overstatement of the effect of each of the two variables and their interaction on long-run growth. There has been an extensive search for good instruments of economic development. In the literature, variables not subject to reverse causality, such as origins of a country's legal systems and geography [74], are commonly used. However, this type of variable has a drawback: they are time-constant and because of that we cannot include them in a panel regression.

Another way to use panel-type data is to consider that unobserved effects influencing the dependent variable consist of two types: those that are constant and those that vary over time. The variable η_i captures all unobserved, time-constant factors that affect dev_{it} . We can call Equations (1)–(3) the models of unobserved effects. Therefore, we can control the unobserved effects and solve the endogeneity problem by differencing variables in the equation. Taking into account time-specific effects, we obtain:

$$\text{dev}_{it} - \text{dev}_{it-1} = \text{lgrwth}_{it} = \beta_1(\text{dev}_{it-1} - \text{dev}_{it-2}) + \beta(X_{it} - X_{it-1}) + c(\text{CON}_{it} - \text{CON}_{it-1}) + (\varepsilon_{it} - \varepsilon_{it-1}), \quad (4)$$

where X_{it} is now the set of explanatory variables including remittances, abundance of remittances in the economy, and the interaction term. The unobserved effect, η_i does not appear in (4): it has been “differenced away”.

For the usual standard errors and test statistics to be valid, we must assume that a new error ($\varepsilon_{it} - \varepsilon_{it-1}$) is serially uncorrelated. That we can test for—if $\Delta\varepsilon_{it}$ follows a stable AR(1) model, then $\Delta\varepsilon_{i,t}$ will be correlated over time. If $\Delta\varepsilon_{it}$ is distributed randomly, $\Delta\varepsilon_{i,t}$ will be serially uncorrelated. If errors are not correlated over time, we can employ the usual methods for dealing with heteroscedasticity. We can use the White test for heteroscedasticity, and we can also compute robust estimators. We should make a strong case for using robust estimator because ordinary White HCCME (heteroscedasticity corrected covariance matrix estimator) can produce misleadingly small standard errors in the panel context because it fails to take autocorrelation into account [75]. In addition, Cameron and Trivedi [76] show that the White HCCME is inconsistent in the fixed-effects panel context for fixed $T > 2$.

As the panel data have a time series and a cross-sectional dimension, we should use robust estimation of the covariance matrix that would correct heteroscedasticity (if variance of the error term differs across cross-sectional units) and autocorrelation (if covariance of the errors across the units is non-zero in each time period). Because of that, we will use the robust estimator (HAC approach) that is suggested by Stock and Watson [77] for the panel data with relatively “large n , small T ” variety (that is, many units are observed in relatively few periods).

The approach used to compute the so-called *first-differenced estimator* (FD) has a drawback, because differencing the equation removes the long-run cross-country information presented at the level of the variables. Under the stationarity assumption (because it is extremely sensitive to violations of stationarity assumption), it is possible to construct an alternative *fixed effects* (FE) estimator that overcomes the abovementioned problem.

The first differencing is one of transformations used to eliminate the fixed effects, η_i . An alternative one, which will also be employed in our analysis, is called fixed-effects transformation. To see how this transformation works, consider Equations (1)–(3). Now, for each i , averaging over time we get:

$$\overline{dev}_i = \beta\overline{X}_i + c\overline{CON}_i + \eta_i + \bar{\varepsilon}_i, \quad (5)$$

where $\overline{dev}_i = T^{-1} \sum_{t=1}^T dev_{it}$ and so on. Because η_i is fixed over time, it appears in Equations (1)–(3) and (5). If we subtract Equation (5) from Equations (1)–(3) for each t , we end up with:

$$\ddot{dev}_{it} = \beta_1\ddot{dev}_{it-1} + \beta\ddot{X}_{it} + c\ddot{CON}_i + \ddot{\varepsilon}_i, \quad (6)$$

where $\ddot{dev}_{it} = dev_{it} - \overline{dev}_i$ is the time-demeaned data on dev_{it} , and similar for X_{it} , CON_{it} , and ε_{it} . The important thing about Equation (6) is that the unobserved effect, η_i , has disappeared.

The fixed-effects estimator will be unbiased if we assume strict exogeneity on the independent variables, that is, ε_{it} should be uncorrelated with each independent variable across all time periods. As with the first differencing, the fixed-effects estimator allows for the correlation between η_i and the independent variables in any time period. Because of that, any independent variable that does not vary over time for all cross-sectional units will be swept away by employing fixed-effects transformation. Therefore, we cannot include variables such as countries’ historical background (colonial or not, etc.) or whether a country is located near the sea. The strict exogeneity assumption was tested and a lack of it was corrected using the methods explained by Wooldridge [78].

4. Empirical Analysis

This section presents ordinary least square (OLS) and fixed-effects (FE) estimates of the parameters in Equations (1)–(3). As discussed in the Introduction, remittances have the potential to affect long-run growth through capabilities to use them, i.e., through investment (in physical and human capital),

which is more likely in developed countries, or through the conventional Keynesian multiplier from increased internal demand in developing ones. As was mentioned earlier, the abundance of remittances in a country's economy can cause increasing dependence on them as on one of the main income sources, at the same time interfering with the internal potential for growth.

Table 3 reports estimates of Equation (1) using various econometric techniques (pooled OLS with (Equation (4)) and without (Equation (1a)) first difference (FD) transformation, and FE (Equation (6))).

Table 3. Estimation results of linear growth effects of remittances (the dependent variable is long-run economic growth).

	Pooled OLS	Pooled OLS with FD Transformation ¹	FE
Constant	−0.9192 *** (0.2891)	0.09543 *** (0.01910)	8.511 *** (2.622)
Initial development level	−0.006061 (0.01367)	0.3162 *** (0.07614)	−0.5473 *** (0.08700)
Remittances	0.01150 ** (0.005006)	0.01483 ** (0.006089)	0.01390 ** (0.006607)
Investment	0.1324 *** (0.03368)	0.1530 *** (0.02827)	0.1678 *** (0.03322)
Fiscal balance	0.02867 (0.03201)	0.1046 *** (0.03650)	0.1088 ** (0.04648)
Openness	0.005256 (0.01825)	−0.09449 ** (0.04016)	−0.07334 * (0.03970)
Consumer price index	−0.07368 ** (0.03393)	−0.06471 ** (0.02852)	−0.07139 *** (0.02638)
Population	0.0009954 (0.005688)	−0.3216 ** (0.1264)	−0.3245 ** (0.1300)
Credit	0.005385 (0.02292)	0.05299 ** (0.02179)	0.01603 (0.02450)
Liquid liabilities	−0.01788 (0.02437)	0.01564 (0.05194)	0.06326 (0.05280)
<i>n</i>	352	232	352
Number of countries	116	105	116
Adj. <i>R</i> ²	0.2262	0.4693	0.6634
<i>p</i> -value AR(1) test	0.0815	0.2903	0.0672

¹ After differencing variables, instead of initial development level we have lagged long-run economic growth, changes in consumer price index approximates inflation, log differences of Population–Population growth rates and so on. Robust standard errors in parentheses. All regressions include time dummies; * indicates significance at the 10 percent level; ** indicates significance at the 5 percent level; *** indicates significance at the 1 percent level.

Estimation results (see Table 3) show that the impact of remittances on growth is statistically significant, but quite small in magnitude, when the remittances variable is simply added as an additional explanatory variable in a long-run growth regression. Increases in remittances flows of 10 percent would induce an additional long-run growth effect of about 0.115–0.148 p.p. (depending on the estimation technique). The coefficient estimates do not marginally change when investment is dropped from the regression (this is done in an attempt to better capture the impact of remittances by omitting one of the channels through which remittances are likely to affect growth, i.e., investment. If the marginal impact of remittances becomes larger, this would provide indirect evidence of a channel working through productive investment). So the empirical evidence in favour of a positive role of remittances on long-run growth through investment channel seems to be at most fragile. Our results contrast with recent studies at the micro level, which have estimated the positive effect of remittances on investment. This raises the hypothesis that the impact of remittances on long-run economic growth is not homogeneous across countries and may vary along with country-specific conditions, which have not been suitably included in the estimated equation. Next, we will explore this hypothesis in more

detail by estimating whether the economic development level of the recipient country influences how remittances are used and possibly shapes how remittances influence long-run economic growth.

We will estimate Equation (2), which accounts for the impact of remittances on long-run growth variation across different levels of economic development in the recipient country. The sign of the interacted coefficient gives information about the nature of remittance impact on long-run economic growth, taking into account the development level of recipient country: a positive interaction term would imply that remittances and development level are complementary and that higher economic development level, along with favourable public policy and stable economic environment enhances the positive impact of remittances. On the other hand, a negative sign would indicate that remittances are more suitable to promoting long-run growth in less developed countries.

Table 4 presents pooled OLS with and without FD transformation, and FE estimates of Equation (2). It is worth noting that all three are qualitatively and quantitatively very similar. Autocorrelation and heteroscedasticity tests are performed to assess the validity of the estimation methods employed. We estimate Equation (2) using each of our estimate methods and find that the results are consistent across them.

Table 4. Estimation results of remittance impact on growth in the context of economic development level (the dependent variable is long-run economic growth).

	Pooled OLS	Pooled OLS with FD Transformation ¹	FE
Constant	5.525 *** (0.6645)	−0.003382 (0.009669)	5.396 *** (1.314)
Initial development level	−0.6358 *** (0.06453)	0.02573 (0.03178)	−0.9675 *** (0.03874)
Remittances	−0.2873 *** (0.03028)	−0.3526 *** (0.02778)	−0.3626 *** (0.03316)
Remittances * Initial development level	0.03157 *** (0.003251)	0.03905 *** (0.002721)	0.04021 *** (0.003304)
Investment	0.06425 ** (0.02793)	0.05164 *** (0.01584)	0.05258 ** (0.02072)
Fiscal balance	−0.001501 (0.02514)	0.03683 ** (0.01678)	0.03379 (0.02519)
Openness	−0.01014 (0.01562)	−0.02939 (0.01782)	−0.03825 * (0.01982)
Consumer price index	−0.006905 (0.01563)	−0.04996 *** (0.01823)	−0.03760 ** (0.01854)
Population	−0.01108 ** (0.005282)	−0.2141 *** (0.07422)	−0.1765 ** (0.07605)
Credit	0.004893 (0.01454)	0.01521 * (0.008869)	0.01265 (0.01184)
Liquid liabilities	0.01738 (0.01901)	0.02869 (0.02465)	0.04727 * (0.02805)
<i>n</i>	352	232	352
Number of countries	116	105	116
Adj. R ²	0.6271	0.8623	0.8987
<i>p</i> -value AR(1) test	0.0714	0.3080	0.0592

¹ After differencing variables instead of *Initial development level* we have *Lagged long-run economic growth*, changes in *Consumer price index* approximates *Inflation*, log differences of *Population–Population growth rates* and so on. Robust standard errors in parentheses. All regressions include time dummies; * indicates significance at the 10 percent level; ** indicates significance at the 5 percent level; *** indicates significance at the 1 percent level.

The estimated negative and statistically significant coefficient on remittances, as well as the positive and statistically significant interaction between remittances and economic development level, provides strong evidence that the marginal impact of remittances on long-run economic growth increases with the level of economic development. This supports the view that remittances have contributed to promoting long-run growth in relatively developed countries and that remittances-driven growth is less possible in relatively undeveloped ones. In countries with limited capabilities along with market imperfections,

remittances do not contribute to financial investment and are more likely to be devoted to non-growth generating activities, such as consumption. We find that a turning point from negative to positive impact of remittances on long-run economic growth is in countries with GDP per capita at about 8250–8960 constant US\$ (depending on the estimation technique). According to the last five-year period average, around 40 per cent of countries in our sample did not reach this development level yet, and three (Ukraine, Jamaica, and Namibia) are at the turning point.

Next, we will explore whether the marginal effect of remittance impact on long-run economic growth changes with remittance abundance in the economy. We estimate Equation (3), which allows the impact of remittances on long-run growth to vary across levels of remittances-to-GDP ratio in the recipient country. A positive interaction term would reveal that a higher remittances-to-GDP ratio enhances the impact of remittances. On the other hand, a negative sign would indicate that the impact of remittances on long-run growth is diminishing and a positive effect is less possible in remittance-abundant countries.

Table 5 presents pooled OLS with and without FD transformation, and FE estimates of Equation (3). As in the previous case, all three estimates are qualitatively and quantitatively very similar. Autocorrelation and heteroscedasticity tests are also performed to assess the validity of the estimation methods employed. After estimating Equation (3) using the abovementioned methods, we find that the results are consistent across them.

Table 5. Estimation results of diminishing impact of remittances on growth (the dependent variable is long-run economic growth).

	Pooled OLS	Pooled OLS with FD Transformation ¹	FE
Constant	−0.5402 (0.3460)	0.08035 *** (0.01676)	7.942 *** (2.446)
Initial development level	−0.06134 * (0.03348)	0.2778 *** (0.06191)	−0.5994 *** (0.07787)
Remittances	0.05499 ** (0.02362)	0.1195 *** (0.03279)	0.1227 *** (0.03795)
Remittances * Remittances-to-GDP ratio	−0.02296 ** (0.001090)	−0.05108 *** (0.001859)	−0.04953 *** (0.002032)
Remittances-to-GDP ratio	−0.06454 * (0.01357)	−0.02750 (0.02502)	−0.02688 * (0.01426)
Investment	0.1320 *** (0.03438)	0.1204 *** (0.03026)	0.1316 *** (0.03311)
Fiscal balance	0.02102 (0.03236)	0.1040 *** (0.03254)	0.09756 ** (0.04005)
Openness	0.01820 (0.01787)	−0.05457 (0.04653)	−0.04463 (0.04291)
Consumer price index	−0.04915 (0.03049)	−0.05352 * (0.02858)	−0.04446 (0.03218)
Population	−0.03939 * (0.02181)	−0.3938 *** (0.1090)	−0.3952 *** (0.1168)
Credit	0.005487 (0.02161)	0.04199 ** (0.01794)	0.007871 (0.02121)
Liquid liabilities	0.008399 (0.02396)	0.02680 (0.04403)	0.07520 (0.04578)
<i>n</i>	352	232	352
Number of countries	116	105	116
Adj. <i>R</i> ²	0.2425	0.5409	0.7084
<i>p</i> -value AR(1) test	0.0900	0.2602	0.0610

¹ After differencing variables, instead of *Initial development level* we have *Lagged long-run economic growth*, changes in *Consumer price index* approximates *Inflation*, log differences of *Population–Population growth rates* and so on. Robust standard errors in parentheses. All regressions include time dummies; * indicates significance at the 10 percent level; ** indicates significance at the 5 percent level; *** indicates significance at the 1 percent level.

The estimated positive and statistically significant coefficient on remittances and negative and statistically significant interaction between remittances and remittances-to-GDP ratio give strong evidence that the marginal impact of remittances on growth is diminishing and is decreasing with the abundance of remittances. In other words, remittances have contributed to promoting growth in countries with smaller remittances-to-GDP ratios. In contrast, remittances-driven growth is less possible in remittance-abundant countries. It may be the case that dependence on remittances as a main personal income source might even discourage labour supply on the side of the recipients and hence reduce growth. This could explain why the impact of remittances declines with an increase in remittances-to-GDP ratio. It turns out that the possibility of the marginal impact becoming negative is very high when the remittances-to-GDP ratio reaches 10.4–11.9 percent (depending on the estimation technique). According to the last five-year period average, around 10 percent of countries in our sample already exceeded this point, and four (Jordan, Georgia, Senegal, Bosnia, and Hercegovina) are at the turning point.

Consistent with earlier studies on long-run economic growth, we also find that financial development promotes economic growth. Population growth and inflation negatively affect growth, whereas investment, positive fiscal balances, and openness help boost economic growth in the long run. We also find evidence of conditional beta convergence (the initial level of GDP is negative and significant) between developing and developed countries.

5. Summary of Empirical Results

In this section we summarise our empirical results, by distributing the countries from our sample into four groups according to their estimated turning points of marginal remittance effect on long-run economic growth. As our analysis results show, countries that do not reach a GDP per capita level of about 8500 in constant PPP U.S. dollars, do not have enough internal capabilities to channel remittances for promoting long-run economic growth. Countries that exceeded an 11% remittances-to-GDP ratio become too dependent on remittance flows, which distorts the internal long-run economic growth background. Table 6 provides a distribution of countries of our sample.

Table 6. Distribution of sample countries by real GDP per capita and remittances-to-GDP ratio.

		Average Real per Capita GDP in Constant PPP U.S. Dollars	
		Below 8500	Above 8500
		A	B
		Average Remittances-to-GDP ratio, %	Above 11
Below 11	Afghanistan, Benin, Burkina Faso, Bangladesh, Belize, Bhutan, Cote d'Ivoire, Cameroon, Congo, Rep., Egypt, Arab Rep., Fiji, Georgia, Ghana, Guatemala, Honduras, Indonesia, India, Kenya, Cambodia, Lao PDR, Sri Lanka, Morocco, Madagascar, Mali, Mongolia, Mozambique, Namibia, Nigeria, Nicaragua, Pakistan, Peru, Philippines, Papua New Guinea, Paraguay, Rwanda, Sudan, Senegal, Togo, Tunisia, Tanzania, Uganda, Ukraine, Vanuatu, Congo, Dem. Rep., Zambia		Antigua and Barbuda, Australia, Bulgaria, Brazil, Barbados, Botswana, Switzerland, Chile, Colombia, Costa Rica, Cyprus, Czech Republic, Dominica, Denmark, Dominican Republic, Algeria, Estonia, United Kingdom, Grenada, Hong Kong SAR, China, Croatia, Hungary, Iran, Islamic Rep., Iceland, Israel, Japan, Kazakhstan, St. Kitts and Nevis, Korea, Rep., St. Lucia, Lithuania, Latvia, Macao SAR, China, Maldives, Mexico, Macedonia, FYR, Mauritius, Malaysia, Norway, New Zealand, Oman, Panama, Poland, Qatar, Romania, Russian Federation, Serbia, Suriname, Slovak Republic, Sweden, Seychelles, Thailand, Trinidad and Tobago, Turkey, Uruguay, United States, Venezuela, RB, South Africa

Countries from Group D in Table 6 are those that have the highest likelihood of positive remittance impact on long-run economic growth. They are developed enough to create a stable political and economic environment to channel remittances to productive investment and long-run economic

growth, but not so rich with remittances to become dependent on them and distort internal incentives for growth.

On the contrary, countries of Group A have the lowest likelihood of experiencing a positive effect of remittances on economic growth. A low development level, along with structural economic problems such as unstable political climate and economic policies, or corruption, which is common in developing countries, does not create a favourable environment for the use of remittances for productive investment. If remittances are used for personal consumption, but not for investment in productive activities or businesses, they can promote economic growth at most just in the short run. This group of countries also has from an abundance of remittances, which is likely to create dependency on them, causing weak internal incentives for growth because income is generated abroad; nevertheless, this source can be unstable.

Countries in Group B are those that are developed enough to channel remittances for long-run economic growth, but already too dependent on them. As remittance flows are generated abroad and political will can be weak to reduce them and to turn on more independent growth path, these countries can also suffer from structural problems generated by the abundance of remittances, and have weak opportunities to channel remittances for long-run economic growth.

Countries in Group C are those that have the highest possibility of using remittances for promoting long-run economic growth with one condition: structural economic problems must be solved. These countries are not dependant on remittance flows, and still have internal incentives for long-run economic growth that can be enhanced by remittances.

Our research does not give insights into all aspects of remittances' impact on long-run economic growth. Future research directions would be investigating more channels that shape the effect of remittances on long-run economic growth, as well as evaluating the impact of remittances on consumption expenditure and capital accumulation. Overall, our research provides empirical evidence for the relationship between remittances, development level, and long-run growth, taking into account the abundance of remittances in the country.

6. Conclusions

What is the impact of remittances on long-run economic growth? How does the economic development level shape the impact of remittances on growth? Is there evidence that remittances have a diminishing effect on growth? To shed some light on these questions, we analysed in this paper the relationship between remittances and long-run growth and their interaction with the economic development level and remittances-to-GDP ratio in the recipient country. We used cross-country data series for remittances covering 116 developed and developing countries over the period 1990–2014.

We found evidence that supports the view that remittances have promoted growth in relatively developed countries and that remittances-driven growth is less possible in relatively undeveloped ones. We estimated that a turning point from negative to positive impact of remittances on long-run economic growth is in countries with GDP per capita at about 8250–8960 constant US\$.

The impact of remittances on long-run growth also varies across remittances-to-GDP ratios in the recipient country. We estimated that the impact of remittances on long-run growth is diminishing and a positive effect is less possible in remittance-abundant countries. The marginal impact of remittances on long-run growth becomes negative when the remittances-to-GDP ratio reaches 10.4–11.9 percent. We interpret that as evidence that remittances are more likely to discourage labour supply in remittance-abundant countries.

All these findings control the endogeneity of remittances and other variables using FD and FE approaches. These findings do not give insights into all channels that may shape the effect of remittances on long-run growth. We did not explore other possible measures of countries' development characteristics, including institutional aspects that may shape this effect. It is possible, for example, that factors other than the degree of development level or abundance of remittances may explain the impact remittances can have on long-run economic growth. Although the omitted variable problem is

reduced by using the FD and FE approaches, we cannot eliminate the possibility that omitted variables at some extent made an impact on our research results.

Author Contributions: Both authors contributed equally.

Conflicts of Interest: The authors declare no conflict of interest.

Appendix A. Sample of Countries

Afghanistan	Egypt, Arab Rep.	Sri Lanka	Paraguay
Albania	Estonia	Lesotho	Qatar
Armenia	Fiji	Lithuania	Romania
Antigua and Barbuda	United Kingdom	Latvia	Russian Federation
Australia	Georgia	Macao SAR, China	Rwanda
Benin	Ghana	Morocco	Sudan
Burkina Faso	Grenada	Moldova	Senegal
Bangladesh	Guatemala	Madagascar	El Salvador
Bulgaria	Hong Kong	Maldives	Serbia
Bosnia and Herzegovina	Honduras	Mexico	Suriname
Belize	Croatia	Macedonia, FYR	Slovak Republic
Brazil	Hungary	Mali	Sweden
Barbados	Indonesia	Mongolia	Seychelles
Bhutan	India	Mozambique	Togo
Botswana	Iran, Islamic Rep.	Mauritius	Thailand
Switzerland	Iceland	Malaysia	Trinidad and Tobago
Chile	Israel	Namibia	Tunisia
Cote d'Ivoire	Jamaica	Nigeria	Turkey
Cameroon	Jordan	Nicaragua	Tanzania
Congo, Rep.	Japan	Norway	Uganda
Colombia	Kazakhstan	Nepal	Ukraine
Cabo Verde	Kenya	New Zealand	Uruguay
Costa Rica	Kyrgyz Republic	Oman	United States
Cyprus	Cambodia	Pakistan	Venezuela, RB
Czech Republic	St. Kitts and Nevis	Panama	Vanuatu
Dominica	Korea, Rep.	Peru	West Bank and Gaza
Denmark	Lao PDR	Philippines	South Africa
Dominican Republic	Lebanon	Papua New Guinea	Congo, Dem. Rep.
Algeria	St. Lucia	Poland	Zambia

Appendix B. Variables and Explanation ¹

Variable (Name in the Equations)	Description
Long-run economic growth (lgrwth)	Measured as <i>growth of real per capita GDP in constant PPP dollars.</i>
Development level (dev)	Measured as <i>log of real per capita GDP in constant PPP dollars.</i> PPP GDP is gross domestic product converted to international dollars using purchasing power parity rates. Data are in constant 2011 international dollars.
Remittances (rem)	<i>Log of personal remittances, received (current US\$).</i> Personal remittances comprise personal transfers and compensation of employees. Personal transfers consist of all current transfers in cash or in kind made or received by resident households to or from non-resident households. Personal transfers thus include all current transfers between resident and non-resident individuals. Compensation of employees refers to the income of border, seasonal, and other short-term workers who are employed in an economy where they are not resident and of residents employed by non-resident entities. Data are the sum of two items defined in the sixth edition of the IMF's Balance of Payments Manual: personal transfers and compensation of employees. Data are in current U.S. dollars.
Remittances intensity in the economy (remint)	Measured as <i>log of Personal remittances, received (% of GDP)</i>

Controls	
Investment (invGDP)	Gross Fixed Capital Formation (formerly gross domestic investment) (% of GDP)
	Ratio between Tax revenue and Expense, %.
Fiscal Balance (fb)	Tax revenue refers to compulsory transfers to the central government for public purposes. Certain compulsory transfers such as fines, penalties, and most social security contributions are excluded. Refunds and corrections of erroneously collected tax revenue are treated as negative revenue.
	Expense is cash payments for operating activities of the government in providing goods and services. It includes compensation of employees (such as wages and salaries), interest and subsidies, grants, social benefits, and other expenses, such as rent and dividends.
Openness (opn)	Exports plus Imports as a share of GDP, %.
Inflation (cpi)	Percentage change in Consumer price index (2010 = 100)
Population growth (pop)	Log difference of Population
Credit (crdGDP)	Domestic credit to private sector by banks (% of GDP). Domestic credit to private sector by banks refers to financial resources provided to the private sector by other depository corporations (deposit taking corporations except central banks), such as through loans, purchases of non-equity securities, and trade credits and other accounts receivable, that establish a claim for repayment. For some countries these claims include credit to public enterprises.
Liquid liabilities (m2GDP)	Money and quasi money (M2) as % of GDP. Money and quasi money comprise the sum of currency outside banks, demand deposits other than those of the central government, and the time, savings, and foreign currency deposits of resident sectors other than the central government.

¹ Data source: World Development Indicators.

References

1. Stahl, C.W.; Arnold, F. Overseas Workers' Remittances in Asian Development. *Int. Migr. Rev.* **1986**, *20*, 899–925. [CrossRef] [PubMed]
2. Lucas, R.E.B.; Stark, O. Motivations to Remit: Evidence from Botswana. *J. Political Econ.* **1985**, *93*, 901–918.
3. Adelman, I.; Taylor, J.E. Is structural adjustment with a human face possible? The case of Mexico. *J. Dev. Stud.* **1990**, *26*, 387–407. [CrossRef]
4. Adams, R.H. The Effects of International Remittances on Poverty, Inequality, and Development in Egypt. *IFPRI Research Report 86*. 1991. Available online: <http://www.ifpri.org/sites/default/files/publications/rr86.pdf> (accessed on 23 May 2016).
5. Faini, R. Migration, Remittances, and Growth. In *Studies in Development Economics and Policy*; Springer: New York, NY, USA, 2002; pp. 171–187.
6. Faini, R. The Brain Drain: An Unmitigated Blessing? Centro Studi Luca d'Agliano Development Studies Working Paper 173. 2003. Available online: http://www.dagliano.unimi.it/media/WP2003_173.pdf (accessed on 23 May 2016).
7. Azam, J.P.; Gubert, F. Migrants' Remittances and the Household in Africa: A Review of the Evidence. *J. Afr. Econ.* **2006**, *15* (Suppl. S2), 426–462. [CrossRef]
8. Adams, R.H. International Remittances and the Household: Analysis and Review of Global Evidence. *J. Afr. Econ.* **2006**, *15* (Suppl. S2), 396–425. [CrossRef]
9. Jongwanich, J. Workers' Remittances, Economic Growth and Poverty in Developing Asia and the Pacific Countries. UNESCAP Working Paper 07/01. 2007. Available online: http://www.unescap.org/pdd/publications/workingpaper/wp_07_01.pdf (accessed on 22 May 2016).
10. Ekanayake, E.M.; Mihalis, H. Do remittances and foreign direct investment promote growth? Evidence from developing countries. *J. Int. Bus. Econ.* **2008**, *8*, 1–15.
11. Fayissa, B. The Impact of Remittances on Economic Growth and Development in Africa. Department of Economics and Finance Working Paper Series 2008. Available online: http://frank.mtsu.edu/~berc/working/WP2008_02remittances.pdf (accessed on 20 May 2016).
12. Pradhan, G.; Upadhyay, M.; Upadhyaya, K. Remittances and economic growth in developing countries. *Eur. J. Dev. Res.* **2008**, *20*, 497–506. [CrossRef]

13. Adenutsi, D.A. Financial development, international migrant remittances and endogenous growth in Ghana. *Stud. Econ. Financ.* **2011**, *28*, 68–89. [[CrossRef](#)]
14. Chami, R.; Fullenkamp, C.; Jahjah, S. *Are Immigrant Remittance Flows a Source of Capital for Development?* IMF Working Paper WP/03/189. International Monetary Fund: Washington, DC, USA, 2003. Available online: <https://www.imf.org/external/pubs/ft/wp/2003/wp03189.pdf> (accessed on 27 May 2016).
15. Freund, C.L.; Spatafora, N. Remittances: Transaction Costs, Determinants, and Informal Flows. World Bank Policy Research Working Paper 3704. 2005. Available online: <http://library1.nida.ac.th/worldbank/fulltext/wps03704.pdf> (accessed on 27 May 2016).
16. International Monetary Fund (IMF). Two Current Issues Facing Developing Countries. World Economic Outlook 2005. Available online: <https://www.imf.org/external/pubs/ft/weo/2005/01/pdf/chapter2.pdf> (accessed on 27 May 2016).
17. Barajas, A.; Chami, R.; Fullenkamp, C.; Gapen, M.; Montiel, P. Do Workers' Remittances Promote Economic Growth? IMF Working Paper WP/09/153. 2009. Available online: <https://www.imf.org/external/pubs/ft/wp/2009/wp09153.pdf> (accessed on 27 May 2016).
18. Barajas, A.; Chami, R.; Ebeke, C.; Tapsoba, S.J.A. Workers' Remittances: An Overlooked Channel of International Business Cycle Transmission? IMF Working Paper WP/12/251. 2012. Available online: <https://www.imf.org/external/pubs/ft/wp/2012/wp12251.pdf> (accessed on 27 May 2016).
19. Feeny, S.; McDonald, L. Vulnerability to Multidimensional Poverty: Findings from Households in Melanesia. *J. Dev. Stud.* **2016**, *3*, 447–464. [[CrossRef](#)]
20. Bettin, G.; Presbitero, A.; Spatafora, N. Remittances and Vulnerability in Developing Countries. IMF Working Papers 14/13. 2014. Available online: <https://www.imf.org/external/pubs/ft/wp/2014/wp1413.pdf> (accessed on 27 May 2016).
21. Giuliano, P.; Ruiz-Arranz, M. Remittances, Financial Development, and Growth. IMF Working Paper 05/234. 2005. Available online: <https://www.imf.org/external/pubs/ft/wp/2005/wp05234.pdf> (accessed on 27 May 2016).
22. Bettin, G.; Zazzaro, A. Remittances and financial development: Substitutes or complements in economic growth? *Bull. Econ. Res.* **2012**, *64*, 509–536.
23. Ratha, D. Leveraging Remittances for Development. Policy Brief, Migration Policy Institute, 2007. Available online: <http://siteresources.worldbank.org/INTPROSPECTS/Resources/334934-1110315015165/LeveragingRemittancesForDevelopment.pdf> (accessed on 20 May 2016).
24. Ratha, D.; Mohapatra, S.; Scheja, E. Impact of Migration on Economic and Social Development. World Bank Policy Research Working Paper 5558. 2011. Available online: https://www.shareweb.ch/site/Migration/Resources_Migration/library/Documents/resourcessharewebResource_en_7560.pdf (accessed on 22 May 2016).
25. International Organization of Migration (IOM). International Migration Report 2006: A Global Assessment. Available online: http://www.un.org/esa/population/publications/2006_MigrationRep/report.htm (accessed on 20 May 2016).
26. Oda, H. The Impact of Workers' Remittances on Economic Growth. In *International Labour Migration from South Asia*; Oda, O., Ed.; ASED 70; IDE: Chiba, Japan, 2004. Available online: http://www.ide-jetro.jp/English/Publish/Download/Asedp/pdf/70_07.pdf (accessed on 22 May 2016).
27. Chami, R.; Barajas, A.; Cosimano, T.; Fullenkamp, C.; Gapen, M.; Montiel, P. Macroeconomic Consequences of Remittances. International Monetary Fund Occasional Paper 259. 2008. Available online: <http://www.imf.org/external/pubs/ft/op/259/op259.pdf> (accessed on 26 May 2016).
28. United Nations. Remittances. INSTRAW Working Paper 4. Remittances 2007. Available online: http://www.flacsoandes.org/generoycultura/Publicaciones/Publicacionesprofesoras/Profesorasasociadas/Perez-Orozco-Amaia/Papers/Amaia_Perez_Orozco_WorkingPaper4.pdf (accessed on 25 May 2016).
29. De Haas, H. The Impact of International Migration on Social and Economic Development in Moroccan Sending Regions: A Review of the Empirical Literature. International Migration Institute Working Papers 3. 2007. Available online: http://edoc.bibliothek.uni-halle.de/servlets/MCRFileNodeServlet/HALCoRe_derivate_00002625/The%20impact%20of%20international%20migration.pdf (accessed on 26 May 2016).
30. Bliss, C. Trade and development. In *Handbook of Development Economics*; Chenery, H., Srinivasan, T.N., Eds.; Elsevier Science Publishers: Amsterdam, The Netherlands, 1989; pp. 1187–1240.
31. Garza, R. The Costs and Benefits of Migration to Sending States: The More You Look, the Worse It Gets. *Cent. Migr. Stud. Spec. Issues* **2008**, *21*, 187–207. [[CrossRef](#)]

32. Ramey, G.; Ramey, V.A. Cross-country evidence on the link between volatility and growth. *Am. Econ. Rev.* **1995**, *85*, 1138–1151.
33. Frankel, J. Are bilateral remittances countercyclical? *Open Econ. Rev.* **2011**, *22*, 1–16. [[CrossRef](#)]
34. Connell, J.; Conway, D. Migration and Remittances in Island Micro-states: A Comparative Perspective on the South Pacific and the Caribbean. *Int. J. Urban Reg. Res.* **2000**, *24*, 52–78. [[CrossRef](#)]
35. Quibria, M.G. International Migration, Remittances and Income Distribution in the source country: A Synthesis. *Bull. Econ. Res.* **1996**, *49*, 29–46. [[CrossRef](#)]
36. Taylor, E.J. The New Economics of Labour Migration and the Role of Remittances in the Migration Process. *Int. Migr.* **1999**, *37*, 63–88. [[CrossRef](#)] [[PubMed](#)]
37. Taylor, J.E.; Arango, J.; Hugo, G.; Kouaouci, A.; Massey, D.; Pellegrino, A. International Migration and National Development. *Popul. Index* **1996**, *62*, 181–212. [[CrossRef](#)] [[PubMed](#)]
38. Taylor, J.E.; Wyatt, T.J. The Shadow Value of Migrant Remittances, income, and Inequality in a Household-Farm Economy. *J. Dev. Stud.* **1996**, *32*, 899–912. [[CrossRef](#)]
39. McCormick, B.; Wahba, J. Overseas Employment and Remittances to a Dual Economy. *Econ. J.* **2000**, *110*, 509–534. [[CrossRef](#)]
40. Feeny, S.; Iamsiraroj, S.; McGillivray, M. Remittances and economic growth. Larger impact in smaller countries? *J. Dev. Stud.* **2014**, *50*, 1055–1066. [[CrossRef](#)]
41. Nwaogu, U.G.; Ryan, M.J. FDI, Foreign Aid, Remittance and Economic Growth in Developing Countries. *Rev. Dev. Econ.* **2015**, *19*, 100–115. [[CrossRef](#)]
42. Tahir, M.; Khan, I.; Shah, A.M. Foreign Remittances, Foreign Direct Investment, Foreign Imports and Economic Growth in Pakistan: A Time Series Analysis. *Arab Econ. Bus. J.* **2015**, *10*, 82–89. [[CrossRef](#)]
43. Olubiyi, E.A. Trade, remittances and economic growth in Nigeria: Any causal relationship? *Afr. Dev. Rev.* **2014**, *26*, 274–286. [[CrossRef](#)]
44. Zizi, G. Remittances as an economic development factor. Empirical evidence from the CEE countries. *Procedia Econ. Financ.* **2014**, *10*, 54–60.
45. Kumar, R.R.; Vu, H.T.T. Exploring the nexus between ICT, remittances and economic growth: A study of Vietnam. *J. Southeast Asian Econ.* **2014**, *31*, 104–120. [[CrossRef](#)]
46. Imai, K.S.; Gaiha, R.; Ali, A.; Kaicker, N. Remittances, growth and poverty: New evidence from Asian countries. *J. Policy Model.* **2014**, *36*, 524–538. [[CrossRef](#)]
47. Nyeadi, J.D.; Atiga, O. Remittances and economic growth: Empirical evidence from Ghana. *Eur. J. Bus. Manag.* **2014**, *6*, 142–149.
48. Kumar, R.R.; Stauvermann, P.J. Exploring the nexus between remittances and economic growth: A study of Bangladesh. *Int. Rev. Econ.* **2014**, *61*, 399–415. [[CrossRef](#)]
49. Salahuddin, M.; Gow, J. The relationship between economic growth and remittances in the presence of cross-sectional dependence. *J. Dev. Areas* **2015**, *49*, 207–221. [[CrossRef](#)]
50. Lim, S.; Simmons, W.O. Do remittances promote economic growth in the Caribbean Community and Common Market? *J. Econ. Bus.* **2015**, *77*, 42–59. [[CrossRef](#)]
51. Jouini, J. Economic growth and remittances in Tunisia: Bi-directional causal links. *J. Policy Model.* **2015**, *37*, 355–373. [[CrossRef](#)]
52. Kasnauskienė, G.; Buzytė, L. Emigrantų piniginiai pervedimai ir jų poveikis ekonomikai. *Pinigų Studijos* **2011**, *1*, 31–47.
53. Faini, R. Migration and Remittances: The Impact on Countries of Origin. In *Migration and Development: Mutual Benefits?* Proceedings of the 4th AFD-EUDN Conference, Paris, France, 8 November 2006. Available online: <http://www.ffem.fr/jahia/webdav/site/afd/shared/PUBLICATIONS/RECHERCHE/Archives/Notes-et-documents/35-notes-documents-VA.pdf#page=185> (accessed on 25 May 2016).
54. Faini, R. Remittances and the Brain Drain: Do the More Skilled Migrants Remit More? *World Bank Econ. Rev.* **2007**, *21*, 177–191. Available online: <http://ftp.iza.org/dp3393.pdf> (accessed on 25 May 2016). [[CrossRef](#)]
55. Catrinescu, N.; Leon-Ledesma, M.; Piracha, M.; Quillin, B. Remittances, Institutions and Economic Growth. *World Dev.* **2009**, *37*, 81–92. [[CrossRef](#)]
56. Cooray, A.V. The impact of migrant remittances on economic growth: Evidence from South Asia. *Rev. Int. Econ.* **2012**, *20*, 985–998. [[CrossRef](#)]
57. Lartey, E.K.K.; Mandelman, F.S.; Acosta, P.A. Remittances, Exchange Rate Regimes and the Dutch Disease: A Panel Data Analysis. *Rev. Int. Econ.* **2012**, *20*, 377–395. [[CrossRef](#)]

58. Ramirez, M.D.; Sharma, H. Remittances and Growth in Latin America: A Panel Unit Root and Panel Cointegration Analysis. Working Papers 51. 2008. Available online: <http://economics.yale.edu/sites/default/files/files/Working-Papers/wp000/ddp0051.pdf> (accessed on 5 August 2016).
59. World Bank. Global Economic Prospects 2006: Economic Implications of Remittances and Migration. 2006. Available online: <http://pubdocs.worldbank.org/en/346121443469727614/Global-Economic-Prospects-2006-Economic-implications-of-remittances-and-migration.pdf> (accessed on 5 August 2016).
60. Glytsos, N.P. Dynamic Effects of Migrant Remittances on Growth: An Econometric Model with an Application to Mediterranean Countries. Centre of Planning and Economic Research 74. 2002. Available online: <http://econwp.a.repec.org/eps/lab/papers/0505/0505014.pdf> (accessed on 5 June 2016).
61. Glytsos, N.P. The contribution of remittances to growth: A dynamic approach and empirical analysis. *J. Econ. Stud.* **2005**, *32*, 468–496. [[CrossRef](#)]
62. Edwards, A.; Ureta, M. International migration, remittances, and schooling: Evidence from El Salvador. *J. Dev. Econ.* **2003**, *72*, 429–461. [[CrossRef](#)]
63. Hildebrandt, N.; McKenzie, D. The effects of migrations on child health in Mexico. *Economia* **2005**, *6*, 257–289.
64. López-Córdova, J. Globalization, Migration and Development: The Role of Mexican Migration Remittances. Argentina: Inter-American Development Bank Working Paper 20. 2006. Available online: <http://www.rrojasdatabank.info/iadbremi/globmigdev.pdf> (accessed on 5 June 2016).
65. Gitter, S.R.; Barham, B.L. Credit, natural disasters, coffee, and educational attainment in rural Honduras. *World Dev.* **2007**, *35*, 498–511. [[CrossRef](#)]
66. Amuedo-Dorantes, C.; Georges, A.; Pozo, S. Migration, Remittances and Children’s Schooling in Haiti. Institute for the Study of Labor Discussion Paper 3657. 2008. Available online: <http://ftp.iza.org/dp3657.pdf> (accessed on 5 June 2016).
67. Acosta, P.; Calderón, C.; Fajnzylber, P.; Lopez, H. What is the impact of international remittances on poverty and inequality in Latin America? *World Dev.* **2008**, *36*, 89–114. [[CrossRef](#)]
68. Demirgüç-Kunt, A.; Córdova, E.L.; Peria, M.; Woodruff, C. Remittances and banking sector breadth and depth: Evidence from Mexico. *J. Dev. Econ.* **2011**, *95*, 229–241. [[CrossRef](#)]
69. Jackman, M.; Craigwell, R.; Moore, W. Economic volatility and remittances: Evidence from SIDS. *J. Econ. Stud.* **2009**, *36*, 135–146. [[CrossRef](#)]
70. Narayan, P.K.; Narayan, S.; Mishra, S. Do remittances induce inflation? Fresh evidence from developing countries. *South. Econ. J.* **2011**, *77*, 914–933. [[CrossRef](#)]
71. Amuedo-Dorantes, C.; Pozo, S. Workers’ remittances and the real exchange rate: A paradox of gifts. *World Dev.* **2004**, *32*, 1407–1417. [[CrossRef](#)]
72. Amuedo-Dorantes, C.; Pozo, S. Remittance receipt and business ownership in the Dominican Republic. *World Econ.* **2006**, *29*, 939–956. [[CrossRef](#)]
73. Woodruff, C.; Zenteno, R. Migration networks and microenterprises in Mexico. *J. Dev. Econ.* **2007**, *82*, 509–528. [[CrossRef](#)]
74. Clemens, M.A.; McKenzie, D.J. Why Don’t Remittances Appear to Affect Growth? World Bank Policy Research Working Paper 6856. 2014. Available online: <https://ssrn.com/abstract=2433809> (accessed on 5 May 2016).
75. Imbens, G.W. Instrumental Variables: An Econometrician’s Perspective. IZA Discussion Paper 8048. 2014. Available online: <https://arxiv.org/pdf/1410.0163.pdf> (accessed on 5 May 2016).
76. Cameron, A.C.; Trivedi, P.K. *Microeconometrics, Methods and Applications*; Cambridge University Press: Cambridge, UK, 2005.
77. Stock, J.H.; Watson, M.W. Heteroskedasticity-robust standard errors for fixed effects panel data regression. *Econometrica* **2008**, *76*, 155–174. [[CrossRef](#)]
78. Wooldridge, J.M. *Econometric Analysis of Cross Section and Panel Data*; MIT Press: Cambridge, MA, USA, 2002.

