

# Remittances, Economic Growth, and the Role of Institutions and Government Policies

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Master Thesis in International Economics

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**Abstract** Over the past three decades, remittance flows accelerated and have grown to become an increasingly prominent source of external funding for many countries. Despite the increasing importance of remittances in total international capital flows, the role of remittances in development and growth is still not well understood. This study seeks to investigate the relationship between remittances and economic growth and studies one of the links between remittances and growth. In particular, this study examines how institutions and local government policies influence a country's capacity to take advantage of remittances. To account for the inherent endogeneities in these relationships a Generalized Method of Moments (GMM) approach is used. The results of this study show that, at best, remittances have no impact on economic growth. When institutions are taken into account, this study finds evidence that remittances have a negative and significant impact on growth. This study also provides evidence that the most important part of remittances is consumed rather than invested, which may explain why remittances do not seem to promote economic growth.

**Keywords** Remittances, institutions, economic growth, Generalized Method of Moments.

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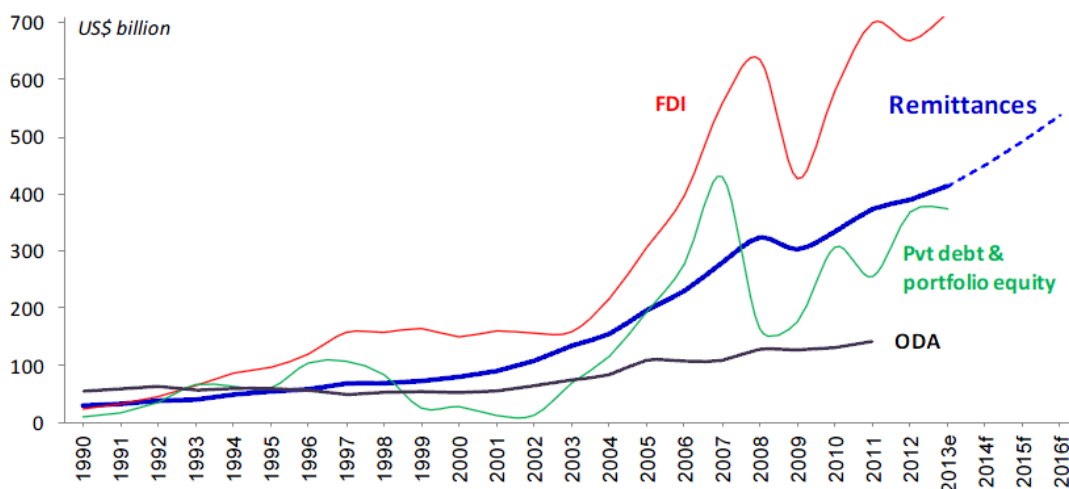
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## 1. Introduction

More people than ever are living abroad. Figures from the United Nations (UN) show that nowadays more than 232 million people, or 3.2 percent of the world's population, live outside their country of birth (UN, 2013). While it is widely recognized that migration can have both negative and positive social, cultural, and economic implications for countries of origin, remittances are the least controversial and most tangible link between migration and development. Remittances are defined as the earnings international migrants send to family members in their country of origin and represent one of the largest sources of financial flows to developing countries. The World Bank (2013a) estimates that in 2013 worldwide officially recorded remittance flows reached \$550 billion, with developing countries receiving the lion's share of these flows (\$414 billion). The true size of remittance flows is perceived to be even significantly larger, as a large portion is sent through unregulated wire-transfer agencies and other unofficial channels, and goes unrecorded.

Over the past three decades, remittance flows accelerated and the flows are expected to continue to increase in all regions and major recipient countries to a global \$700 billion in 2016. Remittances are now almost three times the size of official development assistance (ODA) and the flows are larger than private debt and portfolio equity flows to developing countries (figure 1). The importance of remittances as a source of foreign currency earnings is also increasing now many emerging markets are facing a weakening balance of payments. In some countries, remittances even represent more than 20 percent of gross domestic product (GDP). As such, remittance flows might have a significant impact on the economic well-being of recipient families, and on the development and growth of recipient economies.



**Figure 1:** Remittances, FDI, private debt & portfolio equity and ODA

Source: World Bank Development Indicators and World Bank Development Prospects Group

Given their magnitude and importance, remittances continue to attract the attention of researchers and high-level domestic and international policymakers. There is now a substantial literature that has documented the positive welfare-enhancing benefits of remittances for the recipient households. Among others, remittances allow for investments in health care and education, contribute to the alleviation of poverty, and are responsible for minimizing consumption volatility (De Haas, 2005). However, in contrast to the well documented impact of remittances on recipient households, the role of remittances in development and growth is still not well understood. On one side, the proponents of remittances as a development tool point at the evidence suggesting that remittances are often used for investment purposes and facilitate financial development. On the other hand, authors have argued that remittances may be detrimental to economic growth. Some of the arguments are based on empirical evidence, showing that remittances fuel inflation, reduce labor market participation and may disadvantage the tradable sector by causing a real exchange rate appreciation. However, only a limited number of studies has tested a direct relationship between remittances and economic growth and these studies have typically provided contradictory results.

This research attempts to fill a gap in the existing literature of the macroeconomic impact of remittances, contributing to the debate of the impact of remittances on economic growth in two different ways. First, this paper uses a new notion of remittances introduced in the Sixth Edition of the International Monetary Fund (IMF) Balance of Payments and International Investment Position Manual (BPM6) called 'personal remittances'. Personal remittances are defined independently of the source of income of the sending household, the relationship between the households, and the purpose for which the transfer is made. This new definition is in line with compilation practices applied in many countries, which did not take account of factors such as source of income and purpose, and is therefore perceived to be a significant improvement as opposed to other, older, notions of remittances. Second, I argue that the inconclusive results of the impact of remittances on economic growth are largely due to an omitted variable bias. More specifically, I test the hypothesis that remittances will be more likely to contribute to long-term economic growth in countries with high quality economic and political policies and sound institutions, but have less or no effect in countries in which institutions and policies are poor.

Institutional quality is perceived to be an essential ingredient for economic growth. As Rodrik, Subramanian, and Trebbi (2004) famously proclaimed: institutions rule. Because the social infrastructure and the quality of institutions exert substantial influence on the volume and efficiency of investment, they may also have an important role in determining the impact of remittances on economic growth. This hypothesis is tested by estimating panel growth regressions both on the full sample of countries and for developing countries only. The results show that remittances have, at

best, no impact on economic growth and there is no evidence found supporting the argument that the impact of remittances is enhanced in good policy environments. In addition to investigating the impact of remittances on economic growth conditional on the quality of policies and institutions in the home country, I also investigate the key channels of how remittances affect economic growth, which are usually ignored in previous studies. Understanding through which channels remittances affect economic growth is important in formulating sound policy in enhancing the developmental impact of remittances. The findings suggest that the consumption channel is more important than the investment channel, indicating that the most important part of remittance income is consumed.

The remainder of this paper is set out as follows: the next section provides an overview of existing academic literature and previous empirical studies. Section 3 describes the model to be estimated and the empirical methodology. The data used in this study is explained and summarized in section 4. Section 5 presents the main results. Section 6 concludes and provides some policy recommendations.

## **2. Literature Review**

Remittance inflows on the scale described in the introduction can be expected to potentially have large effects on the recipient economy. This section provides the theoretical framework to examine those effects. First, the determinants of remittances are discussed, both at a microeconomic and macroeconomic level. Second, section 2.2 examines the channels through which remittances may affect the growth rate of recipient countries within a growth accounting framework. In section 2.3 the role of institutions in channeling remittances for economic growth will be discussed.

### **2.1 Determinants of remittances**

An important underlying theme in the literature on the effects of remittances is whether remittances behave in a similar way to other capital flows and whether they share the same determinants. Understanding the underlying motivations behind remitting is necessary for investigating the economic impact of remittances, for at least two reasons. First, the amount a migrant remits depends on the migrant's underlying reasons to migrate and reasons to remit in the first place. In turn, the size and timing of the remittance flows determine their impact on economic activity in the home country. Second, the intended purposes of remittances also impact the end uses of these flows. The uses to which recipients put remittances are an important determinant of their economic impact on the home country (Chami et al., 2008). A vast and growing body of theoretical and empirical literature explains why migrants remit money to their family members at home. The findings from these studies can roughly be divided into two categories: (1) microeconomic determinants related to circumstances of migration and the migrant's connection with the home setting, and (2) macroeconomic determinants related to economic conditions and policies in both the home and host country (Lucas, 2004).

#### *2.1.1 Microeconomic determinants*

The debate about the microeconomic determinants of remittances was triggered by Lucas and Stark (1985) in their influential paper 'Motivations to remit: Evidence from Botswana'. Lucas and Stark studied remittances on a household level and identified three different types of motivation behind the sending of remittances: pure altruism, pure self-interest, and tempered altruism or enlightened self-interest. In the case of pure altruism, migrants send remittances simply because they care about the well-being of those left behind. This can be modeled in a Becker's (1974) economics of the family type setting where the migrant derives positive utility from the consumption of family members at home. This implies that there is a positive relation between adverse conditions of the family left behind and the amount of remittances sent by the migrant. Altruistic transfers should increase with



the migrant's income and his degree of altruism, and decrease with the recipient's income and the recipient's degree of altruism (Funkhouser, 1995). The altruism motive is the most intuitive and widespread presumption, the earliest studies on remittances (e.g. Johnson & Whitelaw, 1974) already mention altruistic motives for remitting.

Second, remittances may be motivated by self-interested reasons. These self-interested theories of remittances view the family as a business or as a nexus of contracts that enables family members to enter in Pareto-improving exchanges (Chami, Fullenkamp, & Jahjah, 2005). There are many situations of Pareto-improving exchanges involving remittances. The most obvious situation is one where remittances buy various types of services such as taking care of the migrant's assets (land, cattle) or relatives at home. Lucas and Stark (1985) argue that migrants may have investments that need to be managed while they are away, so they use family members as their trustworthy and well-informed agents. Such motivations generally signal the migrant's intention to return home some day (Rapoport & Docquier, 2005). Another way to think of Pareto-improving exchanges is to consider the case where a migrant remits to demonstrate laudable behavior as an investment for the future or with the hope to inherit (Hagen-Zanker & Siegel, 2007). As emphasized by Hoddinott (1994), remitting can make the migrant eligible for inheritance or other resources in the community of origin. If a migrant expects to inherit from relatives, remittances should increase with the recipient household's income and other assets.

Tempered altruism or enlightened self-interest is a less extreme view of the motivations to remit. This view highlights how the migrant and the household left behind mutually benefit from migration through informal contractual arrangements. One type of such a contractual arrangement is coinsurance, as emphasized by the New Economics of Labor Migration (NELM). The NELM hypothesis states that due to market failures in the home country, for example imperfect capital markets, a household member migrates and enters a coinsurance agreement with the household left behind (Taylor, 1999). The migrant will send remittances home when the household experiences shocks or economic downturns and at the same time the household supports the migrant by paying the costs of migration. This agreement reduces risks and uncertainty because the family acts as insurance company that provides members with protection against income shocks (Aggarwal & Horowitz, 2002; Gubert, 2002; Stark, 1991). The small number of members, however, limits the size of the insurance pool and the degree of risk diversification that can be attained. According to this view, remittances should increase when the household's income decreases, but also when the risk-level of the migrant increases. The same kind of rationale may be used to explain remittances as repayments of loans on investments in education. In this case, the implicit contractual arrangement aims at increasing family income and the family will keep on sending migrants as long as family income is thereby increased.

Implementing such loans may require complex decision procedures as to the amount to be financed or the various sources to be solicited for fund-raising (Rapoport & Docquier, 2005).

To empirically distinguish between above motives is extremely difficult. A number of scholars regressed remittances on a set of variables to test the different motives but most results are controversial due to the absence of sufficiently detailed data on migrants and receiving households' characteristics and on the timing of the flows (Rapoport & Docquier, 2005). The overall results from these empirical studies show that a mixture of motives explains the likelihood and size of remittances. Not only are the motives different across households, there is also evidence stating both motives exist within households. Both individualistic motives, such as altruism and self-interest, as familial motives like co-insurance play a role in the decision to remit. As Pozo (2005) observed in Latin America, "altruism is an important motive underlying the transfers of monies from immigrants to families. But in many cases, the immigrant is also insuring for a rainy day" (p. 89).

### *2.1.2 Macroeconomic determinants*

A review of studies on the macroeconomic determinants of remittances reveals a list of variables that can be expected to significantly affect the volume of remittances that countries receive. Most empirical macroeconomic papers focus on the number of migrant workers, wage rates, the economic situation in the host and home country, inflation, exchange rate movements, the relative interest rate between the sending and receiving country, and government policies and political stability in the receiving country as determinants of remittance flows (Buch & Kuckulenz, 2004; Pozo, 2005; Russell, 1992).

The stock of migrant workers in the host country is an obvious determinant of remittances because the greater the stock of workers, the greater the volume of remittances. Freund and Spatafora (2005) estimate that doubling the stock of workers would lead to a 75 percent increase in remittance flows. The level of economic activity in the home country is important because negative shocks in the home country may increase the need for remittances to be sent, which may induce current migrants to increase the level of remittances or cause migration in the first place. On the other hand, the economic situation in the host country is important because better economic conditions allow migrants to increase their employment and earnings prospects, which gives them the opportunity to remit more (IMF, 2005). Bad economic government policies and institutions in the home country, like black market premiums and exchange rate restrictions, may discourage remittances and may also shift remittances from the formal to the informal sector (IMF, 2005). Macroeconomic instability, as manifested in high inflation or real exchange rate overvaluation, may have similar negative effects. On the other hand, greater financial sector development may encourage remittances by making

remittances easier and cheaper to send and receive. Political instability and low levels of law and order may also discourage migrants from sending remittances because of the risk of expropriation or theft. In addition, an unstable political and macroeconomic environment is not conducive for investment purposes and may therefore deter remittances. On the contrary, an unstable environment may also create an incentive to migrate abroad and in such times there may also be more need for remittances (Hagen-Zanker & Siegel, 2007). Last, remittances are perceived to be responsive to changes in the interest rate differential between the home and host country. The interest rate differential is a proxy for the investment opportunities in the home country and some researchers find evidence that remittances respond positively to interest rate differentials (Elbadawi & Rocha, 1992). Greater potential return to assets in the home country as opposed to the host country may encourage migrants to invest in the home country and therefore stimulate remittances (IMF, 2005).

A review of empirical papers on the macroeconomic determinants of remittances finds a lack of consensus in the literature. Buch and Kuckulenz (2004), after looking at different studies, conclude that there is no clear connection between the volume of remittances and so-called traditional variables such as the level of economic development, growth, and proxies for the rate of return on financial assets. One likely explanation for this finding is that just as a multitude of microeconomic motives underlie the decision to remit, many different macroeconomic determinants may similarly co-exist. As Amuedo-Dorantes, Bansak, and Pozo (2005) note, “in all likelihood, all the motives for remittances that have been suggested are at play for different subsets of migrants and their families” (p. 38).

### *2.1.3 Compensatory or opportunistic?*

The conclusion that emerges from above assessment of the literature on remittance motives is that a multitude of motives underlie the remitting decision and that these findings have no clear implications for the economic impacts of remittances. From an economic development point of view, the key question remains how remittances are spent or used. Are the transfers spent on consumption, or are they channeled into investments? Since the 1970s, remittances have been generally perceived to be spent on houses, food, cars, and other consumption goods, not on investments in productive enterprises. Remittances are therefore thought to lead to a passive and dangerous dependency (De Haas, 2005). Chami et al. (2008) suggest that, in order to adequately answer the question how remittances are spent, research must focus on whether remittances are predominantly compensatory or opportunistic in nature. If remittances are predominantly opportunistic in nature and sent to take advantage of favorable economic conditions in the home

country, then they are similar to capital flows and can be analyzed as such. On the other hand, if remittances are primarily compensatory transfers, then they are very different from capital flows, and their economic impacts change dramatically (Chami et al., 2008).

A widely-cited cross-country panel study by Chami et al. (2005) found that remittances are best described as compensatory transfers. The authors estimated a panel regression in which a country's ratio of remittances to GDP is regressed on the interest rate differential between the country and the United States and on the difference in the country's per capita GDP and United States' per capita GDP. The estimations revealed negative and highly significant coefficients on the income gap, indicating that remittances increase when income in the home country is relatively depressed and thus providing evidence that remittances are compensatory transfers. The financial crises in Asia between 1998 and 2001 are a textbook case of compensatory remittance flows. While private capital flows declined significantly in the wake of the crises, remittance flows continued to increase. However, a number of scholars expressed some reservations regarding the findings of Chami et al. (2005) because the authors disregard the possibility that, due to liquidity constraints, remittances could affect investments and human capital formation (Durdu & Sayan, 2009; Neagu & Schiff, 2009). These scholars argue that remittances are pro-cyclical and that remittance flows share features of both private and official capital flows, driven by different factors.

Buch and Kuckulenz (2004) also show that although remittances, private, and official capital flows have different determinants and have behaved quite differently over time, remittance flows do share similarities with private and official capital flows. They state that these similarities are not surprising since payments of migrants to their relatives at home are motivated both by market-based considerations and by social considerations. On the one hand, migrants try to shield their families back home from adverse economic developments. On the other hand, remittances are market-driven as well since migrants have to consider the opportunity costs of sending remittances as an alternative to investing their financial assets abroad. The critical link here is that the incentive to invest and its subsequent productivity will depend on the policy environment and on the quality of institutions. Good policy environments will increase the return on investment and hence will raise the opportunity cost of consumption for a recipient household (World Bank, 2006a). The role of the policy environment and institutions will be discussed further in section 2.3. First, the consequences of remittances for economic growth will be analyzed in the next subsection.

## **2.2 Consequences of remittances**

Until recently most of the research and discussion on the effects of remittances was focused on the microeconomic end use by the recipient families, including the impact on poverty alleviation (World

Bank, 2006b). Now, the macroeconomic effects of remittances have moved into focus of the discussion as well. Understanding the appropriate channels through which remittances impact economic performance is essential to formulating sound policies to maximize their overall economic impact. However, precisely because remittances can affect growth through a variety of channels, the macroeconomic effects are hard to disentangle. This section reviews three different channels through which remittances may affect recipient economies: capital accumulation, labor force growth, and total factor productivity (TFP) growth.

### *2.2.1 Capital accumulation*

Remittance inflows can affect the rate of capital accumulation in different ways. First, there is a direct income effect since remittances can directly finance an increase in capital accumulation relative to when a country relies only on domestic sources of income (Barajas, Chami, Fullenkamp, Gapen, & Montiel, 2009). Especially in poorer communities with imperfect capital markets households face financial restrictions that constrain their investment activities. Research conducted in Mexico and the Philippines suggests that remittances can lift these constraints as remittances are associated with greater accumulation of assets in farm equipment, higher levels of self-employment and increased micro-enterprise investments (Woodruff & Zenteno, 2004; Yang, 2005). Remittance inflows thus could help households to set up their own entrepreneurial activity. Second, remittances can improve a country's creditworthiness, thereby lowering the cost of capital and enhancing the country's access to international capital markets (World Bank, 2006b). The calculation of country credit ratings by major international agencies also depends on the magnitude of remittance flows. The higher the magnitude of remittance flows the better the credit rating rank the country could reach. Moreover, the ratio of debt to exports of goods and services, a key indebtedness indicator, would increase significantly if remittances were excluded from the denominator. Another way in which remittances can enhance a country's access to international capital markets is through securitization of future remittance flows. Future flows of remittances can be used by governments or private-sector entities as collateral to raise external financing in international capital markets (Ratha, 2013). In other words, securitization enables governments to raise hard currencies by selling bonds. A third channel through which remittances may affect capital accumulation is through their effect on macroeconomic stability. Because remittances are characterized as a more stable and less cyclical form of capital they make the economy less volatile which in turn may reduce the risk premium that domestic firms demand in order to undertake investment, making investment more attractive (Chami, Hakura, & Montiel, 2009). In addition, Bugamelli and Paternò (2009) state that the stability and low cyclicity of remittances make foreign investors less likely to suddenly flee emerging markets and developing economies.

Besides stimulating capital accumulation, remittances could stimulate additional investment in human capital and health as well. Both education and health are key variables in promoting long-run economic growth. Section 2.1 presented a first possible link between remittances and education through the 'repayment of loans' hypothesis which states that remittances may be seen as repayment of informal loans used to finance investments in education. A second possible link between remittances and education must be considered as remittances alleviate credit constraints and improve access to education for the poor (Rapoport & Docquier, 2005). Indeed, research in sub-Saharan African countries has shown that there exists a strong and positive correlation between the receipt of international remittances and the average number of household members with a secondary education (Ratha, 2013). Once in school, the children of migrants may be more likely to finish their education. Similarly, López-Córdova (2005) finds that municipalities in Mexico which receive more remittances have greater literacy levels and higher school attendance. Especially girls seem to benefit from the receipt of remittances by the household, their educational attainment increases significantly more than the educational attainment of boys. In the same study López-Córdova (2005) reveals that remittances are associated with reduced infant mortality. Specifically, he finds that a 1 percent increase in remittances received by the household reduces the number of children who die in their first year by 1.2. Other papers by Frank and Hummer (2002) and Hildebrandt and McKenzie (2005) for example also conclude that children in migrant households have lower mortality rates and higher birth weights.

### *2.2.2 Labor force participation*

Remittances may also influence economic growth through their effects on the growth rate of labor inputs. Remittance receipts may have a negative effect on labor force participation, for two reasons. First, since remittances are simply income transfers, recipient households may substitute remittance income for labor income (Barajas et al., 2009). Second, remittances may be plagued by severe moral hazard problems. According to Chami et al. (2005) moral hazard problems may induce recipient households to divert remittance inflows to the consumption of leisure, thereby limiting their job search and reducing their labor market effort. Because the transfers occur under asymmetric information and because the distance separating the remitter and recipient is substantial, monitoring and enforcement are extremely difficult. Anecdotal evidence of this labor market effect is abundant in Mexico and El Salvador, and several other empirical studies found evidence as well that remittances tend to increase the reservation wage and reduce household labor participation (Acosta, 2006; Amuedo-Dorantes & Pozo, 2006; Funkhouser, 2006). On the other hand, Özden and Schiff (2006) note that a decline in labor supply because of remittances may actually lead to higher

productivity which in turn has a positive impact on economic performance. This is also shown by a study of Lucas (1987) and a later study by Rozelle, Taylor, and deBrauw (1999).

### *2.2.3 Total factor productivity*

The last channel through which remittances may impact growth is the total factor productivity channel. Remittances may affect total factor productivity growth through effects on the efficiency of investment and through effects on the size of dynamic production externalities generated by an economy (Barajas et al., 2009). By improving the quality of financial intermediation remittances may also improve the efficiency of domestic investment. For example, if recipient family members invest on behalf of the remitter then the efficiency of investment is affected to the extent that the family member possesses some informational advantage relative to formal domestic financial intermediaries (Barajas et al., 2009). Second, because remittances expand the quantity of funds flowing through the banking system, remittance flows may affect the ability of the recipient economy's financial system to allocate capital by creating economies of scale (Aggarwal, Demirgüç-Kunt, & Martínez Pería, 2011).

A second mechanism through which remittances affect total factor productivity is by changing the size of domestic productive sectors that create dynamic production externalities. Several studies state that large and sustained remittance flows can lead to an increase in the demand for domestic currency which may lead to a real appreciation of the exchange rate. This so-called Dutch Disease effect – as has been seen in Latin America and Cape Verde – makes the production of cost-sensitive tradables such as cash crops and manufacturing less profitable and thus jeopardizes the competitiveness of the tradable sectors (Acosta, Lartey & Mandelman, 2007; Bourdet & Falck, 2006; López, Molina, & Bussolo, 2008). Amuedo-Dorantes and Pozo (2004) test the impact of remittances on the real exchange rate using a panel of 13 Latin American and Caribbean countries. Their analysis reveals that remittances have the potential to inflict economic costs on the export sectors of receiving countries by reducing their competitiveness. The authors find a 22 percent appreciation in the real exchange rate once remittances doubled. Other studies, however, conclude otherwise. As remittance flows tend to be relatively stable and persistent over long periods, the Dutch Disease effects of remittances should be less of a concern than those of natural resource windfalls and other cyclical flows. Ratha (2013), for example, argues that the exchange rate implications of remittance flows are easier to manage than a comparatively abrupt shock due to a natural resource windfall. Governments receiving large remittance inflows can opt to liberalize trade policies and to allocate a larger portion of government expenditures on infrastructure. According to Ratha, these measures

would tend to increase exports and also contribute to improved labor productivity and competitiveness.

## **2.3 The role of institutions**

Overall, above discussion showed that there are many potential effects of remittances on economic growth. However, these effects are of uncertain magnitude and conflicting direction. Part of the explanation for these contradictory findings may be that previous studies suffer from an omitted variable bias: the role of institutions and government policies (World Bank, 2007). There are strong arguments, based on the analysis of Acemoglu, Johnson, and Robinson (2001), Knack and Keefer (1995) and La Porta, Lopez-de-Silanes, Shleifer, and Vishny (1997) for example, for believing that the economic growth impact of remittances ultimately depends greatly on the underlying institutions and government policies in the home country. As De Haas (2005) observes: “as both negative and positive effects on development are found to varying degrees, the relevant question is under what conditions are remittances and development more positively correlated than under others” (p. 1275).

### *2.3.1 Which institutions matter?*

A number of scholars have mentioned how an unfavorable investment climate and a lack of political stability and legal security may undermine the benefits of remittances. Hall and Jones (1999), for example, argue that “differences in capital accumulation, productivity, and therefore output per worker are fundamentally related to differences in social infrastructure across countries. By social infrastructure we mean the institutions and government policies that determine the economic environment within which individuals accumulate skills, and firms accumulate capital and produce output” (p. 84). Because the quality of institutions exerts substantial influence on the volume and efficiency of investment, it may also have an important role in determining the effects of remittances on economic growth. Following North (1990), institutions can be understood as the rules of the game in a society. Institutions are the humanly devised constraints that shape human interaction, structuring political, social, and economic incentives in human exchange. Since institutions shape the environment in which individuals operate they play a significant role in a recipient household’s decision on how to use remittance income.

Of primary importance to economic outcomes are the economic institutions in society, such as the security of property rights and the presence and perfection of markets (Acemoglu, Johnson, & Robinson, 2004). These institutions matter for growth because they shape the incentives of key economic actors in society and because they influence investments in physical and human capital, in



technology, and in the organization of production. Many scholars argued that the establishment of secure and stable property rights has been a key element in the rise of the Western world and the onset of modern economic growth. Economic institutions are also important because they help to allocate resources, and thus remittances, to their most efficient uses; they determine who gets profits, revenues and residual rights of control. When markets are missing or ignored, gains from capital flows go unexploited and resources are misallocated (Acemoglu et al., 2004).

Good economic institutions consist of an inter-related cluster of things. Rodrik (2000) identified five important types of market-supporting institutions: property rights, regulatory institutions, institutions for macroeconomic stabilization, institutions for social insurance, and institutions of conflict management. First, there must be a governance system that allows enforcement of contracts and property rights and reduces corruption so that individuals have an incentive to invest, innovate and take part in economic activity (Rodrik et al., 2004). A household that receives remittances will not have the incentive to invest its remittance income in physical or human capital unless it has adequate control over the return to the assets that are thereby produced or improved. Second, in societies where corruption exists potential investors are aware that some of the proceeds from their future investments may be claimed by corrupt officials. To prevent fraudulent or anti-competitive behavior, institutions regulating conduct in goods, services, labor, assets, and financial markets are needed (Rodrik, 2000). Third, the recent global financial crisis stressed the inherent instability of financial markets and its transmission to the real economy. All advanced economies have come to acquire fiscal and monetary institutions that perform stabilizing functions. Fourth, since change is constant in a dynamic market economy and risk to employment and income is pervasive, social insurance programs such as unemployment benefits and public works are needed to protect individuals against these risks. There must also be some degree of equality of opportunity in society, including equality before the law, so that individuals have relatively equal access to economic resources and those with good investment opportunities can take advantage of them (Acemoglu et al., 2004). Last, a well-performing economy needs institutions of conflict management. Social conflicts are harmful because they divert resources from economically productive activities and because they discourage such activities by creating uncertainty (Rodrik, 2000). Leaders who fear replacement are more likely to expropriate because they expect to bear fewer of the future costs of their current expropriatory actions (Knack & Keefer, 1995). The rule of law, a high-quality judiciary, representative political institutions, free elections, independent trade unions, institutionalized representation of minority groups, and social insurance are all examples of conflict managing institutions.

### *2.3.2 The windfall effect*

Despite their aggregate size, remittances are made up of millions of individual household-to-household, private non-market income transfers. Additionally, remittances often flow to poorer households in rural areas. As such they differ from other capital flows in which the motives and destinations derive from the main actors being states or businesses. Remittance flows therefore potentially have less adverse effects on domestic institutional quality than other large resource flows. Aid flows, for example, might be detrimental to a recipient's institutional quality because a government receiving aid is less reliant on the collection of tax revenues and may therefore be less responsive and accountable to its citizens. Natural resource windfalls – oil rents, for example – are associated with civil conflict and often foster weak institutions because they allow the authorities to pursue arbitrary, costly, and inefficient policies (Abdih, Chami, Dagher, & Montiel, 2012). Since remittances are directly transferred to households and allocated in small amounts remittances avoid the government 'middleman' and are likely to escape the adverse effects on institutional quality.

Given that institutions and government policies are important for growth and that remittance flows have little systematic impact on institutions and policies, I introduce the hypothesis that the impact of remittances on economic growth is conditional on these same institutions and policies. The essential thrust of this paper is therefore not merely to stress the importance of remittances for economic growth, or to highlight the importance of institutions, but to explore the relationship between these two variables. The small amount of existing literature on remittances examines the partial relationship between remittance flows and economic growth. Much of the literature that focuses on institutions tries to find a direct relationship between institutional quality and growth. This paper seeks to extend this literature by examining the importance of institutional quality across a range of countries, in order to determine whether there are interaction effects with remittances.

Though this type of research is missing in the remittances literature, the aid effectiveness literature widely investigated the links between foreign aid, institutional quality, and growth. As first emphasized by Burnside and Dollar (2000), aid has a more positive impact on growth in good policy environments. Moreover, Burnside and Dollar also show that this effect goes beyond the direct impact that good policies themselves have on growth; it is complementarity between aid and good policies what matters for growth. Subsequent studies by Collier and Dehn (2001), Collier and Dollar (2002, 2004), and Burnside and Dollar (2004) report similar results. The Burnside and Dollar result proved remarkably influential in the development community but not uncontroversial. Easterly (2003) and Easterly, Levine and Roodman (2004) argued that the results of Burnside and Dollar are sensitive to small changes in the time period and the countries included and to alternative

specifications of aid and institutional quality. Similar to Rajan and Subramanian (2008), the authors failed to find a positive effect of aid even in good policy environments. There is some limited empirical work suggesting that institutions play a role in the impact of remittances on economic growth. Faini (2002) regressed growth of per capita income in the home country on a standard set of explanatory variables and on remittances. The results indicated a positive impact of remittances on growth and Faini interpreted the positive coefficient on the policy variable as a signal that in order for the full impact of remittances to be realized, a good policy environment is needed. That is, an environment that does not foster macroeconomic uncertainty and supports social and productive infrastructures. Barajas et al. (2009) also argue that their findings that remittances have had, at best, no impact on economic growth may suggest that many countries do not yet have the right institutions and infrastructure in place. However, they do not investigate this claim empirically.

### 3. Methodology

In this section, I discuss the tools and techniques used to assess the impact of remittances on economic growth, conditional on the quality of government policies and institutions. The data and variables used in the analysis are described in section 4.

#### 3.1 Model specification

To empirically explore the responsiveness of economic growth to international remittance flows, annual unbalanced panel data from 1980 to 2011 involving 165 countries are used. The choice of the study period and sampling of countries are dependent entirely on availability of data. I first specify a linear regression model which comprises the growth rate of real GDP per capita as dependent variable and the ratio of remittances to GDP as explanatory variable of an otherwise orthodox neoclassical economic growth model of the form:

$$\Delta y_{it} = \beta_0 + (\beta_1 - 1)y_{i,t-1} + \beta_2 Rem_{it} + \beta_3' X_{it} + \eta_i + \mu_t + \varepsilon_{it} \quad (1)$$

where  $i$  indexes countries,  $t$  denotes time,  $\Delta y_{it}$  is the growth rate of real GDP per capita measured as the log difference of real GDP per capita in year  $t$ ,  $y_{i,t-1}$  is the logarithm of real GDP per capita lagged one year,  $Rem_{it}$  is a measure of remittances as a share of GDP,  $X_{it}$  represents a matrix of control variables,  $\eta_i$  is a country-specific fixed effect that allows considering unobservable heterogeneity across countries, and  $\mu_t$  is a time specific effect capturing productivity changes that are common to all countries. Finally  $\varepsilon_{it}$  is an error term.<sup>1</sup> For illustrative purposes, I do not include any variable for institutional quality in the first regression. The empirical model (1) suggests that economic growth depends on previous levels of per capita income, the ratio of remittances to GDP, and a set of control variables. The primary focus of this first empirical model is to assess the nature and magnitude of the estimate of  $\beta_2$ . If the marginal impact of remittances on growth is positive one should find  $\beta_2 > 0$ , whereas if remittances have no impact on growth one might find  $\beta_2 = 0$ . However, the review of theoretical and empirical literature showed that remittances may also have a negative impact on economic growth through multiple channels. Therefore, the possibility that  $\beta_2 < 0$  cannot be excluded and the expected sign of the coefficient on remittances is theoretically ambiguous.

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<sup>1</sup> Note that equation (1) can be written equivalently with the level of real GDP per capita as dependent variable as:  $y_{it} = \beta_0 + \beta_1 y_{i,t-1} + \beta_2 Rem_{it} + \beta_3' X_{it} + \eta_i + \mu_t + \varepsilon_{it}$

The objective of this study is to investigate the hypothesis that remittances' impact on economic growth is determined, at least in part, by the quality of the receiving country's government policies and institutions. To this end, I interact the remittances' variable with different indices of institutional quality and test the significance of the interacted coefficient. A negative coefficient would indicate that remittances are more effective in boosting growth in countries with low quality levels of institutions and government policies. On the other hand, a positive interaction would imply that the growth effects of remittances are enhanced in good policy environments. To ensure that the interaction term does not proxy for remittances or institutions, both variables are also included separately in the regression equation. Accordingly, empirical model (2) is specified as follows:

$$\Delta y_{it} = \beta_0 + (\beta_1 - 1)y_{i,t-1} + \beta_2 Rem_{it} + \beta_3 Ins_{it} + \beta_4 (Rem_{it} \cdot Ins_{it}) + \beta_5' X_{it} + \eta_i + \mu_t + \varepsilon_{it} \quad (2)$$

where  $Ins_{it}$  is a measure of institutions. To measure institutions and government policies data from the International Country Risk Guide (ICRG), Transparency International (TI), and the Polity IV Project are employed. These variables are described in section 4. In equation (2) the main interest centers on the value of the coefficient  $\beta_4$ . Note that the marginal impact of a change in remittances on growth is now given by  $\frac{\partial \Delta y_{it}}{\partial Rem_{it}} = \beta_2 + \beta_4 \cdot Ins$ . Thus when  $\beta_4$  is positive, this will be an indication that in general the higher the value of the institutional variable (or: an improvement in the quality of institutions and government policies) the higher the impact of remittances on growth. It is also worth noting that for institutional quality variables that can only take positive values,  $\beta_2$  can even take values smaller than 0 when  $\beta_4 \neq 0$ , since for remittances to have a positive impact on growth all that is required is that  $\beta_2 + \beta_4 \cdot Ins > 0$ . When interpreting the results, caution must be applied, as the variables for institutional quality have different scales and some can also take negative values.

### 3.2 Estimation technique

To ensure that the results of this study can be compared with those in the literature that studies the impact of remittances on growth, I estimate equation (1) and (2) using three different methods. First, as a starting exercise, I estimate the impact of remittances on economic growth using the standard Ordinary Least Squares (OLS) method. OLS estimation pools observations across cross-sections and, by using all the variation in the data, tends to be more efficient than performing individual OLS on repeated cross-sections. However, estimating equation (1) and (2) by OLS raises several concerns as it fails to account for the potential endogeneity of the explanatory variables. One immediate problem is that  $y_{i,t-1}$  is correlated with the fixed effects  $\eta_i$  in the error term, which gives rise to dynamic

panel bias (Nickell, 1981). The coefficient estimate for  $y_{i,t-1}$  is inflated by attributing a predictive power that actually belongs to the country's fixed effects. Second, as Hsiao (1986) points out, since causality between the endogenous variable and the right hand side variables could run in both directions, regressors may also be correlated with the disturbances. Correlation between regressors and the disturbances violates an assumption necessary for the consistency of OLS and consequently OLS will yield biased and inconsistent coefficient estimates. This endogeneity problem is a common problem in cross-country research and can be traced back to two generally recognized sources other than reverse causality, namely omitted variables and measurement errors. Reverse causality between remittances and growth is likely because economic growth in the receiving country can potentially drive remittance inflows. This can occur either through effects on migration, in which low growth leads to a higher number of migrants and higher remittances; or through altruistic behavior by the migrant, in which low growth leads altruistic migrants to increase their remittance transfers. But also measurement errors may concern remittances as well as institutional quality and may impose serious challenges on the estimation of equation (1) and (2).

There are two ways to work around this endogeneity. One is to transform the data to remove the fixed effects, which is tried by the second estimation method. The second method includes country specific effects and tests which empirical model is most suitable for estimating economic growth. The Hausman test will be used to choose the best specification among the Fixed and Random Effects model. The other way to correct for the endogeneity problem is by choosing a set of instrumental variables. There has been an extensive search in the theoretical and empirical literature for good instruments for remittances. To instrument properly for remittances, one needs a variable that is correlated with the potentially endogenous explanatory variable, in this case remittances, and its effect on individual country growth must operate solely through its effect on that variable. Variables such as the distance between migrants' destination country and their home country and the fraction of a country's migrants going to each of its top five OECD country destinations have been suggested (Rajan & Subramanian, 2008; World Bank, 2006a), but these variables suffer from the drawback that they do not vary over time and therefore they cannot be used in a panel framework. A promising candidate would be the transaction cost of making a remittance transfer, since an increase in the cost of remitting should be negatively correlated with aggregate remittance flows but uncorrelated with the growth rate. Unfortunately, direct observations of these transaction costs are only available for a limited number of country corridors and for a few years. Since 2008, the World Bank monitors remittance costs through the Remittance Prices Worldwide database so maybe future research can use remittance costs to instrument for remittances.

The primary strategy in this paper for mitigating the endogeneity problem is to estimate equation (1) and (2) using a panel system Generalized Method of Moments (GMM) technique. The GMM estimator is designed for situations with few time periods and many individuals and allows relaxing some of the OLS assumptions. The estimator corrects for the endogeneity in the lagged dependent variable and provides consistent parameter estimates even in the presence of endogenous right hand side variables. It also allows for individual fixed effects, heteroskedasticity, and autocorrelation within individuals (Roodman, 2009a). As proposed by Arellano and Bond (1991), the first step in this estimation procedure is to eliminate unobservable heterogeneity ( $\eta_i$ ) by first differencing equation (1) and (2). For example, after rearranging, equation (1) can be rewritten as:

$$\Delta y_{it} - \Delta y_{i,t-1} = (\beta_1 - 1)(y_{i,t-1} - y_{i,t-2}) + \beta_2(Rem_{it} - Rem_{i,t-1}) + \beta_3'(X_{it} - X_{i,t-1}) + (\mu_t - \mu_{t-1}) + (\varepsilon_{it} - \varepsilon_{i,t-1}) \quad (3)$$

which relates changes in the real GDP per capita growth rate to changes in remittances and the control variables. In the differenced equation there still exists the problem of correlation between the errors and the lagged dependent variable, which has to be corrected by instrumenting  $y_{i,t-1} - y_{i,t-2}$ . Absent exogenous variables that can provide external instruments, the endogenous problems are addressed by constructing internal instruments along the lines of Arellano and Bover (1995) and Blundell and Bond (1998). The Arellano-Bover/Blundell-Bond estimator augments Arellano-Bond by making an additional assumption that first differences of instrument variables are uncorrelated with the fixed effects. It builds a system of two equations – the original equation in levels and the transformed one in differences – and is known as system GMM. This allows the introduction of more instruments and can improve efficiency. Instruments for the differenced equation are obtained from the lagged levels of the explanatory variables, while instruments for the level equation are the lagged differences of explanatory variables. The consistency of the GMM estimator depends on the validity of the moment conditions, which can be tested using two specifications tests. The first test is the Arellano-Bond test for autocorrelation, testing for no second order serial correlation in the disturbances. The second test, the Hansen (1982) *J*-test of over-identifying restrictions, is performed to ensure the validity of the instruments. The joint null hypothesis of the Hansen test is that the instruments are exogenous, i.e. uncorrelated with the error term, and that the excluded instruments are correctly excluded from the estimated equation. The Hansen test is used in place of the Sargan (1958) test of over-identifying restrictions because of its consistency in the presence of autocorrelation and heteroskedasticity (Roodman, 2009a).

### 3.3 Control variables

The set of control variables in  $X_{it}$  consists of a wide array of potential explanatory variables that can be used in this framework. Commenting on the unsatisfactory nature of growth specifications in many empirical works, Easterly et al. (2004) have mentioned that “this literature has the usual limitations of choosing a specification without clear guidance from the theory, which often means that there are more plausible specifications than there are data points in the sample” (p. 774). As found by Durlauf, Johnson, and Temple (2005), the number of potential growth enhancing variables used in previous empirical works is as many as 145. Given these reservations, choosing a set of uncontroversial control variables to estimate the growth effect of remittances is a difficult task. Therefore, my approach to this study is that instead of including many variables to the already bulky variety of pro-growth and development models, I opt for considering a set of variables that has been widely used and acknowledged in the empirical growth literature and suggested by the standard neoclassical growth model. In this context, the works of Banerjee and Duflo (2003), Barro (1991), Forbes (2000), and Sala-I-Martin (1997) are of extreme relevance.

The set of controls includes the investment rate (*Investment*), defined as gross fixed capital formation to GDP, which is expected to produce a positive effect on per capita growth. Previous studies, however, pointed out that the presence of investment as control variable seems to influence the magnitude and significance of the remittances variable. Including a measure of investment as control variable namely implies that any estimated growth effect of remittances will be through total factor productivity rather than through capital accumulation (Chami et al., 2008). Since the preceding theoretical discussion indicated that possible effects of remittances on the volume of investment may be important, some of the regressions in this study exclude the investment variable as control variable. Second, the ratio of total secondary school enrollment to the population of the age group corresponding to that level (*School*) is included to measure human capital development. Growth theory predicts that human capital development should stimulate growth, whereas the population growth rate (*Population*) should affect growth negatively (Solow, 1956). Fourth, trade openness (*Openness*) is computed as the sum of exports and imports to GDP and is expected to positively impact growth by facilitating exchanges of goods and services, by improving capital allocation efficiency, and by spurring innovation and entrepreneurial activity resulting from competition and access to larger markets. Final government consumption (*Government*) controls for fiscal policy effect on growth, while inflation proxied by the natural growth in the Consumer Price Index (*Inflation*) controls for monetary policy. Government consumption is an approximate measure of government spending in non-productives so that an increase in this variable tends to generate negative impacts on economic growth. Higher inflation is often viewed as a symptom of



macroeconomic instability, which reflects weakness in macroeconomic management. Such instability hampers private investment and saving decisions, thereby leading to an inefficient allocation of resources. An increase in inflation is thus associated negatively with economic growth. Last, conditional convergence theory predicts that capital inflows should stimulate growth in countries where the initial level of GDP is low and the coefficient  $\beta_1$  is therefore expected to be negative. Poor countries are expected to grow faster than richer countries because diminishing returns to capital imply that each addition to the capital stock generates large additions to output when the capital stock is small to begin with. The opposite is true when the capital stock is large initially. However, initial GDP is not suitable for panel data estimations, because it is time invariant within each cross-section. Therefore, following recent empirical works, lagged per capita GDP ( $y_{i,t-1}$ ) is used as a proxy for initial GDP.

All data are drawn from the World Bank's World Development Indicators database. Table 6 (see appendix) summarizes definitions and sources of all the variables used in the analysis, while descriptive statistics for all variables are reported in table 7. The descriptive statistics show that remittances represent on average 3.86% of GDP over the sample period, with a maximum of 106.48% for Lesotho in 1982. Remittances also exhibit a great volatility with a standard deviation of 7.80. A more detailed description of the data on remittances is provided in section 4. As can be seen from table 7, the mean of real GDP per capita growth is around 1.60%, but output volatility is substantial with a standard deviation largely greater than the average growth over the sample period (6.06). The correlation matrix is presented in table 8 and most results are consistent with theory. The estimated correlation coefficient between per capita growth and remittances suggests that correlation exists: it is positive, significant, but not very strong (0.0558). Furthermore, per capita real GDP growth is positively and significantly correlated to investment, school enrollment, and trade openness and negatively correlated to population growth, government consumption, and inflation. The results also show a strong positive correlation between remittances on one hand and investment on the other hand (0.2867). This result suggests that remittances may foster growth by stimulating investment. Another remarkable result is the negative and significant coefficient between remittances and school enrollment (-0.1051), this result is counterintuitive as theory suggests that remittances may stimulate growth by improving access to education.

## **4. Data and Descriptive Statistics**

### **4.1 Data on remittances**

The variable that imposes the greatest challenge in terms of definition and measurement is remittances. Despite the increasing interest in remittances, it is widely held that the quality and coverage of data on remittances are still subjected to limitations, for a number of reasons. First, there is no consensus on the boundaries of the phenomenon under study. Should only workers' remittances be counted, or should compensation of employees and migrant transfers also be included? Second, remittances are hard to measure because they are heterogeneous, with numerous small transactions conducted by individuals through a variety of channels. Remittances can take various forms, ranging from funds transferred through formal, regulated institutions or channels (e.g. banks, nonbank financial institutions, and money transfer operators) to semi-formal and informal channels (e.g. bus drivers, couriers, and hawala). Third, reporting of remittance transactions made through formal channels is not mandatory in all countries and remittances sent through channels such as post offices or exchange bureaus are often not reflected in official statistics (Jongwanich, 2007). If remittances sent through informal channels are included in the statistics, total remittances could be as much as 50 percent higher than official estimates (World Bank, 2006b). Last, remittances are often misclassified as export revenue, tourism receipts, nonresident deposits, or even foreign direct investment. To improve remittance statistics an international working group led by the World Bank and the IMF simplified concepts and definitions related to remittances and developed practical compilation guidance to support compilers. As a result of this working group, the Sixth Edition of the IMF's Balance of Payments and International Investment Position Manual (BPM6) introduced a new aggregate 'personal remittances'. Personal remittances are defined as current and capital transfers in cash or in kind between resident households and nonresident households, plus net compensation of employees. 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 nonresident entities. In short, personal remittances include all household-to-household transfers and the net compensation of nonresident workers. Personal remittances are defined independently of the source of income on the sending household, the relationship between the households, and the purpose for which the transfer is made (IMF, 2009). Simplifying the definition brought it in line with compilation practices applied in many countries, which did not take account of factors such as source of income and purpose.

In order to test the implications of both models, I collected a panel of aggregate data on personal remittances from the World Bank's World Development Indicators database. The entire data set

includes 165 countries for which remittances are reported over the 1980-2011 period, summary statistics are provided in the appendix (table 9). There are 108 countries with no less than 20 years of continuous observations and 80 countries have 30 years or more of continuous observations. It should be noted, however, that only 74 countries have remittances data available over the entire period. For the majority of countries, data are available only from the mid-1980s. For several countries, missing data are common.

## **4.2 Trends**

Thus defined, table 1 reports the estimated flows of remittances received by developing countries and high-income countries between 1980 and 2011 based on the World Bank's (2013b) country classification. Registered global remittances rose from \$37 billion in 1980 to \$473 billion in 2011. The striking element is the rapid increase in remittances starting in the 1990s following a decade of near stagnation. The observed increase could be explained by a real rise in remittances due to globalization and an increase in the number of migrants. But technological improvements in the banking industry have reduced the costs of sending remittances and increased the geographical reach over which transfers can be sent through financial institutions (Chami et al., 2005). Moreover, efforts to crack down on money laundering may also affected remittance flows. This could mean that remittance transactions that previously went unrecorded were brought into the formal banking system during this period, and therefore included in the official statistics. Current trends should therefore be interpreted with care and keeping in mind the severe limitations in the quality of data.

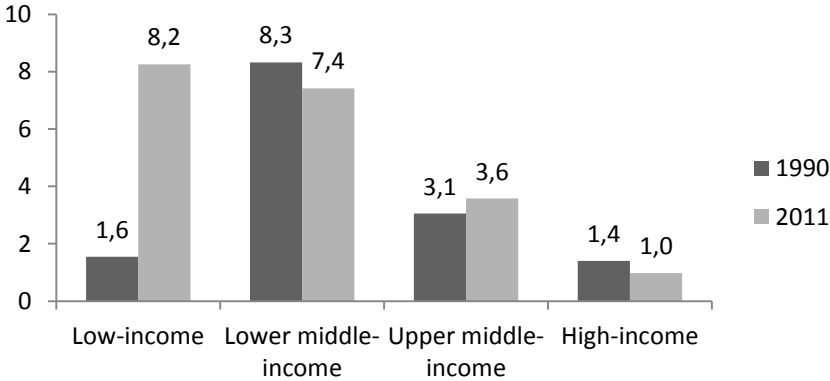
As reported in table 1, remittances received by developing countries rose to \$350 billion in 2011, up 352 percent from 2000. In comparison, remittances to high-income countries increased by 115 percent during this same period. Low-income countries experienced a significantly higher increase in remittances than other developing countries, low-income countries registered an increase of over \$23 billion (or 592 percent) during this period. Especially Kyrgyz Republic has reported a spectacular increase in remittance inflows – from almost \$9 million in 2000 to over \$1.7 billion in 2011. As a share of GDP, remittances are on average significantly higher in low-income countries and in lower middle-income countries (figure 2). In 2011, remittances to low-income countries were 8.2 percent of GDP; in the upper-middle income countries they formed 3.6 percent of GDP. A closer look at developing countries by region reveals substantial variation between regions. In the last decade, remittance flows expanded rapidly to Sub-Saharan Africa while growth in Latin America and the Caribbean decelerated due to a decline in remittances to Mexico. Bangladesh and Pakistan propelled South Asia to emerge as the largest recipient region in 2011, although East Asia and the Pacific is expected to continue as the largest recipient region in the medium term (World Bank, 2013a). The

regional trends in remittances are influenced by the circumstances migrants face in their countries of destination. Latin America and the Caribbean receives over three-quarters of its remittances from the United States, and is thus susceptible to the United States' economic cycle. In contrast, the source of remittances to East Asia and the Pacific and South Asia are more diversified, lending a high degree of resilience to remittance flows during the global financial crisis.

**Table 1:** Personal remittances (billions of dollars)

|                                 | 1980         | 1985         | 1990         | 1995          | 2000          | 2005          | 2010          | 2011          | %*          |
|---------------------------------|--------------|--------------|--------------|---------------|---------------|---------------|---------------|---------------|-------------|
| <b>Developing countries</b>     | <b>17,71</b> | <b>19,52</b> | <b>28,94</b> | <b>50,91</b>  | <b>77,43</b>  | <b>178,14</b> | <b>309,92</b> | <b>350,31</b> | <b>9,78</b> |
| Low-income                      | 0,87         | 0,99         | 1,41         | 2,03          | 3,97          | 9,31          | 23,12         | 27,50         | 11,40       |
| Lower middle-income             | 11,03        | 11,61        | 16,16        | 25,54         | 38,46         | 93,79         | 173,83        | 197,78        | 9,44        |
| Upper middle-income             | 5,80         | 6,93         | 11,37        | 23,34         | 35,00         | 75,04         | 112,97        | 125,03        | 10,07       |
| Latin America and the Caribbean | 1,91         | 2,61         | 5,68         | 13,32         | 20,15         | 48,89         | 55,90         | 59,45         | 11,34       |
| East Asia and the Pacific       | 1,05         | 2,11         | 3,10         | 8,85          | 16,62         | 33,98         | 75,64         | 85,82         | 14,75       |
| South Asia                      | 5,29         | 5,80         | 5,57         | 10,01         | 17,21         | 33,91         | 81,62         | 97,53         | 9,53        |
| Europe and Central Asia         | 2,07         | 1,71         | 3,25         | 4,13          | 8,18          | 18,59         | 31,18         | 36,68         | 9,40        |
| Middle East and North Africa    | 6,04         | 6,14         | 9,58         | 11,47         | 10,47         | 22,48         | 36,70         | 39,79         | 6,07        |
| Sub-Saharan Africa              | 1,34         | 1,14         | 1,78         | 3,16          | 4,83          | 20,31         | 28,92         | 31,09         | 10,32       |
| <b>High-income countries</b>    | <b>19,25</b> | <b>15,93</b> | <b>38,91</b> | <b>50,82</b>  | <b>56,77</b>  | <b>79,06</b>  | <b>112,02</b> | <b>122,49</b> | <b>5,95</b> |
| OECD members                    | 19,07        | 15,77        | 38,66        | 47,55         | 54,40         | 74,44         | 103,35        | 112,72        | 5,71        |
| Non-OECD members                | 0,18         | 0,16         | 0,25         | 3,27          | 2,36          | 4,62          | 8,67          | 9,77          | 13,29       |
| <b>World</b>                    | <b>36,96</b> | <b>35,45</b> | <b>67,85</b> | <b>101,74</b> | <b>134,20</b> | <b>257,20</b> | <b>421,94</b> | <b>472,80</b> | <b>8,29</b> |

Note: \* Annual percentage growth rate between 1980 and 2011. Source: World Bank, own calculations.

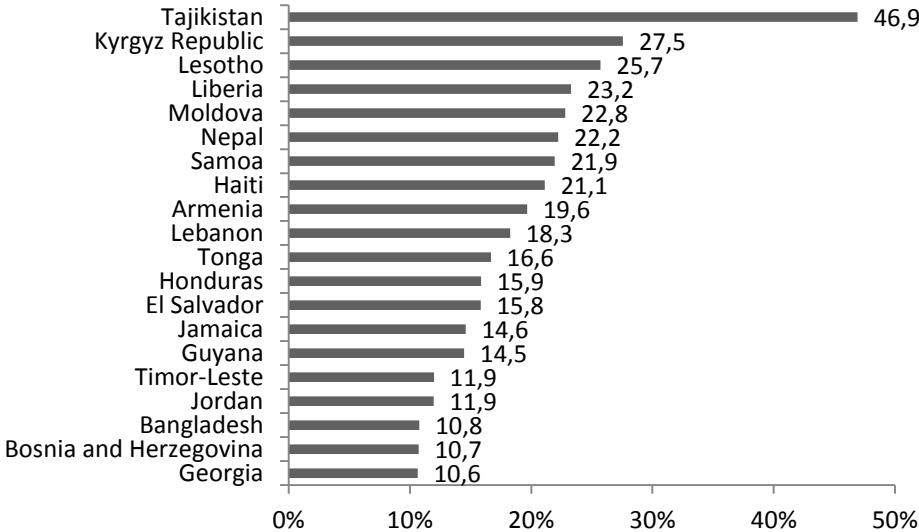


**Figure 2:** Remittances as a share of GDP

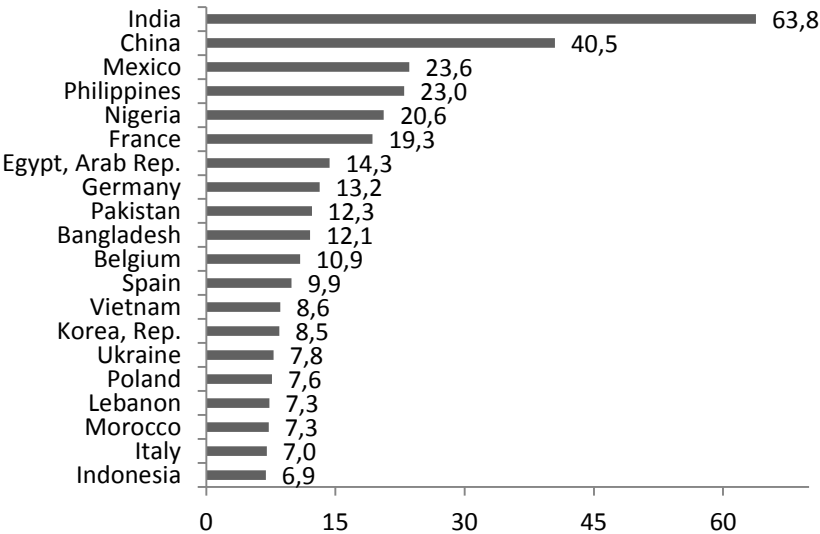
Source: World Bank, own calculations

Although in nominal terms the top recipients of remittances include several large countries, remittances as a share of GDP were larger in small low-income countries. Figures 3 and 4 identify the top 20 remittance-recipient countries in 2011. When remittances are calculated as a share of GDP, the top 20 recipients are all developing countries. All receive more than 10 percent of GDP as remittance flows, Tajikistan even received as much as 46 percent of GDP. It is estimated that half of

Tajikistan’s working-age males are abroad, most in Russia (World Bank, 2013a). Small countries such as Lesotho (26 percent), Moldova (23 percent), Samoa (22 percent), and Haiti (21 percent) are among the most dependent on remittances. When remittances are calculated in absolute terms, a different picture emerges. Figure 4 lists the top 20 recipients of remittances in billions of dollars. Among developing countries, China (\$40 billion), India (\$64 billion), Mexico (\$24 billion) and the Philippines (\$23 billion) were among the top recipients but several industrial countries such as France (\$19 billion) and Germany (\$13 billion) appear in this list as well.



**Figure 3:** Top 20 remittance-recipient countries, 2011 (share of GDP)  
 Source: World Bank, own calculations



**Figure 4:** Top 20 remittance-recipient countries, 2011 (billions of dollars)  
 Source: World Bank, own calculations

### **4.3 Data on institutional quality**

The theoretical discussion in section 2.3 showed that institutions are a complex phenomenon. Since empirical research cannot capture all of this complexity, simplified institutional indicators and proxies need to be used in applied research. A huge disparity in using institutional indicators in empirical research suggests that a single variable measuring institutions is not available (Knack & Keefer, 1995; Rodrik, 2000; Shirley, 2008). Therefore, in order to investigate whether government policies and institutions play a role in the impact of remittances on economic growth, I use different proxies for institutions and government policies. First, data on corruption indicators from Transparency International (TI) are employed. The TI Corruption Perceptions Index (CPI) focuses on corruption in the public sector and defines corruption as the abuse of public office for private gain. The CPI ranks countries in terms of the degree to which corruption is perceived to exist as seen by business people, risk analysts, and the general public. It is a composite index, drawing on corruption-related data in expert surveys, and ranges between 0 (highly corrupt) and 10 (highly clean). The CPI index is available only starting 1995 and as few as 35 countries have continuous observations during 1995-2011 which substantially limits the estimation sample.

Second, I employ the Quality of Government indicator from the International Country Risk Guide (ICRG). This composite indicator assesses the quality of government policies and comprises three different institutional measures: corruption, law and order, and bureaucracy quality. The indicator is scaled 0 to 1 with higher values indicating higher quality of government. The measure of corruption in this composite indicator is concerned with actual or potential corruption in the form of excessive patronage, nepotism, job reservations, favor-for-favors, secret party funding, and suspiciously close ties between politics and business. The law and order indicator consists of a law subcomponent assessing the strength and impartiality of the legal system and an order subcomponent which is an assessment of popular observance of the law. The quality of bureaucracy indicator measures whether the bureaucracy has the strength and expertise to govern without drastic changes in policy or interruptions in government services when governments change. Data are available for 125 countries and span over the period 1984-2011, 90 countries have continuous observations over the entire period.

Last, the revised polity score from the Polity IV Project is employed (Marshall & Gurr, 2013). The Polity Project is one of the most widely used data sources for studying the authority characteristics of states. The Polity scheme consists of six components that record key qualities of executive recruitment, constraints on executive authority, political competition, and changes in the institutionalized qualities of governing authority. The polity variable is the difference between two

scores, one for democracy and one for autocracy, and ranges from -10 (strongly autocratic) to +10 (strongly democratic). Polity scores are available for the entire period and 147 countries.

It is important to note, as Rodrik (2004) points out, that the way in which the quality of institutions and government policies is measured suffers from some serious weaknesses. Most indices of institutional quality are based on surveys of domestic and foreign investors, thus capturing perceptions rather than any of the formal aspects of the institutional setting. This in his view raises two difficulties. First, these perceptions are shaped not just by the actual institutional environment, but also by many other aspects of the economic environment, creating endogeneity and reverse causality issues. Second, even if causality is properly established, the results do not indicate what specific rules, legislation, or institutional design is responsible for the measured institutional outcome. On the other hand, Moers (1999) argues that the use of subjective instead of objective institutional measures in growth empirics is quite consistently verified. According to the author, subjective institutional measures prove to be robustly correlated with growth. Despite these shortcomings, this paper will employ above described indices to investigate whether institutional quality impacts the relation between remittances and growth. A brief description and source for each data series on institutions is provided in table 6.

## 5. Results

This section addresses the estimation results and calculations based on the models described in section 3. The section is structured in three different parts. In the first part, the results for the overall dataset using annual data will be described. As a robustness check, the second part will estimate the models using non-overlapping five year panels and splitting the dataset in developing countries and high-income countries. The third section investigates two key channels through which remittances are likely to affect growth: consumption and investment.

### 5.1 Estimations

Table 2 provides the empirical results of the first set of regressions of model (1) using the three estimation methods described in section 3 and using annual data. These results exclude the variables for institutional quality and the interactions between remittances and institutional quality. The first two columns report OLS results, where the second column refers to the specification excluding investment as control variable. According to the OLS results, all control variables are statistically significant and have the expected sign. The main result of interest is that the impact of remittances on growth is negative in the first specification. As is to be expected, the presence of investment as a control variable seems to make a difference in the significance and magnitude of the coefficient on remittances. When investment is dropped from the specification, in an attempt to better capture the impact of remittances by omitting one of the channels through which remittances are likely to affect growth, the coefficient estimate increases and the impact of remittances on growth becomes positive, but is no longer statistically significant. The third and fourth column present the results of Fixed Effects, or Within Groups, estimation. The Fixed Effects model is chosen because the Hausman test rejects the null hypothesis that both the Random Effects estimator and the Fixed Effects estimator are consistent. All control variables still have the expected sign, however the coefficient assigned to the secondary school enrollment rate is no longer statistically significant. The remittances' coefficient is negative and significant in both specifications.

The OLS and Fixed Effects results are particularly useful because the estimators for lagged real GDP per capita are likely to be biased in opposite directions and can therefore be used to check for the validity of the system GMM estimates. Due to the presence of individual effects in the OLS estimation, the explanatory variable lagged real GDP per capita is positively correlated with the error term. Standard results for omitted variable bias indicate that the OLS estimator is biased upwards. The Fixed Effects estimator eliminates this source of inconsistency by transforming the equation to eliminate  $\eta_i$ . However, this transformation induces a negative correlation between the transformed lagged dependent variable and the transformed error term. This correlation does not vanish as the



number of countries in the sample increases, so that the Fixed Effects estimator is also inconsistent. Standard results for omitted variable bias indicate that the Fixed Effects estimator is biased downwards. A consistent estimator thus will lie between the OLS and Fixed Effects estimates or at least will not be significantly higher than the former or lower than the latter (Bond, 2002).

**Table 2:** Remittances and growth

|                                  | Pooled OLS             |                        | Fixed Effects          |                        | SGMM                  |                        |
|----------------------------------|------------------------|------------------------|------------------------|------------------------|-----------------------|------------------------|
|                                  | (1a)                   | (1b)                   | (2a)                   | (2b)                   | (3a)                  | (3b)                   |
| Log (lagged real GDP per capita) | -0.0072***<br>(0.0012) | -0.0071***<br>(0.0013) | -0.0462***<br>(0.0110) | -0.0445***<br>(0.0107) | -0.0113<br>(0.0161)   | -0.0405*<br>(0.0230)   |
| Remittances                      | -0.0246***<br>(0.0076) | 0.0001<br>(0.0074)     | -0.0801***<br>(0.0188) | -0.0617***<br>(0.0206) | -0.0034<br>(0.0802)   | -0.2150<br>(0.1867)    |
| Log (Investment)                 | 0.0314***<br>(0.0037)  |                        | 0.0252***<br>(0.0061)  |                        | 0.0806***<br>(0.0204) |                        |
| Log (School)                     | 0.0082***<br>(0.0025)  | 0.0103***<br>(0.0025)  | 0.0017<br>(0.0062)     | 0.0033<br>(0.0062)     | 0.0083<br>(0.0226)    | 0.0551<br>(0.0383)     |
| Log (Population)                 | -0.0049***<br>(0.0008) | -0.0053***<br>(0.0008) | -0.0056***<br>(0.0014) | -0.0054***<br>(0.0015) | -0.0054<br>(0.0033)   | -0.0127**<br>(0.0052)  |
| Log (Openness)                   | 0.0038**<br>(0.0017)   | 0.0071***<br>(0.0017)  | 0.0281***<br>(0.0064)  | 0.0375***<br>(0.0060)  | 0.0365<br>(0.0259)    | 0.0608**<br>(0.0241)   |
| Government                       | -0.0880***<br>(0.0157) | -0.0917***<br>(0.0158) | -0.1909***<br>(0.0439) | -0.1880***<br>(0.0434) | -0.1575<br>(0.1889)   | -0.3096<br>(0.2185)    |
| Inflation                        | -0.0045**<br>(0.0021)  | -0.0050**<br>(0.0021)  | -0.0045**<br>(0.0021)  | -0.0047**<br>(0.0022)  | -0.0026<br>(0.0019)   | -0.0060***<br>(0.0022) |
| Constant                         | 0.1258***<br>(0.0106)  | 0.0799***<br>(0.0130)  | 0.4682***<br>(0.0942)  | 0.4232***<br>(0.0895)  | 0.2603**<br>(0.1209)  | 0.4135**<br>(0.2079)   |
| Countries                        |                        |                        | 138                    | 138                    | 138                   | 138                    |
| Observations                     | 2288                   | 2297                   | 2288                   | 2297                   | 2288                  | 2297                   |
| R-squared                        | 0.1988                 | 0.1514                 | 0.2065                 | 0.1910                 |                       |                        |
| Number of instruments            |                        |                        |                        |                        | 63                    | 58                     |
| AR(1) test ( <i>p</i> -value)    |                        |                        |                        |                        | 0.000                 | 0.000                  |
| AR(2) test ( <i>p</i> -value)    |                        |                        |                        |                        | 0.686                 | 0.778                  |
| Hansen <i>p</i> -value           |                        |                        |                        |                        | 0.170                 | 0.288                  |

Notes: Dependent variable is real GDP per capita growth. Robust standard errors in parentheses, \*significant at 10%, \*\* significant at 5%, \*\*\* significant at 1%. All regressions include time dummies.

The last two columns of table 2 report two-step system GMM results. As can be seen from table 2 the coefficient on lagged per capita real GDP lies between the OLS and Fixed Effects estimates. Two-step system GMM is chosen instead of one-step because the two-step estimator is asymptotically more efficient, with lower bias. Because the reported two-step standard errors tend to be severely downward biased, a finite-sample correction to the two-step covariance matrix derived by Windmeijer (2005) is applied in all estimations. All system GMM estimations are based on internal instruments only, the relevant diagnostics are reported in the bottom part of the table. To assess the validity of the instruments employed, autocorrelation tests and the Hansen test of over-identifying

restrictions are performed. The Hansen  $J$ -test tests the null hypothesis that the instruments are valid instruments, uncorrelated with the error term. The Arellano-Bond test for autocorrelation has a null hypothesis of no autocorrelation and is applied to the differenced residuals. The test for AR (1) process in first differences usually rejects the null hypothesis, but this is expected since

$$\Delta\varepsilon_{it} = \varepsilon_{it} - \varepsilon_{i,t-1} \text{ and } \Delta\varepsilon_{i,t-1} = \varepsilon_{i,t-1} - \varepsilon_{i,t-2} \text{ both have } \varepsilon_{i,t-1}.$$

The test for AR (2) in first differences is more important, because it will detect first-order autocorrelation in levels. It is evident from table 2 that the tests for AR (2) fail to reject the null hypothesis of no autocorrelation.

In the estimation process of model (1), 63 instruments have been used in the specification including investment as control variable, while 58 instruments have been used for the specification without investment. These instruments were generated as lagged per capita real GDP, remittances, investment, openness, government consumption, and inflation are treated as potentially endogenous variables, while the school enrollment rate, population growth, and time dummies are treated as exogenous. Exogenous regressors ordinarily instrument themselves, with one column per variable in the instrument matrix. The endogenous variables are instrumented using lags two through five of the levels as instruments for the differenced equation and lag one of the differences for the equation in levels. This lag depth is chosen after repeatedly selecting random subsets from the potential instruments and investigating how key results such as coefficients and the Hansen test change with the number of instruments. Furthermore, the number of instruments is reduced to the minimum by applying the collapse option when using the *xtabond2* command in Stata. The collapse option specifies that *xtabond2* should create one instrument for each variable and lag distance, with 0 substituted for any missing values, rather than one instrument for each time period, variable, and lag distance. Collapsing thus makes the instrument count linear in time dimension instead of quadratic. In large samples, collapsing the instrument matrix may reduce statistical efficiency but on the other hand, a large instrument collection tends to overfit endogenous variables and weakens the Hansen test. As Roodman (2009b) notes, since system GMM uses lagged variables in levels to instrument the differenced equation and lagged differences to instrument levels, system GMM estimators easily generate instruments that are numerous and potentially suspect. Too many instruments can overfit endogenous variables and fail to expunge their endogenous components, resulting in biased coefficient estimates. Unfortunately, there appears to be little guidance from the literature concerning how many instruments is too many. One rule of thumb is to keep the number

of instruments below the number of groups (countries). Furthermore, it is important to report the instrument count and the  $p$ -value of the Hansen  $J$ -statistic. An implausibly perfect  $p$ -value of 1.000 is a telltale sign of potentially weak instruments.

In both specifications, the Hansen test fails to detect any problem with instrument validity as the  $p$ -value for the Hansen test is higher than the conventional 5 percent level but not as high as 1.000. The instruments therefore seem to be valid and informative. Moreover, all diagnostics suggest that the model is correctly instrumented and estimated coefficients are reliable for inference. The results reported in the last two columns of table 2 show that all control variables, i.e. lagged real GDP per capita, investment as a share of GDP, the secondary school enrollment rate, population growth, trade openness, government consumption, and inflation, appear with the expected sign and are consistent with theory. The negative coefficient associated with lagged income supports the conditional convergence hypothesis where poor economies tend to grow faster than rich economies once the determinants of their steady state are held constant. The positive and significant coefficient of openness points out that trade liberalization is a useful policy in promoting economic growth, which supports Mankiw, Romer, and Weil (1992). The secondary school enrollment rate also carries a positive coefficient just as investment, although the former is not significantly different from zero. By contrast, the coefficient estimate associated with inflation is negative, suggesting that macroeconomic instability is bad for growth (see Barro, 1991). An increase in the population growth rate also tends to retard economic growth, consistent with Solow (1956).

Other things being equal, the direct impact of remittances on growth is nil, i.e. negative but statistically insignificant, when the remittances variable is simply added as an additional explanatory variable in a standard growth regression. This poses the question of whether the impact of remittances is homogeneous across countries or whether it varies along a dimension, which has not been properly accounted for in the estimated specification. This avenue is investigated next. In particular, I explore whether the quality of institutions and government policies influence the specific uses given to remittances and their capacity to influence growth. To this end, I estimate equation (2) which allows the impact of remittances on growth to vary across different policy environments in the recipient countries. The sign of the interacted coefficient provides information regarding the nature of remittances. A positive interaction term indicates that remittances and the quality of institutions are complementary and that the growth effects of remittances are enhanced in good policy environments. On the other hand, a negative interaction term reveals that remittances and institutional quality are used as substitutes to promote growth. The results of estimating growth equation (2) are reported in table 3. Each column reports the results that are obtained when the

system GMM estimator is implemented using three different measures of institutional quality, OLS and Fixed Effects estimates can be obtained from table 10 and table 11 (see appendix).

**Table 3:** Remittances, growth, and institutions: SGMM results

|                                  | (1a)                  | (1b)                  | (2a)                   | (2b)                   | (3a)                   | (3b)                   |
|----------------------------------|-----------------------|-----------------------|------------------------|------------------------|------------------------|------------------------|
| Log (lagged real GDP per capita) | -0.0241*<br>(0.0125)  | -0.0329**<br>(0.0163) | -0.0216*<br>(0.0114)   | -0.0325***<br>(0.0119) | -0.0229**<br>(0.0081)  | -0.0269**<br>(0.0110)  |
| Remittances                      | -0.4408*<br>(0.2481)  | -0.5011*<br>(0.2761)  | 0.0748<br>(0.5241)     | -0.1214<br>(0.3565)    | -0.1195**<br>(0.0488)  | -0.0913*<br>(0.0535)   |
| Log (Investment)                 | 0.0351**<br>(0.0158)  |                       | 0.0372**<br>(0.0170)   |                        | 0.0683***<br>(0.0161)  |                        |
| Log (School)                     | 0.0573***<br>(0.0182) | 0.0755***<br>(0.0242) | 0.0277*<br>(0.0156)    | 0.0393***<br>(0.0141)  | 0.0223**<br>(0.0105)   | 0.0355**<br>(0.0158)   |
| Log (Population)                 | -0.0064**<br>(0.0028) | -0.0084**<br>(0.0035) | -0.0070**<br>(0.0028)  | -0.0078**<br>(0.0030)  | -0.0081***<br>(0.0030) | -0.0110**<br>(0.0042)  |
| Log (Openness)                   | 0.0339*<br>(0.0197)   | 0.0303<br>(0.0218)    | 0.0293*<br>(0.0154)    | 0.0376**<br>(0.0182)   | 0.0105<br>(0.0145)     | 0.0343**<br>(0.0154)   |
| Government                       | -0.0642<br>(0.1026)   | -0.0257<br>(0.1590)   | -0.4124***<br>(0.1299) | -0.5243***<br>(0.1570) | -0.2689***<br>(0.0952) | -0.3578***<br>(0.1137) |
| Inflation                        | -0.0035<br>(0.0202)   | 0.0019<br>(0.0227)    | -0.0047***<br>(0.0015) | -0.0057***<br>(0.0019) | -0.0039***<br>(0.0013) | -0.0057**<br>(0.0019)  |
| TI CPI                           | -0.0104*<br>(0.0056)  | -0.0118*<br>(0.0069)  |                        |                        |                        |                        |
| CPI*Remittances                  | 0.1084<br>(0.0839)    | 0.1185<br>(0.0895)    |                        |                        |                        |                        |
| ICRG QoG                         |                       |                       | 0.0346<br>(0.0462)     | 0.0840**<br>(0.0417)   |                        |                        |
| QoG*Remittances                  |                       |                       | -0.9847<br>(1.0051)    | -0.7136<br>(0.6065)    |                        |                        |
| Polity IV                        |                       |                       |                        |                        | 0.0014<br>(0.0014)     | 0.0007<br>(0.0013)     |
| Polity*Remittances               |                       |                       |                        |                        | -0.0079<br>(0.0057)    | -0.0008<br>(0.0056)    |
| Constant                         | 0.3464***<br>(0.0846) | 0.3681***<br>(0.1219) | 0.3167***<br>(0.0805)  | 0.3510***<br>(0.0851)  | 0.3489***<br>(0.0716)  | 0.2894***<br>(0.0880)  |
| Countries                        | 124                   | 125                   | 104                    | 104                    | 125                    | 125                    |
| Observations                     | 1108                  | 1116                  | 1742                   | 1751                   | 2083                   | 2092                   |
| Number of instruments            | 82                    | 77                    | 115                    | 110                    | 126                    | 121                    |
| AR(1) test ( <i>p</i> -value)    | 0.000                 | 0.000                 | 0.000                  | 0.000                  | 0.000                  | 0.000                  |
| AR(2) test ( <i>p</i> -value)    | 0.134                 | 0.152                 | 0.840                  | 0.844                  | 0.904                  | 0.776                  |
| Hansen <i>p</i> -value           | 0.465                 | 0.242                 | 0.844                  | 0.716                  | 0.157                  | 0.211                  |

Notes: Dependent variable is real GDP per capita growth. Robust standard errors in parentheses, \*significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%. All regressions include time dummies.

The general assumptions for two-step system GMM estimation of model (2) are as follows: school enrollment, population growth, and all time dummies are treated as exogenous and instrument themselves. All other control variables and the remittances variable are treated as endogenous and are instrumented using lags two through five. This again implies that lags two through five of the

instrumenting variable in levels are used for the differenced equation, and lag one of the instrumenting variable in differences is used for the levels equation. Similarly, all institutional variables are assumed endogenous since reverse causality between growth and institutions is possible. The number of lags is restricted to three of the instrumenting variable for the differenced equation and thus automatically to two of the instrumenting variable in differences for the levels equation. The number of instruments is again reduced by applying the collapse command. These sets of lags are finally chosen after a series of attempts involving multiple combinations of lags were made in running the system GMM regression. The decision to use these sets of lags is because they yield the best results as far as the significance of the control variables, remittances, and the institutional variables as well as the strength of diagnostic tests are concerned. The insignificant  $p$ -value for the Arellano-Bond AR (2) test reveals absence of second order serial autocorrelation and the Hansen  $J$ -test does not detect any problems in the validity of the instruments used. In addition, in all specifications the coefficient on lagged per capita real GDP lies between the OLS and Fixed Effects estimates. The model thus seems to be correctly instrumented and estimated coefficients are reliable for inference.

A first inspection of table 3 reveals a negative correlation between remittances and the growth rate of real GDP per capita, both when investment is included and excluded from the specification. While the robustness of the coefficients on personal remittances depends on model specifications, in the instances where results are significant, they show a consistently negative impact of remittances on economic performance. The first two columns (1a and 1b) report results using Transparency International's Corruption Perceptions Index (CPI) as a measure of institutional quality, the second two columns (2a and 2b) use the International Country Risk Guide's Quality of Government (QoG) ratings as a proxy for the institutional environment, while the last two columns (3a and 3b) report results using the revised Polity score from the Polity IV Project. The inclusion of these institutional indicators and interactions between remittances and institutions yields unexpected and inconsistent results, which could be due to the severe endogeneity problems associated with both remittances and institutions and the use of subjective institutional indicators. As explained in section 4, using subjective instead of objective indicators may cause reverse causality issues.

In the first specification, using CPI as a measure of institutional quality, a 0.10 percentage point increase in personal remittances as a share of GDP is associated, on average and holding all other independent variables constant, with a 4.41 percentage points decrease in real GDP per capita growth. The coefficient on CPI is negative and statistically significant in both specifications, indicating that an increase in the index, or less perceived corruption, is associated with a decrease in per capita growth. This result is not consistent with theory. The interaction variable is positive, suggesting that

remittances have contributed to promote growth in countries with lower levels of corruption, but insignificant in both instances. It is worth noting that the inclusion of the CPI variable dramatically reduces the number of observations and countries, although this is also the case for the rest of the institutional variables. The result is a shorter panel, both in time and country dimension. When QoG is used as a measure of institutional quality, results change slightly. The estimated coefficient on remittances is no longer statistically significant, while all control variables do appear significant and with the expected sign. The coefficient estimates on QoG are positive, indicating that an increase in QoG is associated with higher real GDP per capita growth, but the estimated coefficient is only statistically significant in the second specification. The negative interaction between QoG and remittances suggest that the marginal impact of remittances on growth is decreasing with the level of QoG but in both cases the coefficient is insignificant. Using the revised Polity score as institutional indicator yields similar results. Neither the coefficients on the Polity score, nor the coefficients associated with the interaction between remittances and the Polity score appear significantly different from zero.

The main message of the estimation results reported in table 2 and table 3 is that remittances do not seem to make a positive contribution to economic growth. When the remittances variable is simply added as an additional explanatory variable to an otherwise standard growth regression, the coefficients are lacking in significance. When remittances are considered in conjunction with institutional variables, as is the case in table 3, remittances appear to have a negative and statistically significant impact on economic growth in four out of six specifications. Only in one specification the impact is positive but not significant. However, the coefficients and their significance seem sensitive to the set of conditioning variables and the estimation method. The significant coefficients range from -0.0913 to -0.5011, which denotes that the estimates cannot be considered to be very robust. What seems to be more robust, however, is that, if anything, remittances appear to have a negative effect on economic performance. Moreover, I do not find evidence to support the argument that the impact of remittances on growth depends on whether countries' institutions are conducive to a productive use of remittances. The interaction variables, which test whether the impact of remittances on growth is conditioned by the institutional environment, appear to be insignificant in all specifications. The parameter estimates for the institutional variables neither signify that the maintenance of a judicial system, a general abeyance of the law or a productive bureaucracy are good for growth. In short, there is no robust evidence that remittances have made the sort of contribution to economic growth that has been hoped for, not even in good policy environments. These findings are similar to those of Barajas et al. (2009) and Chami et al. (2005).

## 5.2 Robustness

As a robustness check and to capture the long-run effects of remittances on economic growth while smoothing out cyclical effects, the analysis for model (2) is also performed using data averaged over 5-year periods. The data are transformed and are based on averages for non-overlapping periods of five years (1981-1985, 1986-1990, 1991-1995, 1996-2000, 2001-2005, 2006-2010), so that there are six data entries for each country for each variable in the sample. Because the number of time periods dramatically decreases as opposed to annual data, the number of lags used as instruments is restricted to two for the institutional variables and to two and three for all other potentially endogenous variables. For the institutional variables, this means that lag two of the instrumenting variable is used for the differenced equation and lag one (or: the previous 5-year period) of the instrumenting variable in differences for the levels equation. The secondary school enrollment rate, population growth, and the period dummies are considered exogenous, standard treatment implies that these regressors instrument themselves. Collapsing the instrument sets severely reduced statistical efficiency and is therefore not applied in these estimations.

The results for the system GMM estimator are provided in table 4 for the model which includes institutional interaction terms with the remittances variable.<sup>2</sup> The Arellano-Bond test and the Hansen test do not detect any problems in the validity of the instruments, but it is important to note that the number of instruments is higher than the number of countries in one specification. The results are similar to the specifications that use annual observations, though not very robust. Once again, the impact of remittances on economic growth is negative in the specification where the estimated coefficient associated with remittances is statistically significant. All control variables, except trade openness, appear with the expected sign and are consistent with theory. The estimated coefficient on QoG is positive and significant in the specification excluding investment as control variable, while the interaction terms between institutional quality and remittances all appear insignificant. The coefficient estimate for the Polity score is of significance in both specifications. By construction, the Polity score reflects institutionalized democracy if it receives a higher score, and institutionalized autocracy if it receives a lower score. Therefore, a positive estimated coefficient for the Polity variable is interpreted as the effect of democracy and a negative coefficient as the effect of autocracy. It would appear that a strongly autocratic regime has a discernible positive impact on growth, which lends empirical support to the strong government hypothesis stating that strong autocratic governments able to govern markets and enforce policies promote growth (Ahrens, 2002).

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<sup>2</sup> OLS and Fixed Effects results are reported in table 12 and table 13 respectively.

**Table 4: SGMM 5-year averages**

|                                  | (1a)                   | (1b)                   | (2a)                   | (2b)                   | (3a)                   | (3b)                  |
|----------------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|-----------------------|
| Log (lagged real GDP per capita) | -0.0129*<br>(0.0069)   | -0.0282***<br>(0.0097) | -0.0084*<br>(0.0046)   | -0.0296***<br>(0.0062) | -0.0058<br>(0.0053)    | -0.0108**<br>(0.0043) |
| Remittances                      | 0.0290<br>(0.1104)     | 0.0175<br>(0.1352)     | -0.2708<br>(0.1642)    | -0.4023*<br>(0.2142)   | -0.0124<br>(0.0199)    | 0.0194<br>(0.0293)    |
| Log (Investment)                 | 0.0452***<br>(0.0093)  |                        | 0.0662***<br>(0.0104)  |                        | 0.0572***<br>(0.0119)  |                       |
| Log (School)                     | 0.0209**<br>(0.0084)   | 0.0390***<br>(0.0123)  | 0.0126**<br>(0.0056)   | 0.0340***<br>(0.0069)  | 0.0104<br>(0.0078)     | 0.0211***<br>(0.0064) |
| Log (Population)                 | -0.0063***<br>(0.0017) | -0.0084***<br>(0.0020) | -0.0037**<br>(0.0018)  | -0.0058**<br>(0.0024)  | -0.0046<br>(0.0029)    | -0.0067**<br>(0.0026) |
| Log (Openness)                   | 0.0001<br>(0.0054)     | 0.0060<br>(0.0058)     | -0.0114*<br>(0.0065)   | -0.0087<br>(0.0069)    | -0.0126<br>(0.0100)    | -0.0039<br>(0.0111)   |
| Government                       | -0.1230<br>(0.0776)    | -0.0875<br>(0.0896)    | -0.1207*<br>(0.0626)   | -0.1060*<br>(0.0568)   | -0.1420**<br>(0.0606)  | -0.1290*<br>(0.0692)  |
| Inflation                        | -0.0113<br>(0.0113)    | -0.0264<br>(0.0267)    | -0.0046***<br>(0.0015) | -0.0053***<br>(0.0015) | -0.0087***<br>(0.0033) | -0.0096**<br>(0.0038) |
| TI CPI                           | -0.0019<br>(0.0463)    | -0.0614<br>(0.0546)    |                        |                        |                        |                       |
| CPI*Remittances                  | -0.0391<br>(0.0463)    | -0.0614<br>(0.0546)    |                        |                        |                        |                       |
| ICRG QoG                         |                        |                        | -0.0028<br>(0.0177)    | 0.0649***<br>(0.0198)  |                        |                       |
| QoG*Remittances                  |                        |                        | 0.3633<br>(0.3218)     | 0.5351<br>(0.3994)     |                        |                       |
| Polity IV                        |                        |                        |                        |                        | -0.0008*<br>(0.0004)   | -0.0009*<br>(0.0005)  |
| Polity*Remittances               |                        |                        |                        |                        | 0.0015<br>(0.0023)     | 0.0011<br>(0.0024)    |
| Constant                         | 0.2202***<br>(0.0476)  | 0.2680***<br>(0.0784)  | 0.2136***<br>(0.0370)  | 0.2547***<br>(0.0500)  | 0.1741***<br>(0.0327)  | 0.1226***<br>(0.0300) |
| Countries                        | 131                    | 131                    | 107                    | 107                    | 130                    | 130                   |
| Observations                     | 374                    | 376                    | 454                    | 456                    | 521                    | 523                   |
| Number of instruments            | 99                     | 86                     | 116                    | 102                    | 116                    | 102                   |
| AR(1) test ( <i>p</i> -value)    | 0.014                  | 0.023                  | 0.000                  | 0.000                  | 0.000                  | 0.000                 |
| AR(2) test ( <i>p</i> -value)    | 0.538                  | 0.956                  | 0.971                  | 0.855                  | 0.798                  | 0.571                 |
| Hansen <i>p</i> -value           | 0.356                  | 0.285                  | 0.572                  | 0.499                  | 0.186                  | 0.285                 |

Notes: Dependent variable is real GDP per capita growth. Robust standard errors in parentheses, \*significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%. All regressions include time dummies.

In light of the main results of the empirical analysis, a second simple robustness test consists of splitting the sample according to the level of economic development and comparing the impact of remittances across subsamples. To see whether the pattern of the estimates remains consistent, I estimated specification (2) for two different sets of countries: developing countries and high-income countries (both OECD and non-OECD). Since high-income countries have good access to international capital markets and generally have better institutional environments there is no compelling reason to believe that remittances would have the same impact on their growth rates as it would on the growth rates of developing countries. Two-step system GMM results can be obtained from table 14



in the appendix, OLS and Fixed Effects results are reported in table 15 and 16. In none of the specifications, remittances appear to have a significant impact on economic performance. Most other variables remain quite the same regarding sign, magnitude, and significance. However, because the number of observations in the dataset is reduced, there is a corresponding problem of poor statistical diagnostics. Three out of six specifications report an implausibly perfect  $p$ -value of 1.000 on the Hansen test, which is a sign of overfitting endogenous variables. Changing the number of lags does not change the significance of the estimated coefficients on remittances, while model diagnostics become even weaker. Hence, the model does not identify significant differences between remittances' impact in developing countries and high-income countries.

### 5.3 Channels

As discussed earlier, remittances might also have indirect impact on economic growth as a result of easing credit constraints that allows domestic investment or consumption to expand. The theoretical discussion in section 2 showed that, from an economic development point of view, one of the key questions is how remittances are spent. Are the transfers predominantly compensatory in nature, used as recurrent household expenditure, or are the flows opportunistic in nature and channeled into investments? The negative correlation between remittances and per capita real GDP growth found in some specifications might imply that remittances are not profit-driven, but are compensatory transfers. This indicates that remittances may not be intended to serve as a source of capital for economic development but are used for non-productive consumption, which supports the claim of Chami et al. (2005). The contrast between the negative correlation of remittances with growth and the positive correlation between investment and growth is also evidence that remittances might not be considered equivalent to capital flows. To solve these arguments and to test which of the two channels is the most effective, I estimate separate equations of the impact of remittances on investment and consumption. Model (4) includes remittances among the independent variables explaining investment behavior:

$$Investment_{it} = \alpha_0 + \alpha_1 Rem_{it} + \alpha_2' Z_1 + \eta_i + \mu_t + \varepsilon_{it} \quad (4)$$

where  $Investment_{it}$  is represented by the log of investment to GDP of country  $i$  at period  $t$ . The matrix  $Z_1$  is composed of real GDP per capita growth to capture the accelerator effect and the lending interest rate as a proxy for the user cost of capital. The accelerator effect suggests that during a boom investment opportunities increase and therefore per capita growth is expected to

produce a positive effect on investment (Hubbard, 1997). On the contrary, higher lending rates hamper the rate of capital accumulation. Accordingly, model (5) describes consumption behavior:

$$Consumption_{it} = \gamma_0 + \gamma_1 Rem_{it} + \gamma_2' Z_2 + \eta_i + \mu_t + \varepsilon_{it} \quad (5)$$

where  $Consumption_{it}$  is the log of per capita household consumption of country  $i$  during period  $t$  measured at constant prices. The set of controls in  $Z_2$  includes, in addition to real GDP per capita, the deposit interest rate to control for the tradeoff between consuming and saving. According to the literature, countries with higher real GDP per capita levels have higher consumption rates. The sign of the coefficient associated with the deposit interest rate is ambiguous, depending on whether the substitution or income effect is stronger. When the substitution effect is dominant, higher interest rates make saving more attractive, thus reducing consumption. On the other hand, when the interest rate increases, income from savings also increases which gives consumers more income to spend. If the income effect is stronger, higher interest rates will induce an increase in consumption (Pindyck & Rubinfeld, 2009).

Table 5 reports system GMM results of the investment and consumption model.<sup>3</sup> Instruments are generated by using lag two through five of the growth rate of per capita GDP, the level of real per capita GDP, the deposit rate, and the lending rate for the differenced equation, and lag one of these instrumenting variables in differences for the levels equation. The remittances variable and time dummies are treated as exogenous in both specifications. The number of instruments are reduced to the minimum by collapsing the instrument set. The results show that remittances produce a positive and significant marginal impact on investment, a 0.10 percentage point increase in the remittances to GDP ratio is associated with a 8.38 percentage points increase in investment. In line with theory, the coefficient corresponding to the per capita growth rate carries the anticipated positive sign while the coefficient assigned to the lending interest rate is insignificant. The marginal impact of remittances on consumption is also significantly positive and much stronger, consumption rises by 16.20 percentage points in response to a 0.10 percentage point increase in remittances. This result indicates that the most important part of remittances is consumed. In addition, the coefficient on real GDP per capita is positive and significant while per capita consumption is negatively associated with the deposit interest rate, pointing at a stronger substitution effect.

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<sup>3</sup> OLS and Fixed Effects results are reported in table 17 and table 18 respectively.

Since the impact of remittances on both investment and consumption is positive and significant, the channel through which remittances impact economic growth is not obvious. However, these findings do provide evidence that remittances produce a larger effect on consumption than on investment. Because a larger portion of remittances is directed towards consumption, this may suggest that remittances are compensatory in nature and can lead to the passive and dangerous dependency described by De Haas (2005). As a consequence of this ‘dangerous’ dependency on remittances, individuals receiving remittance transfers are thought to be inclined to withdraw from local economic activities. A review of the literature by Chami, Fullenkamp, and Jahjah (2005) indicates that a large portion of remittances is spent on imported, status-oriented consumption goods, and land and houses, which is not productive to the economy as a whole. Only when new capital goods are purchased and deployed the capital stock and its productivity are actually enhanced. However, some researchers point out that even when all remittance income is consumed there will still be a benefit to the overall economy as at least some of the transfers are spent on domestically produced goods and services, which may result in a multiplier effect. Therefore, the results obtained in this section may partly explain why remittances have had a negative, or, at best, no impact on economic growth.

**Table 5: Remittances, investment, and consumption**

|                               | <b>Investment</b>      |                               | <b>Consumption</b>     |
|-------------------------------|------------------------|-------------------------------|------------------------|
| Per capita real GDP growth    | 1.9762***<br>(0.4599)  | Log (per capita real GDP)     | 1.1892***<br>(0.0649)  |
| Lending rate                  | 0.0017<br>(0.0054)     | Deposit rate                  | -0.0033***<br>(0.0010) |
| Remittances                   | 0.8376***<br>(0.1798)  | Remittances                   | 1.6203***<br>(0.2987)  |
| Constant                      | -1.5992***<br>(0.0335) | Constant                      | -2.6195***<br>(0.5346) |
| Countries                     | 150                    | Countries                     | 145                    |
| Observations                  | 2907                   | Observations                  | 2546                   |
| Number of instruments         | 42                     | Number of instruments         | 43                     |
| AR(1) test ( <i>p</i> -value) | 0.019                  | AR(1) test ( <i>p</i> -value) | 0.326                  |
| AR(2) test ( <i>p</i> -value) | 0.151                  | AR(2) test ( <i>p</i> -value) | 0.761                  |
| Hansen <i>p</i> -value        | 0.146                  | Hansen <i>p</i> -value        | 0.133                  |

Notes: Dependent variables are the log of investment to GDP and the log of per capita household consumption. Robust standard errors in parentheses, \*significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%. All regressions include time dummies.

## 6. Conclusion

The relationship between remittances and economic growth has attracted increasing attention among applied economists in recent years. While the poverty-reducing potential of remittance flows has been widely acknowledged, the impact of remittances on economic growth is still not well understood. Using unbalanced panel data on remittance flows to 165 countries for the period 1980-2011, this study investigated the relationship between remittances and economic growth, while paying special attention to the role of institutions and government policies. To control for possible endogeneity problems, I employed panel system GMM regressions.

The findings in this paper suggest that decades of remittance transfers have contributed little to economic growth in remittance-recipient countries and may have even retarded growth in some. The results show that when remittances are properly measured, and when the growth equations are well specified and instrumented, there is no evidence of a robust and significant positive relationship between remittances and economic growth. Moreover, when the quality of institutions and government policies are taken into account, most of the considered specifications find a significant negative relationship between remittances and economic growth. In order to further challenge these results, several robustness checks were conducted. When examining the long-run effects of remittances on economic growth, the ratio of remittances to GDP has a significant correlation with economic growth in only one specification. In addition, the findings of the second robustness suggest that there is no significant difference between remittances' impact in developing countries and high-income countries. These checks indicate that the obtained results cannot be considered to be very robust.

Turning to the main hypothesis, the results of this study do not find empirical support to the widely used phrase 'institutions matter'. The empirical analysis does not provide evidence supporting the claim that institutions are important in channeling remittances for economic development, nor finds evidence of a direct effect of institutions and government policies on economic growth. In themselves, the institutional variables used in this study are not strongly linked to economic growth, neither do the results suggest that institutions increase the extent to which remittance flows stimulate economic growth. These results might imply that active government attempts to improve the quality of institutions, ensuring a minimum level of institutional protection, are unlikely to significantly enhance the growth impact of remittances. However, as stated earlier, the process of integrating institutions into economic theory is not a straightforward matter. Institutions are a complex phenomenon and there is a huge disparity in using institutional indicators in empirical research. The growth literature does not subscribe to one encompassing definition of economic,

political, and social institutions and researchers often rely on different indicators to capture the features of institutions (Aron, 2000). It could therefore be worthwhile in further research to use other variables for the quality of institutions and government policies.

Taken together, the findings in this study provide some, albeit weak, suggestion of a negative association between remittances and economic growth. The results suggest that remittances had, at best, no impact on economic growth. However, because concerns about the endogeneity of remittances remain, more research on the link between remittances and economic growth is warranted. The findings of this study echo the recent criticisms of remittances presented by Barajas et al. (2009) and others who point out that there is very little evidence that decades of remittance transfers have contributed to economic growth in remittance-recipient countries. As argued by the authors, perhaps the most persuasive evidence supporting these findings is the lack of an example of a remittances success story: a country in which remittances-led growth hastened its economic development. Given that the top 20 remittance-recipient countries all receive more than 10 percent of GDP as remittance flows, one should expect to find at least one example of a documented success story. However, no country can claim that remittance inflows have accelerated its economic development.

From the perspective of political decision-makers, these results are not very encouraging. The negative association between remittances and growth found in this study and the lack of anecdotal evidence linking remittances positively to growth, should lead policymakers to reconsider their optimistic views. As shown in this study, part of the reason why remittances have not spurred economic growth might be because the transfers are used for non-productive consumption rather than investment, suggesting that remittance flows are compensatory in nature. Remittances lift people out of poverty but recipients of remittances are not automatically turned into entrepreneurs. The possibility that remittances can be channeled somehow into achieving both of these ends remains, but this requires more research on the role remittances play in recipients' lives. Case studies and improved household statistics could play a crucial role here. When more is known about remittances at a household level, policymakers could focus their efforts on finding ways to channel remittances into uses that do enhance economic growth. For example, governments of remittance-recipient countries could develop training programs to assist households receiving remittances in making effective investment decisions. In addition, instruments such as loans linked to remittances and securitization of remittance flows may help in developing the appropriate infrastructure to generate a favorable investment climate. Last, the quality and coverage of data on remittances still needs improvement. Without such improvement, it will remain difficult for policymakers to examine and evaluate the impact of remittances accurately.

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## Appendix

**Table 6:** Data definitions

| Variable                       | Definition  | Source                                  |
|--------------------------------|---|---|
| <b>Real GDP per capita (y)</b> | GDP per capita based on purchasing power parity (PPP). GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. Data are in constant 2005 international dollars.                              | World Development Indicators            |
| <b>Remittances</b>             | The level of personal remittances computed as a share of GDP. 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.   | World Development Indicators            |
| <b>Investment</b>              | The level of gross fixed capital formation in constant dollars as a share of GDP. Gross fixed capital formation includes land improvements; plant, machinery, and equipment purchases; and the construction of roads, railways, schools, offices, hospitals, and other buildings.                           | World Development Indicators            |
| <b>School</b>                  | The secondary school enrollment rate is the ratio of total enrollment, regardless of age, to the population of the age group that officially corresponds to the level of education shown.   | World Development Indicators            |
| <b>Population</b>              | The annual population growth rate for year t is the exponential rate of growth of midyear population from year t-1 to t, expressed as a percentage.   | World Development Indicators            |
| <b>Openness</b>                | The level of the sum of exports and imports of goods and services measured as a share of GDP. Exports of goods and services represent the value of all goods and other market services provided to the rest of the world.   | World Development Indicators            |
| <b>Government</b>              | The level of general government final consumption expenditure in constant dollars as a share of GDP. General government final consumption expenditure includes all government current expenditures for purchases of goods and services.   | World Development Indicators            |
| <b>Inflation</b>               | Inflation as measured by the Consumer Price Index (CPI) reflects the annual percentage change in the cost to the average consumer of acquiring a basket of goods and services.  | World Development Indicators            |
| <b>CPI</b>                     | The Transparency International (TI) Corruption Perceptions Index (CPI) ranks countries in terms of the degree to which corruption is perceived to exist among public officials and politicians. It is a composite index, reflecting the views of business people, analysts, and the public. Scaled 0 to 10. | Transparency International (TI)         |
| <b>QoG</b>                     | The International Country Risk Guide (ICRG) indicator of Quality of Government comprises the mean value of the ICRG variables Corruption, Law and Order and Bureaucracy Quality. Higher values indicate higher quality of government. Scaled 0 to 1.  | International Country Risk Guide (ICRG) |
| <b>Polity</b>                  | The Polity IV revised combined Polity Score is computed by subtracting the autocracy score from the democracy score. Scaled -10 (strongly autocratic) to +10 (strongly democratic).   | Polity IV Project                       |
| <b>Lending rate</b>            | Lending rate is the bank rate that usually meets the short- and medium-term financing needs of the private sector. This rate is normally differentiated according to creditworthiness of borrowers and objectives of financing.   | World Development Indicators            |
| <b>Deposit rate</b>            | Deposit interest rate is the rate paid by commercial banks for demand, time, or savings deposits.   | World Development Indicators            |
| <b>Consumption</b>             | Household final consumption expenditure per capita is the market value of all goods and services, including durable products, purchased by households. Data are in constant 2005 U.S. dollars.  | World Development Indicators            |

**Table 7: Summary statistics of variables**

|                              | Mean   | Median | Maximum | Minimum  | Std. Dev. | Obs. |
|------------------------------|--------|--------|---------|----------|-----------|------|
| Real GDP per capita growth   | 0.0160 | 0.0211 | 0.6506  | -.6979   | 0.0606    | 4632 |
| Remittances (% of GDP)       | 0.0386 | 0.0116 | 1.0648  | 2.89E-07 | 0.0780    | 4027 |
| Investment (% of GDP)        | 0.2211 | 0.2101 | 1.1358  | -0.0242  | 0.0846    | 4523 |
| School enrollment rate       | 0.6630 | 0.7295 | 1.6235  | 0.0234   | 0.3318    | 3711 |
| Population growth (annual %) | 0.0158 | 0.0158 | 0.1118  | -0.0760  | 0.0133    | 5263 |
| Openness (% of GDP)          | 0.7961 | 0.7164 | 3.7538  | 0.0632   | 0.4161    | 4736 |
| Government (% of GDP)        | 0.1621 | 0.1578 | 0.5919  | 0.0205   | 0.0646    | 4557 |
| Inflation (annual %)         | 0.2757 | 0.0632 | 47.3491 | -0.1764  | 1.8220    | 4354 |
| Corruption Perceptions Index | 4.2462 | 3.4000 | 10      | 0.4000   | 2.2043    | 1910 |
| Quality of Government        | 0.5454 | 0.5000 | 1       | 0.0417   | 0.2262    | 3240 |
| Polity IV                    | 2.4411 | 5      | 10      | -10      | 6.9863    | 4307 |

Notes: Real GDP per capita growth is computed as  $\ln(y_{it}) - \ln(y_{i,t-1})$ . All other variables are not in logarithm formula.

**Table 8: Correlation matrix**

|                    | Growth     | Remittances | Investment | School     | Population | Openness   | Government | Inflation |
|--------------------|------------|-------------|------------|------------|------------|------------|------------|-----------|
| <b>Growth</b>      | 1.0000     |             |            |            |            |            |            |           |
| <b>Remittances</b> | 0.0558***  | 1.0000      |            |            |            |            |            |           |
| <b>Investment</b>  | 0.2489***  | 0.2867***   | 1.0000     |            |            |            |            |           |
| <b>School</b>      | 0.0495***  | -0.1051***  | 0.0813***  | 1.0000     |            |            |            |           |
| <b>Population</b>  | -0.0498*** | -0.0201     | -0.0841*** | -0.6838*** | 1.0000     |            |            |           |
| <b>Openness</b>    | 0.1218***  | 0.2171***   | 0.3344***  | 0.1938***  | -0.1803*** | 1.0000     |            |           |
| <b>Government</b>  | -0.0897*** | 0.1000***   | 0.1759***  | 0.2208***  | -0.1342*** | 0.2929***  | 1.0000     |           |
| <b>Inflation</b>   | -0.1740*** | -0.0349**   | -0.0593*** | 0.0007     | -0.0210    | -0.0627*** | -0.0209    | 1.0000    |

Notes: Pairwise correlation coefficients. All variables are not in logarithm formula. \*\*\* significant at 1 percent; \*\* significant at 5 percent; \* significant at 10 percent.

**Table 9:** List of countries and personal remittances (share of GDP, 1980-2011)

|                          | <b>Mean</b> | <b>Maximum</b> | <b>Minimum</b> | <b>Std. Dev.</b> | <b>Obs.</b> |
|--------------------------|-------------|----------------|----------------|------------------|-------------|
| Albania                  | 15.5001     | 27.0343        | 8.9647         | 4.1431           | 20          |
| Algeria                  | 1.2755      | 3.2791         | 0.0608         | 1.0146           | 32          |
| Antigua and Barbuda      | 2.4211      | 4.5487         | 0.6406         | 1.0342           | 26          |
| Argentina                | 0.0861      | 0.2529         | 0.0067         | 0.0861           | 32          |
| Armenia                  | 8.1237      | 19.6645        | 4.4507         | 3.9095           | 17          |
| Australia                | 0.4485      | 0.8015         | 0.1352         | 0.2027           | 32          |
| Austria                  | 0.5498      | 0.9829         | 0.2933         | 0.2343           | 32          |
| Azerbaijan               | 2.1333      | 4.7053         | 0.0983         | 1.4483           | 17          |
| Bangladesh               | 4.8845      | 11.7734        | 1.8696         | 3.0385           | 32          |
| Barbados                 | 2.7955      | 5.1367         | 0.6802         | 1.3425           | 32          |
| Belarus                  | 1.0665      | 2.3752         | 0.0025         | 0.6585           | 19          |
| Belgium                  | 1.6096      | 2.2059         | 0.8641         | 0.4568           | 32          |
| Belize                   | 4.7738      | 10.7088        | 2.2329         | 2.1697           | 28          |
| Benin                    | 3.9161      | 8.0402         | 1.5556         | 1.3983           | 32          |
| Bhutan                   | 0.3756      | 0.5695         | 0.2459         | 0.1417           | 6           |
| Bolivia                  | 1.6568      | 8.0439         | 0.0309         | 2.2994           | 32          |
| Bosnia and Herzegovina   | 22.3442     | 49.7425        | 10.7345        | 11.2308          | 14          |
| Botswana                 | 1.9755      | 7.2888         | 0.2306         | 1.8598           | 32          |
| Brazil                   | 0.2135      | 0.5386         | 0.0097         | 0.1659           | 32          |
| Bulgaria                 | 3.6185      | 8.3146         | 0.3215         | 2.7166           | 16          |
| Burkina Faso             | 3.9861      | 9.4105         | 0.9180         | 2.6868           | 32          |
| Burundi                  | 0.6884      | 1.9300         | 0.0009         | 0.8877           | 8           |
| Cambodia                 | 1.9945      | 3.8350         | 0.3308         | 1.2408           | 19          |
| Cameroon                 | 0.3437      | 0.8309         | 0.0590         | 0.2168           | 32          |
| Cape Verde               | 15.6997     | 28.1657        | 7.8912         | 4.4709           | 32          |
| Central African Republic | 0.0047      | 0.0122         | 0.0016         | 0.0036           | 14          |
| Chad                     | 0.0510      | 0.1164         | 0.0032         | 0.0448           | 8           |
| Chile                    | 0.0063      | 0.0175         | 0.0004         | 0.0060           | 20          |
| China                    | 0.3392      | 1.0136         | 0.0549         | 0.2474           | 30          |
| Colombia                 | 1.3717      | 3.2487         | 0.1859         | 0.8057           | 32          |
| Congo, Dem. Rep.         | 0.2155      | 0.7321         | 0.0879         | 0.2293           | 7           |
| Congo, Rep.              | 0.1854      | 0.4956         | 0.0004         | 0.1231           | 28          |
| Costa Rica               | 0.8270      | 2.3476         | 0.0849         | 0.7698           | 32          |
| Cote d'Ivoire            | 0.8269      | 1.6294         | 0.3163         | 0.4185           | 32          |
| Croatia                  | 2.1877      | 3.2403         | 1.5130         | 0.5226           | 19          |
| Cyprus                   | 1.4416      | 4.3651         | 0.5054         | 1.1637           | 32          |
| Czech Republic           | 0.6355      | 1.1377         | 0.1434         | 0.3282           | 19          |
| Denmark                  | 0.3828      | 0.5001         | 0.2630         | 0.0665           | 20          |
| Djibouti                 | 2.8849      | 4.0844         | 2.0869         | 0.7038           | 17          |
| Dominica                 | 7.1362      | 14.5516        | 2.6982         | 2.9962           | 32          |
| Dominican Republic       | 5.8412      | 11.3489        | 1.9844         | 2.4373           | 32          |
| Ecuador                  | 3.1247      | 7.2149         | 0.0072         | 2.4490           | 26          |
| Egypt, Arab Rep.         | 7.2483      | 14.5835        | 2.8566         | 3.4137           | 32          |
| El Salvador              | 13.5787     | 18.7740        | 7.6294         | 3.1838           | 22          |
| Equatorial Guinea        | 0.3964      | 0.8552         | 0.0611         | 0.3447           | 5           |
| Estonia                  | 0.9076      | 2.3923         | 0.0340         | 0.8757           | 17          |
| Ethiopia                 | 0.5133      | 1.8297         | 0.0432         | 0.5383           | 31          |
| Fiji                     | 2.9082      | 6.7745         | 0.4066         | 2.0320           | 32          |
| Finland                  | 0.2136      | 0.3936         | 0.0453         | 0.1232           | 32          |
| France                   | 0.4511      | 0.7137         | 0.2087         | 0.1833           | 32          |
| Gabon                    | 0.0548      | 0.1273         | 0.0011         | 0.0485           | 26          |
| Gambia, The              | 6.6792      | 12.1557        | 0.0869         | 4.7583           | 13          |
| Georgia                  | 8.5117      | 12.8856        | 5.6313         | 2.0839           | 15          |
| Germany                  | 0.2572      | 0.3655         | 0.1783         | 0.0497           | 32          |

**Table 9 (Continued)**

|                    | <b>Mean</b> | <b>Maximum</b> | <b>Minimum</b> | <b>Std. Dev.</b> | <b>Obs.</b> |
|--------------------|-------------|----------------|----------------|------------------|-------------|
| Ghana              | 0.3362      | 0.9275         | 0.0105         | 0.2882           | 32          |
| Greece             | 1.6583      | 2.5956         | 0.4096         | 0.7244           | 32          |
| Grenada            | 8.3161      | 14.0090        | 3.4260         | 3.9324           | 26          |
| Guatemala          | 4.2816      | 12.4181        | 0.0014         | 4.5044           | 32          |
| Guinea             | 0.6605      | 3.2220         | 0.0034         | 0.7374           | 26          |
| Guinea-Bissau      | 3.1153      | 8.6593         | 0.4099         | 2.4697           | 24          |
| Guyana             | 7.5025      | 24.4022        | 0.2384         | 7.7130           | 23          |
| Haiti              | 19.9783     | 28.6929        | 8.7106         | 5.3866           | 14          |
| Honduras           | 6.8115      | 21.4139        | 0.0517         | 7.2718           | 32          |
| Hungary            | 1.0424      | 1.8425         | 0.3327         | 0.6584           | 17          |
| Iceland            | 0.5446      | 1.0071         | 0.0380         | 0.3752           | 32          |
| India              | 2.0313      | 4.0828         | 0.7298         | 0.9959           | 32          |
| Indonesia          | 0.5849      | 1.8958         | 0.0117         | 0.5230           | 29          |
| Iran, Islamic Rep. | 0.7399      | 2.4963         | 0.2587         | 0.6058           | 19          |
| Iraq               | 0.4386      | 1.9353         | 0.0035         | 0.6879           | 7           |
| Ireland            | 0.3619      | 0.5899         | 0.2121         | 0.1439           | 22          |
| Israel             | 0.9344      | 2.2926         | 0.2303         | 0.6650           | 32          |
| Italy              | 0.3783      | 0.8728         | 0.1253         | 0.2587           | 32          |
| Jamaica            | 9.2229      | 16.5529        | 2.3264         | 4.9716           | 32          |
| Japan              | 0.0254      | 0.0477         | 0.0129         | 0.0095           | 26          |
| Jordan             | 19.0350     | 25.0950        | 10.6814        | 3.8628           | 32          |
| Kazakhstan         | 0.3508      | 0.8318         | 0.0941         | 0.2444           | 17          |
| Kenya              | 2.1030      | 4.2353         | 0.3815         | 1.0754           | 32          |
| Kiribati           | 12.7757     | 21.3208        | 5.7063         | 5.0229           | 15          |
| Korea, Rep.        | 0.9564      | 1.6211         | 0.6289         | 0.2516           | 32          |
| Kyrgyz Republic    | 8.7585      | 27.5695        | 0.0596         | 10.2426          | 19          |
| Lao PDR            | 0.7589      | 3.9057         | 0.0303         | 0.9089           | 28          |
| Latvia             | 1.6028      | 2.5505         | 0.6668         | 0.6891           | 16          |
| Lebanon            | 21.5136     | 25.6617        | 13.2854        | 3.5636           | 10          |
| Lesotho            | 60.7284     | 106.4789       | 25.7210        | 24.0261          | 32          |
| Liberia            | 9.3207      | 23.2944        | 2.1743         | 6.9362           | 8           |
| Libya              | 0.0318      | 0.0353         | 0.0266         | 0.0035           | 7           |
| Lithuania          | 1.5205      | 4.5672         | 0.0005         | 1.7041           | 19          |
| Luxembourg         | 3.2086      | 3.5885         | 2.7837         | 0.2710           | 17          |
| Macedonia, FYR     | 3.1748      | 4.2282         | 1.5327         | 1.0268           | 16          |
| Madagascar         | 0.2705      | 0.6669         | 0.0032         | 0.1656           | 26          |
| Malawi             | 0.2233      | 0.8179         | 0.0280         | 0.2447           | 16          |
| Malaysia           | 0.4035      | 0.8393         | 0.1304         | 0.2057           | 25          |
| Maldives           | 0.6744      | 4.3230         | 0.1392         | 0.8212           | 29          |
| Mali               | 3.9470      | 5.8539         | 2.4782         | 0.8003           | 32          |
| Malta              | 1.4300      | 3.6698         | 0.3622         | 1.1599           | 32          |
| Mauritania         | 0.6102      | 3.4235         | 0.1158         | 0.7594           | 19          |
| Mauritius          | 2.3915      | 4.7393         | 0.0048         | 1.9926           | 18          |
| Mexico             | 1.5302      | 2.7877         | 0.4878         | 0.6665           | 32          |
| Moldova            | 19.2958     | 34.4972        | 0.0582         | 10.7734          | 17          |
| Mongolia           | 4.2109      | 10.1653        | 0.4891         | 2.8087           | 14          |
| Montenegro         | 6.8235      | 7.6221         | 5.3359         | 0.9131           | 5           |
| Morocco            | 6.8990      | 8.9470         | 4.8782         | 1.0818           | 32          |
| Mozambique         | 1.7236      | 3.4203         | 0.8377         | 0.7649           | 32          |
| Namibia            | 0.3125      | 0.5723         | 0.1227         | 0.1462           | 22          |
| Nepal              | 9.7325      | 23.2213        | 0.9767         | 8.7082           | 19          |
| Netherlands        | 0.3108      | 0.4807         | 0.1884         | 0.0791           | 32          |
| New Zealand        | 1.1923      | 2.9612         | 0.4462         | 0.6281           | 32          |
| Nicaragua          | 6.3295      | 10.2781        | 0.5578         | 3.4610           | 20          |
| Niger              | 0.9673      | 2.1419         | 0.2263         | 0.5971           | 32          |

**Table 9 (Continued)**

|                                   | <b>Mean</b> | <b>Maximum</b> | <b>Minimum</b> | <b>Std. Dev.</b> | <b>Obs.</b> |
|-----------------------------------|-------------|----------------|----------------|------------------|-------------|
| Nigeria                           | 3.4581      | 13.0426        | 0.0088         | 4.0969           | 32          |
| Norway                            | 0.1618      | 0.1989         | 0.1342         | 0.0175           | 32          |
| Oman                              | 0.2981      | 0.5808         | 0.0558         | 0.1685           | 32          |
| Pakistan                          | 4.8239      | 10.2476        | 1.4536         | 2.3233           | 32          |
| Panama                            | 1.2651      | 2.0946         | 0.1411         | 0.5341           | 32          |
| Papua New Guinea                  | 0.2327      | 0.5549         | 0.0369         | 0.1193           | 32          |
| Paraguay                          | 2.1627      | 4.3444         | 0.3236         | 1.3185           | 32          |
| Peru                              | 1.3102      | 1.9907         | 0.3309         | 0.4789           | 22          |
| Philippines                       | 6.9817      | 13.1576        | 1.9291         | 3.8865           | 32          |
| Poland                            | 1.2601      | 2.4837         | 0.4917         | 0.7217           | 18          |
| Portugal                          | 4.4135      | 9.1457         | 1.5052         | 2.6674           | 32          |
| Romania                           | 1.6102      | 5.4414         | 0.0254         | 2.0369           | 18          |
| Russian Federation                | 0.4744      | 1.1549         | 0.2607         | 0.2322           | 18          |
| Rwanda                            | 0.6150      | 1.8339         | 0.0909         | 0.5785           | 32          |
| Samoa                             | 23.6462     | 38.3727        | 14.9053        | 6.8503           | 30          |
| Sao Tome and Principe             | 1.4733      | 3.1652         | 0.6046         | 0.7898           | 12          |
| Saudi Arabia                      | 0.0370      | 0.0500         | 0.0281         | 0.0087           | 7           |
| Senegal                           | 4.9578      | 11.4947        | 1.9870         | 3.3150           | 32          |
| Serbia                            | 7.9828      | 9.7722         | 5.6700         | 1.5727           | 5           |
| Seychelles                        | 0.8876      | 2.4815         | 0.0187         | 0.8507           | 23          |
| Sierra Leone                      | 0.8976      | 3.3578         | 0.0036         | 1.0695           | 32          |
| Slovak Republic                   | 0.8265      | 2.0153         | 0.0622         | 0.7988           | 19          |
| Slovenia                          | 0.8933      | 1.9005         | 0.3058         | 0.3583           | 20          |
| Solomon Islands                   | 0.8318      | 2.3184         | 0.1924         | 0.6506           | 13          |
| South Africa                      | 0.1607      | 0.3036         | 0.0434         | 0.0953           | 32          |
| Spain                             | 0.6477      | 0.9681         | 0.3812         | 0.1510           | 32          |
| Sri Lanka                         | 6.3787      | 8.7063         | 3.7693         | 1.2658           | 32          |
| St. Kitts and Nevis               | 6.2040      | 13.4075        | 0.8108         | 3.3760           | 32          |
| St. Lucia                         | 3.7904      | 8.4347         | 0.4308         | 1.7653           | 29          |
| St. Vincent and the<br>Grenadines | 5.8015      | 10.8529        | 0.8751         | 2.4145           | 26          |
| Sudan                             | 3.2512      | 6.9340         | 0.3990         | 2.0096           | 32          |
| Suriname                          | 0.4098      | 1.8487         | 0.0262         | 0.4438           | 32          |
| Swaziland                         | 6.5526      | 15.7512        | 1.3779         | 3.9354           | 32          |
| Sweden                            | 0.1098      | 0.2543         | 0.0001         | 0.0659           | 32          |
| Switzerland                       | 0.4637      | 0.5409         | 0.3785         | 0.0427           | 32          |
| Syrian Arab Republic              | 2.6890      | 5.9216         | 0.6255         | 1.1946           | 31          |
| Tajikistan                        | 30.1796     | 49.2899        | 6.4337         | 16.5747          | 10          |
| Tanzania                          | 0.1394      | 0.3174         | 0.0160         | 0.0848           | 17          |
| Thailand                          | 1.2139      | 2.2551         | 0.3989         | 0.4422           | 32          |
| Timor-Leste                       | 7.8122      | 15.1265        | 0.8179         | 6.6696           | 6           |
| Togo                              | 4.1338      | 11.2722        | 0.7441         | 3.9514           | 32          |
| Tonga                             | 22.9572     | 36.4930        | 12.2166        | 7.7636           | 25          |
| Trinidad and Tobago               | 0.3589      | 0.8781         | 0.0035         | 0.2738           | 32          |
| Tunisia                           | 4.0924      | 4.9304         | 3.0552         | 0.5139           | 32          |
| Turkey                            | 1.6329      | 3.5051         | 0.1358         | 1.0589           | 32          |
| Uganda                            | 4.6673      | 6.8395         | 3.5702         | 0.9887           | 13          |
| Ukraine                           | 1.8861      | 5.0679         | 0.0135         | 1.9982           | 16          |
| United Kingdom                    | 0.1802      | 0.3287         | 0.0697         | 0.0756           | 25          |
| United States                     | 0.0269      | 0.0457         | 0.0019         | 0.0144           | 32          |
| Uruguay                           | 0.3427      | 0.5127         | 2.89E-05       | 0.1515           | 11          |
| Vanuatu                           | 5.9254      | 20.4333        | 1.0530         | 4.4334           | 30          |
| Venezuela, RB                     | 0.0347      | 0.2487         | 0.0017         | 0.0544           | 27          |
| Vietnam                           | 6.0317      | 8.7023         | 3.3654         | 1.5260           | 12          |
| Yemen, Rep.                       | 13.6056     | 26.5297        | 4.4253         | 7.0868           | 22          |

**Table 9 (Concluded)**

|          | Mean   | Maximum  | Minimum  | Std. Dev. | Obs. |
|----------|--------|----------|----------|-----------|------|
| Zambia   | 0.5350 | 0.8898   | 0.2411   | 0.2410    | 9    |
| Zimbabwe | 0.1362 | 0.6340   | 0.0040   | 0.1944    | 15   |
| All      | 3.8642 | 106.4789 | 2.89E-05 | 7.8032    | 4027 |

Source: World Bank Development Indicators and IMF Balance of Payments (BPM6), own calculations.

**Table 10: Remittances, growth, and institutions: OLS results**

|                                  | (1a)                   | (1b)                   | (2a)                   | (2b)                   | (3a)                   | (3b)                   |
|----------------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|
| Log (lagged real GDP per capita) | -0.0112***<br>(0.0018) | -0.0127***<br>(0.0020) | -0.0108***<br>(0.0017) | -0.0125***<br>(0.0018) | -0.0084***<br>(0.0014) | -0.0081***<br>(0.0015) |
| Remittances                      | -0.0173<br>(0.0382)    | -0.0729*<br>(0.0383)   | -0.1430*<br>(0.0845)   | -0.2291**<br>(0.0910)  | -0.0260***<br>(0.0089) | 0.0025<br>(0.0084)     |
| Log (Investment)                 | 0.0371***<br>(0.0044)  |                        | 0.0351***<br>(0.0044)  |                        | 0.0337***<br>(0.0038)  |                        |
| Log (School)                     | 0.0198***<br>(0.0037)  | 0.0218***<br>(0.0037)  | 0.0108***<br>(0.0027)  | 0.0137***<br>(0.0027)  | 0.0088***<br>(0.0025)  | 0.0111***<br>(0.0026)  |
| Log (Population)                 | -0.0038***<br>(0.0009) | -0.0048***<br>(0.0010) | -0.0050***<br>(0.0009) | -0.0057***<br>(0.0009) | -0.0053***<br>(0.0009) | -0.0059***<br>(0.0009) |
| Log (Openness)                   | 0.0047**<br>(0.0020)   | 0.0063***<br>(0.0021)  | 0.0037**<br>(0.0017)   | 0.0064***<br>(0.0017)  | 0.0019<br>(0.0017)     | 0.0053***<br>(0.0018)  |
| Government                       | -0.0852***<br>(0.0186) | -0.0891***<br>(0.0196) | -0.1225***<br>(0.0237) | -0.1433***<br>(0.0234) | -0.0896***<br>(0.0160) | -0.0919***<br>(0.0161) |
| Inflation                        | -0.0035<br>(0.0027)    | -0.0056*<br>(0.0034)   | -0.0024***<br>(0.0007) | -0.0032***<br>(0.0007) | -0.0046**<br>(0.0021)  | -0.0051**<br>(0.0021)  |
| TI CPI                           | 0.0001<br>(0.0007)     | 0.0001<br>(0.0007)     |                        |                        |                        |                        |
| CPI*Remittances                  | -0.0044<br>(0.0114)    | 0.0119<br>(0.0114)     |                        |                        |                        |                        |
| ICRG QoG                         |                        |                        | 0.0219***<br>(0.0076)  | 0.0285***<br>(0.0077)  |                        |                        |
| QoG*Remittances                  |                        |                        | 0.1675<br>(0.1736)     | 0.3692**<br>(0.1854)   |                        |                        |
| Polity IV                        |                        |                        |                        |                        | 0.0002<br>(0.0002)     | 0.0002<br>(0.0002)     |
| Polity*Remittances               |                        |                        |                        |                        | -0.0013<br>(0.0010)    | -0.0006<br>(0.0010)    |
| Constant                         | 0.1874***<br>(0.0162)  | 0.1412***<br>(0.0171)  | 0.1699***<br>(0.0152)  | 0.1281***<br>(0.0156)  | 0.1475***<br>(0.0137)  | 0.0917***<br>(0.0126)  |
| Observations                     | 1108                   | 1116                   | 1742                   | 1751                   | 2083                   | 2092                   |
| R-squared                        | 0.3253                 | 0.2552                 | 0.2228                 | 0.1723                 | 0.2198                 | 0.1626                 |

Notes: Dependent variable is real GDP per capita growth. Robust standard errors in parentheses, \*significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%. All regressions include time dummies.



**Table 11:** Remittances, growth, and institutions: Fixed Effects results

|                                  | (1a)                   | (1b)                   | (2a)                   | (2b)                   | (3a)                   | (3b)                   |
|----------------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|
| Log (lagged real GDP per capita) | -0.0730***<br>(0.0231) | -0.0640***<br>(0.0233) | -0.0503***<br>(0.0131) | -0.0496***<br>(0.0133) | -0.0398***<br>(0.0110) | -0.0382***<br>(0.0108) |
| Remittances                      | -0.1096<br>(0.0799)    | 0.0607<br>(0.0944)     | -0.2716*<br>(0.1455)   | -0.2251<br>(0.1383)    | -0.0771***<br>(0.0250) | -0.0546**<br>(0.0256)  |
| Log (Investment)                 | 0.0502***<br>(0.0091)  |                        | 0.0308***<br>(0.0092)  |                        | 0.0251***<br>(0.0060)  |                        |
| Log (School)                     | 0.0285***<br>(0.0105)  | 0.0295***<br>(0.0095)  | 0.0054<br>(0.0069)     | 0.0066<br>(0.0066)     | 0.0038<br>(0.0059)     | 0.0049<br>(0.0059)     |
| Log (Population)                 | -0.0067***<br>(0.0013) | -0.0063***<br>(0.0017) | -0.0072***<br>(0.0013) | -0.0066***<br>(0.0015) | -0.0061***<br>(0.0014) | -0.0059***<br>(0.0015) |
| Log (Openness)                   | 0.0240**<br>(0.0114)   | 0.0328***<br>(0.0108)  | 0.0182**<br>(0.0086)   | 0.0279***<br>(0.0083)  | 0.0199***<br>(0.0059)  | 0.0297***<br>(0.0058)  |
| Government                       | -0.3538***<br>(0.0866) | -0.4063***<br>(0.0920) | -0.3433***<br>(0.0493) | -0.3395***<br>(0.0506) | -0.2140***<br>(0.0461) | -0.2099***<br>(0.0447) |
| Inflation                        | -0.0026<br>(0.0047)    | -0.0037<br>(0.0053)    | -0.0038***<br>(0.0008) | -0.0040***<br>(0.0008) | -0.0046**<br>(0.0021)  | -0.0048**<br>(0.0021)  |
| TI CPI                           | 0.0010<br>(0.0027)     | 0.0038<br>(0.0027)     |                        |                        |                        |                        |
| CPI*Remittances                  | -0.0021<br>(0.0325)    | -0.0440<br>(0.0382)    |                        |                        |                        |                        |
| ICRG QoG                         |                        |                        | 0.0039<br>(0.0126)     | 0.0153<br>(0.0142)     |                        |                        |
| QoG*Remittances                  |                        |                        | 0.4675*<br>(0.2417)    | 0.4162<br>(0.2528)     |                        |                        |
| Polity IV                        |                        |                        |                        |                        | 0.0004<br>(0.0004)     | 0.0005<br>(0.0004)     |
| Polity*Remittances               |                        |                        |                        |                        | -0.0000<br>(0.0013)    | 0.0002<br>(0.0013)     |
| Constant                         | 0.7946***<br>(0.2151)  | 0.6400***<br>(0.2083)  | 0.5372***<br>(0.1199)  | 0.4839***<br>(0.1112)  | 0.4135***<br>(0.0940)  | 0.3685***<br>(0.0888)  |
| Countries                        | 124                    | 125                    | 104                    | 104                    | 125                    | 125                    |
| Observations                     | 1108                   | 1116                   | 1742                   | 1751                   | 2083                   | 2092                   |
| R-squared                        | 0.3731                 | 0.3245                 | 0.2342                 | 0.2123                 | 0.2041                 | 0.1875                 |

Notes: Dependent variable is real GDP per capita growth. Robust standard errors in parentheses, \*significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%. All regressions include time dummies.

**Table 12: OLS 5-year averages**

|                                  | (1a)                   | (1b)                   | (2a)                   | (2b)                   | (3a)                   | (3b)                   |
|----------------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|
| Log (lagged real GDP per capita) | -0.0114***<br>(0.0022) | -0.0150***<br>(0.0025) | -0.0107***<br>(0.0019) | -0.0144***<br>(0.0023) | -0.0079***<br>(0.0022) | -0.0101***<br>(0.0023) |
| Remittances                      | 0.0013<br>(0.0510)     | -0.0692<br>(0.0497)    | -0.1239<br>(0.1031)    | -0.2219*<br>(0.1218)   | -0.0290*<br>(0.0164)   | -0.0024<br>(0.0167)    |
| Log (Investment)                 | 0.0354***<br>(0.0054)  |                        | 0.0370***<br>(0.0050)  |                        | 0.0420***<br>(0.0073)  |                        |
| Log (School)                     | 0.0159***<br>(0.0043)  | 0.0207***<br>(0.0043)  | 0.0138***<br>(0.0030)  | 0.0188***<br>(0.0033)  | 0.0106***<br>(0.0035)  | 0.0159***<br>(0.0034)  |
| Log (Population)                 | -0.0030***<br>(0.0012) | -0.0049***<br>(0.0015) | -0.0033**<br>(0.0014)  | -0.0049***<br>(0.0016) | -0.0019<br>(0.0018)    | -0.0033*<br>(0.0020)   |
| Log (Openness)                   | 0.0019<br>(0.0025)     | 0.0037<br>(0.0027)     | -0.0008<br>(0.0022)    | 0.0025<br>(0.0024)     | -0.0016<br>(0.0030)    | 0.0026<br>(0.0040)     |
| Government                       | -0.0367<br>(0.0232)    | -0.0482**<br>(0.0231)  | -0.0905***<br>(0.0241) | -0.1072***<br>(0.0255) | -0.0786***<br>(0.0219) | -0.0728***<br>(0.0216) |
| Inflation                        | -0.0031<br>(0.0071)    | -0.0103<br>(0.0079)    | -0.0058***<br>(0.0020) | -0.0062***<br>(0.0020) | -0.0096***<br>(0.0023) | -0.0097***<br>(0.0024) |
| TI CPI                           | -0.0000<br>(0.0007)    | 0.0002<br>(0.0008)     |                        |                        |                        |                        |
| CPI*Remittances                  | -0.0149<br>(0.0158)    | 0.0074<br>(0.0152)     |                        |                        |                        |                        |
| ICRG QoG                         |                        |                        | 0.0163**<br>(0.0079)   | 0.0241***<br>(0.0086)  |                        |                        |
| QoG*Remittances                  |                        |                        | 0.1484<br>(0.2017)     | 0.3503<br>(0.2367)     |                        |                        |
| Polity IV                        |                        |                        |                        |                        | 0.0001<br>(0.0003)     | 0.0001<br>(0.0003)     |
| Polity*Remittances               |                        |                        |                        |                        | -0.0002<br>(0.0018)    | 0.0003<br>(0.0020)     |
| Constant                         | 0.1817***<br>(0.0205)  | 0.1526***<br>(0.0221)  | 0.1766***<br>(0.0189)  | 0.1447***<br>(0.0207)  | 0.1724***<br>(0.0187)  | 0.1199***<br>(0.0179)  |
| Observations                     | 374                    | 376                    | 454                    | 456                    | 521                    | 523                    |
| R-squared                        | 0.3120                 | 0.1872                 | 0.3359                 | 0.2257                 | 0.3821                 | 0.2423                 |

Notes: Dependent variable is real GDP per capita growth. Robust standard errors in parentheses, \*significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%. All regressions include time dummies.

**Table 13: Fixed Effects 5-year averages**

|                                  | (1a)                   | (1b)                   | (2a)                   | (2b)                   | (3a)                   | (3b)                   |
|----------------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|
| Log (lagged real GDP per capita) | -0.0557***<br>(0.0177) | -0.0636***<br>(0.0203) | -0.0494***<br>(0.0154) | -0.0578***<br>(0.0177) | -0.0470***<br>(0.0133) | -0.0522***<br>(0.0146) |
| Remittances                      | -0.2095*<br>(0.1155)   | -0.0029<br>(0.0968)    | -0.3727***<br>(0.1326) | -0.3330**<br>(0.1274)  | -0.0696***<br>(0.0237) | -0.0346*<br>(0.0188)   |
| Log (Investment)                 | 0.0384***<br>(0.0106)  |                        | 0.0325***<br>(0.0123)  |                        | 0.0324***<br>(0.0095)  |                        |
| Log (School)                     | 0.0008<br>(0.0074)     | 0.0070<br>(0.0071)     | 0.0002<br>(0.0052)     | 0.0013<br>(0.0060)     | -0.0003<br>(0.0061)    | 0.0010<br>(0.0066)     |
| Log (Population)                 | -0.0062***<br>(0.0020) | -0.0068**<br>(0.0030)  | -0.0066***<br>(0.0019) | -0.0073***<br>(0.0026) | -0.0062***<br>(0.0017) | -0.0066***<br>(0.0023) |
| Log (Openness)                   | 0.0145<br>(0.0099)     | 0.0266**<br>(0.0115)   | 0.0035<br>(0.0087)     | 0.0161*<br>(0.0097)    | 0.0110<br>(0.0110)     | 0.0250**<br>(0.0121)   |
| Government                       | -0.2043**<br>(0.0840)  | -0.1889**<br>(0.0884)  | -0.1761***<br>(0.0635) | -0.1680**<br>(0.0720)  | -0.2732***<br>(0.0937) | -0.2706***<br>(0.0999) |
| Inflation                        | -0.0367*<br>(0.0221)   | -0.0402<br>(0.0273)    | -0.0063***<br>(0.0013) | -0.0060***<br>(0.0014) | -0.0105***<br>(0.0030) | -0.0106***<br>(0.0032) |
| TI CPI                           | 0.0032<br>(0.0037)     | 0.0059<br>(0.0041)     |                        |                        |                        |                        |
| CPI*Remittances                  | 0.0576<br>(0.0415)     | -0.0001<br>(0.0382)    |                        |                        |                        |                        |
| ICRG QoG                         |                        |                        | -0.0008<br>(0.0159)    | 0.0126<br>(0.0154)     |                        |                        |
| QoG*Remittances                  |                        |                        | 0.7081***<br>(0.2654)  | 0.6228**<br>(0.2768)   |                        |                        |
| Polity IV                        |                        |                        |                        |                        | -0.0003<br>(0.0004)    | -0.0001<br>(0.0004)    |
| Polity*Remittances               |                        |                        |                        |                        | 0.0021<br>(0.0021)     | 0.0015<br>(0.0018)     |
| Constant                         | 0.5789***<br>(0.1478)  | 0.5758***<br>(0.1770)  | 0.4905***<br>(0.1303)  | 0.5072***<br>(0.1444)  | 0.4852***<br>(0.1171)  | 0.4823***<br>(0.1231)  |
| Countries                        | 131                    | 131                    | 107                    | 107                    | 130                    | 130                    |
| Observations                     | 374                    | 376                    | 454                    | 456                    | 521                    | 523                    |
| R-squared                        | 0.2938                 | 0.2008                 | 0.3713                 | 0.3050                 | 0.4734                 | 0.4141                 |

Notes: Dependent variable is real GDP per capita growth. Robust standard errors in parentheses, \*significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%. All regressions include time dummies.

**Table 14:** SGMM 5-year averages developing and high-income countries

|                                  | Developing             | High-income          | Developing             | High-income           | Developing             | High-income           |
|----------------------------------|------------------------|----------------------|------------------------|-----------------------|------------------------|-----------------------|
| Log (lagged real GDP per capita) | -0.0137**<br>(0.0065)  | -0.0279*<br>(0.0156) | -0.0038<br>(0.0079)    | -0.0242<br>(0.0160)   | -0.0094<br>(0.0059)    | -0.0242**<br>(0.0092) |
| Remittances                      | 0.0814<br>(0.1412)     | -0.0099<br>(1.2429)  | -0.0248<br>(0.3081)    | 0.3040<br>(1.5081)    | -0.0036<br>(0.0213)    | -0.0086<br>(0.6673)   |
| Log (Investment)                 | 0.0369***<br>(0.0119)  | 0.0258**<br>(0.0117) | 0.0533***<br>(0.0133)  | 0.0375**<br>(0.0176)  | 0.0483***<br>(0.0107)  | 0.0412*<br>(0.0213)   |
| Log (School)                     | 0.0157*<br>(0.0084)    | 0.0029<br>(0.0196)   | 0.0040<br>(0.0079)     | 0.0084<br>(0.0192)    | 0.0119*<br>(0.0070)    | -0.0013<br>(0.0134)   |
| Log (Population)                 | -0.0094***<br>(0.0032) | -0.0007<br>(0.0010)  | -0.0093*<br>(0.0051)   | 0.0005<br>(0.0018)    | -0.0080*<br>(0.0042)   | -0.0001<br>(0.0013)   |
| Log (Openness)                   | -0.0083<br>(0.0053)    | 0.0085<br>(0.0091)   | -0.0105*<br>(0.0057)   | -0.0002<br>(0.0164)   | -0.0209***<br>(0.0057) | 0.0088<br>(0.0079)    |
| Government                       | -0.0765<br>(0.0675)    | -0.0993<br>(0.1295)  | -0.0774<br>(0.0709)    | -0.0382<br>(0.1292)   | -0.1025**<br>(0.0498)  | -0.0449<br>(0.0713)   |
| Inflation                        | -0.0131<br>(0.0102)    | 0.0355<br>(0.1270)   | -0.0048***<br>(0.0011) | -0.0275**<br>(0.0113) | -0.0093***<br>(0.0034) | -0.0531**<br>(0.0234) |
| TI CPI                           | -0.0012<br>(0.0044)    | 0.0022<br>(0.0026)   |                        |                       |                        |                       |
| CPI*Remittances                  | -0.0557<br>(0.0565)    | -0.0396<br>(0.1938)  |                        |                       |                        |                       |
| ICRG QoG                         |                        |                      | 0.0245<br>(0.0300)     | -0.0098<br>(0.0419)   |                        |                       |
| QoG*Remittances                  |                        |                      | -0.0490<br>(0.5740)    | -0.0315<br>(2.2773)   |                        |                       |
| Polity IV                        |                        |                      |                        |                       | -0.0166**<br>(0.0065)  | -0.0081<br>(0.0054)   |
| Polity*Remittances               |                        |                      |                        |                       | -0.0007<br>(0.0005)    | -0.0003<br>(0.0020)   |
| Constant                         | 0.1850***<br>(0.0488)  | 0.3501**<br>(0.1466) | 0.1059<br>(0.0666)     | 0.3478**<br>(0.1342)  | 0.1660***<br>(0.0450)  | 0.3502***<br>(0.0677) |
| Countries                        | 93                     | 38                   | 70                     | 37                    | 94                     | 36                    |
| Observations                     | 248                    | 126                  | 295                    | 159                   | 372                    | 149                   |
| Number of instruments            | 98                     | 94                   | 116                    | 111                   | 116                    | 111                   |
| AR(1) test ( <i>p</i> -value)    | 0.000                  | 0.042                | 0.000                  | 0.116                 | 0.001                  | 0.219                 |
| AR(2) test ( <i>p</i> -value)    | 0.892                  | 0.950                | 0.789                  | 0.586                 | 0.827                  | 0.196                 |
| Hansen <i>p</i> -value           | 0.852                  | 1.000                | 0.999                  | 1.000                 | 0.931                  | 1.000                 |

Notes: Dependent variable is real GDP per capita growth. Robust standard errors in parentheses, \*significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%. All regressions include time dummies.

**Table 15:** OLS 5-year averages developing and high-income countries

|                                  | Developing             | High-income            | Developing             | High-income            | Developing             | High-income            |
|----------------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|
| Log (lagged real GDP per capita) | -0.0124***<br>(0.0028) | -0.0194***<br>(0.0050) | -0.0100***<br>(0.0021) | -0.0220***<br>(0.0046) | -0.0080***<br>(0.0024) | -0.0205***<br>(0.0058) |
| Remittances                      | 0.0451<br>(0.0587)     | -0.3064<br>(0.3999)    | 0.0038<br>(0.1197)     | 0.9264<br>(0.9112)     | -0.0137<br>(0.0152)    | -0.5736<br>(0.7265)    |
| Log (Investment)                 | 0.0365***<br>(0.0066)  | 0.0229**<br>(0.0092)   | 0.0373***<br>(0.0057)  | 0.0207**<br>(0.0096)   | 0.0372***<br>(0.0052)  | 0.0380**<br>(0.0152)   |
| Log (School)                     | 0.0156***<br>(0.0049)  | -0.0122<br>(0.0117)    | 0.0099***<br>(0.0032)  | -0.0055<br>(0.0100)    | 0.0088***<br>(0.0034)  | -0.0141<br>(0.0204)    |
| Log (Population)                 | -0.0061**<br>(0.0028)  | -0.0001<br>(0.0011)    | -0.0130***<br>(0.0036) | 0.0007<br>(0.0010)     | -0.0056<br>(0.0054)    | 0.0011<br>(0.0016)     |
| Log (Openness)                   | -0.0023<br>(0.0034)    | 0.0080***<br>(0.0029)  | -0.0056*<br>(0.0031)   | 0.0035<br>(0.0025)     | -0.0056*<br>(0.0030)   | 0.0034<br>(0.0039)     |
| Government                       | -0.0361<br>(0.0293)    | -0.0437<br>(0.0384)    | -0.0786***<br>(0.0288) | -0.0448<br>(0.0328)    | -0.0930***<br>(0.0276) | -0.0296<br>(0.0517)    |
| Inflation                        | -0.0043<br>(0.0064)    | 0.0212<br>(0.0711)     | -0.0043***<br>(0.0007) | -0.0255***<br>(0.0012) | -0.0090***<br>(0.0023) | -0.0314***<br>(0.0081) |
| TI CPI                           | 0.0010<br>(0.0019)     | 0.0005<br>(0.0010)     |                        |                        |                        |                        |
| CPI*Remittances                  | -0.0300<br>(0.0204)    | -0.0010<br>(0.0566)    |                        |                        |                        |                        |
| ICRG QoG                         |                        |                        | 0.0331**<br>(0.0140)   | 0.0181<br>(0.0185)     |                        |                        |
| QoG*Remittances                  |                        |                        | -0.1356<br>(0.2423)    | -0.9155<br>(1.1163)    |                        |                        |
| Polity IV                        |                        |                        |                        |                        | 0.0002<br>(0.0003)     | -0.0008<br>(0.0006)    |
| Polity*Remittances               |                        |                        |                        |                        | -0.0013<br>(0.0022)    | 0.0604<br>(0.0624)     |
| Constant                         | 0.1755***<br>(0.0293)  | 0.2546***<br>(0.0489)  | 0.1067***<br>(0.0252)  | 0.2790***<br>(0.0464)  | 0.1485***<br>(0.0253)  | 0.3128***<br>(0.0671)  |
| Observations                     | 248                    | 126                    | 295                    | 159                    | 372                    | 149                    |
| R-squared                        | 0.3009                 | 0.4952                 | 0.4188                 | 0.5721                 | 0.4095                 | 0.6375                 |

Notes: Dependent variable is real GDP per capita growth. Robust standard errors in parentheses, \*significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%. All regressions include time dummies.

**Table 16:** Fixed Effects 5-year averages developing and high-income countries

|                                  | Developing            | High-income            | Developing             | High-income            | Developing             | High-income            |
|----------------------------------|-----------------------|------------------------|------------------------|------------------------|------------------------|------------------------|
| Log (lagged real GDP per capita) | -0.0503**<br>(0.0206) | -0.0703***<br>(0.0169) | -0.0427***<br>(0.0160) | -0.0760***<br>(0.0122) | -0.0430***<br>(0.0145) | -0.0618***<br>(0.0194) |
| Remittances                      | -0.0820<br>(0.1165)   | -0.0111<br>(0.5011)    | -0.3018**<br>(0.1332)  | 0.4203<br>(0.8820)     | -0.0749***<br>(0.0249) | 0.9676<br>(2.8236)     |
| Log (Investment)                 | 0.0347***<br>(0.0123) | 0.0397***<br>(0.0084)  | 0.0254*<br>(0.0135)    | 0.0302***<br>(0.0094)  | 0.0270***<br>(0.0101)  | 0.0360***<br>(0.0107)  |
| Log (School)                     | -0.0199**<br>(0.0095) | -0.0101<br>(0.0165)    | -0.0100<br>(0.0069)    | -0.0015<br>(0.0130)    | -0.0063<br>(0.0074)    | -0.0083<br>(0.0157)    |
| Log (Population)                 | 0.0000<br>(0.0066)    | -0.0047***<br>(0.0017) | -0.0063<br>(0.0052)    | -0.0038**<br>(0.0015)  | -0.0067*<br>(0.0039)   | -0.0019<br>(0.0022)    |
| Log (Openness)                   | 0.0163*<br>(0.0090)   | 0.0216<br>(0.0197)     | 0.0039<br>(0.0089)     | 0.0204*<br>(0.0120)    | 0.0017<br>(0.0089)     | 0.0633***<br>(0.0223)  |
| Government                       | -0.0492<br>(0.1057)   | -0.3722***<br>(0.1034) | -0.0734<br>(0.0694)    | -0.3382***<br>(0.1057) | -0.1477*<br>(0.0849)   | -0.6268***<br>(0.1517) |
| Inflation                        | -0.0137<br>(0.0222)   | -0.1645**<br>(0.0613)  | -0.0044***<br>(0.0007) | -0.0244***<br>(0.0021) | -0.0098***<br>(0.0033) | -0.0288***<br>(0.0031) |
| TI CPI                           | 0.0066<br>(0.0055)    | 0.0028<br>(0.0032)     |                        |                        |                        |                        |
| CPI*Remittances                  | -0.0092<br>(0.0512)   | 0.0374<br>(0.0668)     |                        |                        |                        |                        |
| ICRG QoG                         |                       |                        | 0.0239<br>(0.0182)     | 0.0073<br>(0.0237)     |                        |                        |
| QoG*Remittances                  |                       |                        | 0.4046<br>(0.3095)     | -0.1841<br>(1.2730)    |                        |                        |
| Polity IV                        |                       |                        |                        |                        | -0.0003<br>(0.0004)    | 0.0025<br>(0.0074)     |
| Polity*Remittances               |                       |                        |                        |                        | -0.0005<br>(0.0020)    | -0.1382<br>(0.2770)    |
| Constant                         | 0.4842***<br>(0.1649) | 0.8178***<br>(0.1816)  | 0.3571***<br>(0.1298)  | 0.8578***<br>(0.1207)  | 0.3823***<br>(0.1253)  | 0.8029***<br>(0.1379)  |
| Countries                        | 93                    | 38                     | 70                     | 37                     | 94                     | 36                     |
| Observations                     | 248                   | 126                    | 295                    | 159                    | 372                    | 149                    |
| R-squared                        | 0.2912                | 0.7140                 | 0.3561                 | 0.7418                 | 0.4650                 | 0.7924                 |

Notes: Dependent variable is real GDP per capita growth. Robust standard errors in parentheses, \*significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%. All regressions include time dummies.

**Table 17: Investment channel**

|                            | <b>OLS</b>             | <b>Fixed Effects</b>   |
|----------------------------|------------------------|------------------------|
| Per capita real GDP growth | 2.2798***<br>(0.2082)  | 1.0305***<br>(0.1554)  |
| Lending rate               | -0.0076<br>(0.0063)    | -0.0044***<br>(0.0013) |
| Remittances                | 0.8646***<br>(0.0798)  | 0.6628**<br>(0.2535)   |
| Constant                   | -1.5175***<br>(0.0429) | -1.4398***<br>(0.0333) |
| Countries                  |                        | 150                    |
| Observations               | 2907                   | 2907                   |
| R-squared                  | 0.1554                 | 0.1404                 |

Notes: Dependent variable is the log of investment to GDP. Robust standard errors in parentheses, \*significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%. All regressions include time dummies.

**Table 18: Consumption channel**

|                           | <b>OLS</b>             | <b>Fixed Effects</b>   |
|---------------------------|------------------------|------------------------|
| Log (real GDP per capita) | 1.1844***<br>(0.0068)  | 0.8385***<br>(0.0475)  |
| Deposit rate              | -0.0037***<br>(0.0012) | -0.0012***<br>(0.0003) |
| Remittances               | 1.5066***<br>(0.0780)  | 0.5221**<br>(0.2146)   |
| Constant                  | -2.5277***<br>(0.0847) | 0.3451<br>(0.4004)     |
| Countries                 |                        | 145                    |
| Observations              | 2546                   | 2546                   |
| R-squared                 | 0.9317                 | 0.9232                 |

Notes: Dependent variable is the log of consumption per capita. Robust standard errors in parentheses, \*significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%. All regressions include time dummies.