

# REMITTANCES, INSTITUTIONS, AND ECONOMIC GROWTH

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## **Abstract**

There is considerable debate regarding the relative contribution of international migrants' remittances to sustainable economic development. While officially recorded remittances to developing countries have increased over the last decade, academic and policy-oriented research has not come to a consensus over whether remittances contribute to longer-term growth by building human and financial capital or degrade long-run growth by creating labor substitution and 'Dutch disease' effects. This paper suggests that remittances contribute to longer-term growth when the receiving countries' political and economic policies and institutions create the incentives for financial and business investment and savings from remittances.

## **Keywords**

International migration, remittances, growth, institutions, growth regressions

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## 1. INTRODUCTION

Theoretical and empirical research into the economic impact of remittances has produced highly mixed results. On the positive side, remittances contribute to the alleviation of poverty and, in some instances, provide capital to fund households' investments and savings. For a number of countries, international remittances have driven macroeconomic growth, mainly by increasing national disposable income.

However, some studies have found that remittances can have a deleterious impact on national economic growth in the medium and longer term.<sup>1</sup> Remittances can fuel inflation, disadvantage the tradable sector by leading to an appreciation of the real exchange rate, and reduce labor market participation rates as receiving households opt to live off of migrants' transfers rather than by working. Moreover, remittances' contribution to growth and poverty might reduce the incentives for implementing sound macroeconomic policy or to institute necessary structural reforms.

This paper seeks to fill two key gaps in the empirical study of remittances and growth. First, we investigate the possibility that the contradictory findings of previous research are generated by the failure of these studies to appropriately control for the effects of reverse causality. In particular, the estimations in Chami, Fullenkamp, and Jahjah's (2003) influential paper are brought under scrutiny. Their paper concluded that remittances have a negative impact on growth by estimating cross-sectional and panel regressions. They controlled for endogeneity by estimating an instrumental variables regression that primarily employed the income gap and interest rate gap between the US and the remittance receiving country as an instrument. As Lucas (2005) argues, the instrument used in the model does not seem to be effective in eliminating the bias, which

is indicated by the insignificance of the interest rate gap differential in the first stage. This paper seeks to understand if the results that Chami *et al* obtain suffer from endogeneity that is not properly controlled for by employing dynamic panel regressions following the methodologies of Anderson-Hsiao (1981) and Arellano and Bond (1991).

In addition, we argue that contradictory findings have emerged when looking at the remittances-growth link because of an omitted variable bias: specifically, remittances will be more likely to contribute to longer-term growth when the remittance receiving countries' political and economic policies and institutions create the incentives for financial and business investment and savings from remittances.<sup>ii</sup> We test the hypothesis that the key to increasing the longer-term development impact of remittances is to implement economic and governance policies that support a sound business investment environment, provide for the prudential security of the financial sector, and quality public services (e.g. education and health care). Institutions must favor policies that encourage savings and investment so that, at the margin, household income that exceeds the needs of basic subsistence can be saved or invested (including investment in human capital). We test the hypothesis that countries with sounder institutions will realize a net payoff from migrants' remittances on aggregate income.

Our results show that remittances indeed exert a positive impact on macroeconomic growth when controlling for endogeneity. Our replications of Chami *et al*'s work produce some results that are consistent with theirs, though we find that these estimations are highly sensitive to model selection. However, our dynamic panel regressions find that remittances exert a positive and statistically significant impact on long-term macroeconomic growth. These results are stable across various specifications.

Moreover, we find that remittances' impact increases the higher the quality of the receiving countries' policies, institutions, and political environment.

The rest of the paper is organized as follows. Section II presents some background on the relationship between migrants' remittances and economic growth. Section III presents the model specification. Section IV presents the data and Section V the estimation results. The last section concludes the paper.

## **2. BACKGROUND AND FRAMEWROK FOR ANALYSIS**

There is empirical evidence that remittances contribute to economic growth, be it through their positive impact on consumption, savings or investment. Lucas (2005) cites several case studies that show signs that remittances may indeed have served to accelerate investment in Morocco, Pakistan, and India. Glytsos (2002) models the direct and indirect effects of remittances on incomes and hence on investment in seven Mediterranean countries, and finds that investment rises with remittances in six out of the seven countries. Additionally, the results of the analysis conducted by Leon-Ledesma and Piracha (2004) for eleven transition economies of Eastern Europe during 1990-1999 show support for the view that remittances have a positive impact on productivity and employment both directly and indirectly through their effect on investment.<sup>iii</sup>

There are, nevertheless, at least two points of reservation regarding the effects of remittances. One is the possibility that countries can face a situation similar to the 'Dutch Disease' in which the inflow of remittances causes a real appreciation, or postpones depreciation, of the exchange rate. This has the effect of restricting export performance and hence possibly limiting output and employment.

Second, as Chami et al. (2003) show, income from remittances may court a moral hazard problem, permitting the migrant's family members to reduce their work effort. Their panel regressions support this view as they find remittances to be negatively correlated with growth among a sample of developing and developed economies from the early 1970s.

Chami et al (2003) employ panel data on worker's remittances, per capita GDP, gross capital formation, and net private capital flows (all reported over the period 1970-1998) to examine the relationship between workers' remittances and per capita GDP growth using standard population-averaged cross-section estimations. The estimated equation is based on:

$$\Delta y_i = \beta_0 + \beta_1 y_{0i} + \beta_2 wr_i + \beta_3 gcf_i + \beta_4 npc_f_i + u_i \quad (1)$$

where  $y$  is the log of real GDP per capita,  $y_0$  is the initial value of  $y$ ,  $wr$  is the log of worker remittances to GDP ratio,  $gcf$  is the log of gross capital formation to GDP ratio, and  $npc_f$  is the log of net private capital flows to GDP ratio. They also use an alternative specification, which they prefer to the above one, using the change in the log of workers remittances to GDP ratio as an independent variable:

$$\Delta y_i = \beta_0 + \beta_1 y_{0i} + \beta_2 \Delta wr_i + \beta_3 gcf_i + \beta_4 npc_f_i + u_i \quad (2)$$

However, their model does not capture some of the essential features of remittances' impact on growth and might be improved in significant ways to properly assess the relationship between remittances and growth. With that in mind, we extend

their empirical model in a number of ways. First, their argument that the growth of remittances captures better the dynamic nature of private transfers, in (2), is flawed as a country would need to increase the remittances to GDP ratio year after year to promote growth. This implies that, in the limit, this ratio would converge to 100 percent. Therefore, we look at the level, rather than growth, of the remittances to GDP ratio.

Second, we investigate the hypothesis that remittances' impact on long-run growth is determined, at least in part, by the quality of the receiving country's policies and institutions. Economic policies and institutions are instrumental in establishing "rules of the game" for a society as they formulate the formal and informal constraints on political, economic, and social interactions. In this regard then, "good" institutions are viewed as establishing an incentive structure that reduces uncertainty and promotes efficiency—hence contributing to stronger economic performance. It is argued that institutions facilitate the interactions between different factions of society which in turn affects the ease with which economic activity can take place. Strong institutions are associated with high levels of real *per capita* income since they shape overall conditions for investment and growth. Institutions that are seen to support a country's economic development include those that protect private property rights and the operation of the rule of law, lead to low levels of corruption and facilitate all private interactions rather than protect a small elite (IMF 2003).

Indeed, there is substantial evidence suggesting that growth-enhancing policies, including in the areas of human capital accumulation, trade openness and investment, are less likely to arise or be effective where political and other institutions are weak.<sup>iv</sup> And since remittances form one of the key sources of income and therefore investment for

many households in developing countries across the world, the influence of institutions in channeling remittances is then as instrumental as it is in terms of the impact of trade, FDI and other forms of investment.

There is some limited empirical work that suggests that institutions do influence the role that remittances play on long-term growth. Faini (2002) regressed income growth in source countries on a standard set of explanatory variables and on remittances. He found a positive impact of remittances on growth and interpreted the positive coefficient on the policy stance to indicate that in order for the full impact of remittances to be realized, which allow households to accumulate productive assets, a sound policy environment is needed – one that does not foster macroeconomic uncertainty and supports the build-up of social and productive infrastructures

Third, Chami et al fail to address some of the problems associated with running panel estimations. One possible problem arising from the panel specifications is that estimated coefficients may be biased if errors are autocorrelated due to misspecified dynamics. It is well known that growth is autocorrelated due to business cycle effects. One solution would be to pool observations from peak to peak of the business cycle or take 5 or 6 years averages of the data. The first option is implausible as it would require a priori knowledge of business cycle features for each economy. The second appears to be very arbitrary. Both options also lead to a large loss of information.

Another, more rigorous, alternative is to model these dynamics by introducing the lagged rate of growth of per capita income as an independent variable. This however, leads to some estimation problems that have to be dealt with by using Dynamic Panel Data (DPD) estimators. In our estimations we used the annual data and introduced one

lag of the rate of growth of per capita GDP. The estimator used in most equations is the Anderson and Hsiao (1981) method. This method estimates the equation in first differences and instrumentalizes the lagged growth of GDPpc by using its lagged level in  $t - 2$ . This estimation method is superior to the popular Arellano and Bond (1991) GMM estimator for the typical macroeconomic panel datasets as demonstrated by Judson and Owen (1999). Nevertheless, the results of using the GMM estimator are also relevant as we do not have specific Monte Carlo evidence on the appropriateness of each estimator for our panel settings. In both cases we provide a 2-step estimator.

Another potential problem that arises is the endogeneity of the remittances variables. This can arise because it is likely that countries experiencing less successful economic performance would receive larger remittances from their émigrés. To deal with this problem, we have estimated the equations instrumentalizing also the remittances variable with its first and second lagged level in the transformed (first difference) equation. This is different from Chami *et al* (2003), as we believe their results are heavily biased in the absence of this IV estimator.

Finally, abstracting for missing observations, our dataset adds 5 years of observations to the data considered by the Chami *et al* (2003) model and covers the period 1970-2003.

### **3. SPECIFICATION**

In all the estimations we have used the logarithm of the Remittances/GDP ratio as the independent variable, as well as the control variables of Chami *et al* (2003). Formally:

$$g_{it} = \beta_i + \beta_1 g_{it-1} + \beta_2 wr_{it} + \beta_3 gcf_{it} + \beta_4 npc_{it} + u_t \quad (3)$$

where  $\beta_i$  captures the fixed effects,  $g$  is the growth rate of per-capita income,  $wr$  is the log of worker remittances to GDP ratio,  $gcf$  is the log of gross capital formation to GDP ratio, and  $npc$  is the log of net private capital flows to GDP ratio.

Since one of our main arguments is that the effect of remittances on growth could work through different channels with institutions being one of the most important ones, we examine the link between remittances and growth specifically working through the institutions of a country. In order to properly test the hypothesis that institutions affect the impact of remittances on growth, we interact remittances variable with different indexes of institutional quality and test the significance of the interacted coefficient. In order to ensure that the interaction term does not proxy for remittances or institutions, we add these variables separately also in the regression equation.

$$g_{it} = \beta_i + \beta_1 g_{it-1} + \beta_2 wr_{it} + \beta_3 Ins_{it} + \beta_4 (wr_{it} \cdot Ins_{it}) + \beta_5 gcf_{it} + \beta_6 npc_{it} + u_t \quad (4)$$

where  $Ins$  is institutions. To measure institutions we use the ICRG aggregate index and a number of its components and Transparency International Corruption Perceptions Index.<sup>v</sup> In equation (4), the coefficient(s)  $\beta_4$  is to be interpreted as the marginal increase in the impact of remittances on growth when institutional quality improves.

For the dynamic panel results we provide the estimated coefficients and their standard errors, the p-value of a Wald test of joint model significance (high p-values

indicate joint significance), the p-value of the Sargan test for instrument validity (high p-values indicate valid instruments) and p-values of autocorrelation tests of order 1 and 2. Note that autocorrelation of order 1 is expected due to first differencing even if the original level errors are not autocorrelated unless they follow a random walk. Finally we provide the long-run dynamic solution for the coefficient on remittances and its standard error, which is to be interpreted as the impact of remittances on growth in equilibrium. We use several specifications depending on the control variables introduced in the regression. The results are discussed in section IV.

#### 4. DATA

##### *(a) Data on remittances*

The data on remittances was collected from the World Bank's World Development Indicators (WDI) database.<sup>vi</sup> The WDI data represents current transfers by migrant workers and wages and salaries earned by nonresident workers. The data is reported by countries in their balance of payments (BoP).

There is a widespread consensus in the literature that the quality of data on remittances is extremely poor. It is well known that large quantities of international remittances are transmitted through "informal" channels such as "hawala" service providers, public transportation providers, or through friends and family and are not recorded in the balance of payments of many countries.<sup>vii</sup> Therefore, efforts to measure remittances suffer from important limitations as official estimates understate actual flows. In conducting any type of panel estimation with remittances data, one should also keep in mind the fact that better technology, decreased transfer transaction cost, and efforts to

crack down on money laundering have generated a decrease in the unrecorded portion of remittance, which might create difficulties in determining whether a higher recorded amount represents remittance growth or improved reporting.

In addition, uneven reporting across countries and time results in panels that are significantly unbalanced – there are many missing values in the data set. In fact, if we look at the last 34 years (1970-2003), only twelve countries<sup>viii</sup> have reported observations for every year. Some 91 out of the 162 countries, for which at least one observation on remittances and compensation of employees is available, have 20 or more observations in this entire period. This situation, however, is to be expected since remittances have drawn significant attention for only the last several years. Moreover, in Eastern Europe and the former Soviet Union, international migration is a relatively new phenomenon.

Despite all the problems mentioned above, remittance flows tend to be the best measured aspect of the migration experience. This dataset, which includes observations for 162 countries and spans a period of 34 years is, to our knowledge, the best available consistent data on remittances.

#### ***(b) Data on institutional quality***

To measure the role of policies and institutions, data on corruption indicators (Transparency International) was employed. The TI Corruption Perceptions Index (CPI)<sup>ix</sup> ranks countries in terms of the degree to which corruption is perceived to exist among public officials and politicians. It is a composite index, drawing on corruption-related data in expert surveys and reflects the views of business people and analysts from around the world, including experts who are locals in the countries evaluated. Although

the CPI index now covers 155 countries, it is available only starting 1995 and as few as 36 countries have continuous observations during 1995-2003 which limits substantially our estimation sample.

Second, we employ the political risk rating from the International Country Risk Guide (ICRG). This composite indicator assesses the political stability of a country and comprises 12 institutional measures - government stability, socioeconomic conditions, investment profile, internal conflict, external conflict, corruption, military in politics, religious tensions, law and order, ethnic tensions, democratic accountability, and bureaucracy quality. Data is available for 135 countries and spans over the period between 1984 and 2003. This is the longest and most comprehensive time-series measuring institutions in our dataset – as many as 102 countries have continuous observations over the entire 20-year period.

It is important to mention that there are crucial conceptual concerns connected with the manner in which institutional quality is measured. Rodrik (2004) points out that the most commonly-used institutional quality measure 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 creates two important problems – perceptions are shaped not just by institutional environment, but also by many other aspects of the economic environment, creating endogeneity and reverse causality issues, and even when causality is established, the results do not indicate the specific institutional design that led to the measured outcome.

On the other hand, Moers (1999) notes that use of subjective institutional measures instead of objective institutional measures in growth empirics is quite

consistently verified and considers it a promising research avenue. Despite the obvious shortcomings, this paper will employ the indices described above merely to find an indication that the institutional environment might have an impact on the relationship between remittances and economic growth.

## 5. EMPIRICAL ESTIMATES

The results of the empirical analysis are presented in Tables 1 to 6. The cross-section and panel analyses<sup>x</sup> conducted in accordance with a modified version of the Chami et al (2003) model, over two separate periods, 1970-2003 and 1991-2003, show inconclusive results, but certainly do not find a negative relationship between remittances and economic growth. Looking at the cross-sectional estimates, conducted through averages of the data from 1991 through 2003, there is not discernable relationship between remittances and economic growth that is statistically significant. When we interact remittances with institutions, however, we observe a positive effect of remittances on growth. The results are significant at the 5% and 10% level (Table 2).

*[Insert Table 2 about here]*

Looking at the panel estimates in Tables 3 and 4, we find that while the robustness of the coefficients on remittances depends on model specifications, in the instances where results are significant, they show a consistently positive effect of remittances on growth. As with the cross-sectional estimates, the inclusion of institutional variables in the panel models yields expected, albeit somewhat inconsistent

results, which could be due to the severe endogeneity problems associated with both remittance estimations and the use of subjective institutional indices.

*[Insert Tables 3 and 4 about here]*

However, albeit the cross section (Tables 1-2) and panel estimations (Tables 3-4) produce uncertain results, they do not give any indication that remittances have a negative impact in nature as suggested by Chami et al. The analysis varies from that utilized in Chami et al (2003) in minor ways. The very different results obtained here from those presented in Chami et al (2003) suggest that their results are not very stable and must be interpreted with extreme caution.

The results of our preferred dynamic panel estimations are shown in Table 5. We present first the estimate of a simple dynamic model with remittances as the only independent variable and then add different control variables at a time. Specification (10) only includes variables that appeared to be significant in at least one of the previous equations. The inclusion of the TICI index reduce dramatically the number of observations and countries, although this is also the case for the rest of institutional variables. The result is a shorter panel, especially in the time dimension, in which we end up with 4-5 consecutive time series per country (this is an unbalanced panel). In that context the GMM estimator is more reliable than the AH estimator. The Wald test for the AH estimator when these variables are included clearly show that the model is not significant and is grossly misspecified. For this reason, we recommend looking at the results provided in equations (1) to (3) and (7) to (10).

*[Insert Table 5 about here]*

The main result in Table 5 is that remittances appear to have a positive and statistically significant impact on growth in five out of nine of these specifications. Only in one specification the impact is negative but not significant (when we do not instrumentalize or use control variables). The significant long-run coefficients range from 0.001 to 0.022. This denotes that the estimates cannot be considered to be very robust. What seems to be more robust, however, is the fact that, if anything, remittances appear to have a positive effect on growth. The other important result is that the impact of remittances appears to be more positive when (i) we control for the potential endogeneity bias in remittances and (ii) we consider remittances in conjunction with institutional variables that, in general, also appear to be significant and show the expected sign.

*[Insert Table 6 about here]*

The most interesting results arise from the specifications in which we interact institutions with remittances (see Table 6). This specification allows us to test whether the impact of remittances on growth is conditioned by the institutional environment. We present four specifications. In the first two we use all the ICRG institutional variables and their interaction with remittances and present the results of using the AH-IV and GMM estimators. In the third one we only use the composite political risk index from ICRG and specification (4) presents the results of the estimates when we select only the institutional variables and their interactions that appear significant. The estimates show two very important results. First, the remittances variable appears to be statistically very significant, has a larger impact than that obtained in the previous specifications, and is very robust. Secondly, the interaction variables appear to be significant as well and they

all show the expected sign. Specifically, ethnic tensions appear to have a negative effect on the impact of remittances on growth. Law and order, government stability and socioeconomic conditions all appear to exert a positive effect on the impact of remittances on growth. When taken individually, the political risk indicator has a negative coefficient on the interaction term as expected. This evidence supports our argument that the effect of remittances on growth depends on whether countries' institutions are conducive to a productive use of remittances. Low level of ethnic tensions, good governance, prevalence of law and order, and good socioeconomic conditions are preconditions for a successful use of migrant remittances.

## **6. CONCLUSION**

Our Dynamic Panel Data analysis, which accounts correctly for the misspecified dynamics and endogeneity problems that plagued previous research, yields positive and significant estimators of remittances in most of the considered specifications. Moreover, the empirical analysis points to the fact that institutions play an important role in how remittances affect economic growth. A sound institutional environment has been found to affect the volume and efficiency of investment; hence in the presence of good institutions, remittances could be channeled more efficiently, ultimately leading to higher output.

The results obtained in this paper could also have significant policy implications. A number of researchers have expressed skepticism regarding the ability of governments to affect the manner in which remittances are used. For example, Kapur (2004) points out that active government attempts to encourage or require remittances to be invested are

unlikely to have significant economic benefit. However, since institutions seem to matter in the manner in which remittances are used, the best way for recipient country governments to ensure that remittances contribute to positive economic growth is to foster better quality of institutions, thus ensuring that a greater proportion of remittances are channeled in a more effective way to have a positive impact on growth.

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<sup>i</sup> See Chami, Fullenham, and Jahjah (2003).

<sup>ii</sup> This argument is explored further in World Bank (2007).

<sup>iii</sup> Also see Giuliano and Ruiz-Arranz (2005) and Banaian and Roberts (2004).

<sup>iv</sup> See, for example, Banerjee and Iyer (2002) and Dollar and Kraay (2003).

<sup>v</sup> Estimations were also conducted with the World Bank Institute's Worldwide Governance Research Indicators. However, this was dropped as data are only available at two year intervals.

<sup>vi</sup> Note that the remittance data we use comprises workers' remittance and compensation of employees. This differs slightly from Chami et al as they only use workers' remittances in their analysis. However, it is generally an accepted view that remittances as a whole should include both aspects of transfers.

<sup>vii</sup> A recent World Bank survey of central banks in forty developing and emerging market economies found that only ten made efforts to collect data from informal channels when reporting international remittance levels in balance of payments statistics. See De Luna Martínez (2005).

<sup>viii</sup> Algeria, Australia, Austria, Barbados, Colombia, Dominican Republic, India, Israel, Italy, Kenya, Netherlands, and South Africa.

<sup>ix</sup> Transparency International,

[http://www.transparency.org/pressreleases\\_archive/2003/2003.10.07.cpi.en.html](http://www.transparency.org/pressreleases_archive/2003/2003.10.07.cpi.en.html).

<sup>x</sup> The choice of fixed-effects or random-effects models in each instance was determined by the results of the Hausman test.

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**Table 1: Remittances (in percent of GDP) and Economic Growth: Cross Section**

**Estimation OLS (1970-2003)**

Dependent Variable: Log(GDP Per Capita Growth)	(1)	(2)	(3)	(4)	(5)	(6)
Log(GDP Per Capita 1970)	-0.003* (0.002)	-0.005** (0.002)	-0.005*** (0.002)	-0.007*** (0.002)	-0.005** (0.002)	-0.008*** (0.002)
<b>Log (Remittances / GDP)</b>	0.001 (0.001)	-0.001 (0.001)	0.000 (0.001)	0.001 (0.001)	0.014 (0.009)	0.015 (0.009)
Log (GCF / GDP)	0.041*** (0.008)	0.043*** (0.007)	0.033*** (0.008)	0.039*** (0.007)	0.034*** (0.007)	0.038*** (0.007)
Log(NPCF/GDP)	0.000 (0.002)	-0.002 (0.002)	-0.004* (0.002)	-0.004 (0.002)	-0.004* (0.002)	-0.002 (0.003)
TI Corruption Index		0.004*** (0.001)				
ICRG Bureaucracy Quality			0.001 (0.003)		0.001 (0.003)	
ICRG Corruption			-0.003 (0.003)		-0.004 (0.003)	
ICRG Ethnic Tensions			0.000 (0.002)		0.000 (0.002)	
ICRG Law and Order			0.005* (0.003)		0.004 (0.003)	
ICRG Democratic Accountability			0.001 (0.002)		0.003 (0.003)	
ICRG Government Stability			0.001 (0.002)		0.002 (0.003)	
ICRG Socio-Economic Conditions			0.004* (0.002)		0.005** (0.002)	
ICRG Investment Profile			0.003 (0.003)		0.000 (0.003)	
ICRG Political Risk Indicator				0.001*** (0.000)		0.001*** (0.000)
ICRG Bureaucracy Quality*WR					0.002 (0.002)	
ICRG Corruption*WR					-0.002 (0.002)	
ICRG Ethnic Tensions*WR					-0.001 (0.001)	
ICRG Law and Order*WR					0.002 (0.002)	
ICRG Democratic Accountability*WR					0.001 (0.001)	
ICRG Government Stability*WR					0.000 (0.001)	
ICRG Socio-Economic Conditions*WR					-0.004** (0.002)	
ICRG Investment Profile*WR					0.001 (0.002)	
ICRG Political Risk Indicator*WR						-0.000 (0.000)
Constant	-0.090*** (0.021)	-0.098*** (0.021)	-0.104*** (0.026)	-0.111*** (0.023)	-0.109*** (0.025)	-0.104*** (0.023)
Observations	77	69	62	62	62	62
R-squared	0.44	0.56	0.66	0.55	0.74	0.57

Robust standard errors in parentheses

\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

**Table 2: Remittances (in percent of GDP) and Economic Growth: Cross Section**

**Estimation OLS (1991-2003)**

Dependent Variable: Log(GDP Per Capita Growth)	(1)	(2)	(3)	(4)	(5)	(6)
Log(GDP Per Capita 1991)	-0.001 (0.002)	-0.004 (0.003)	-0.006** (0.003)	-0.004 (0.003)	-0.006** (0.003)	-0.005* (0.003)
<b>Log ( Remittances / GDP )</b>	0.000 (0.001)	-0.000 (0.002)	0.001 (0.001)	0.001 (0.002)	0.024* (0.013)	0.024** (0.010)
Log ( GCF / GDP )	0.027*** (0.009)	0.024** (0.010)	0.021** (0.010)	0.022* (0.011)	0.019* (0.010)	0.023** (0.011)
Log(NPCF/GDP)	0.000 (0.002)	0.001 (0.003)	0.002 (0.003)	0.001 (0.003)	0.001 (0.003)	0.002 (0.003)
TI Corruption Index		0.006*** (0.002)				
ICRG Bureaucracy Quality			0.001 (0.003)		0.002 (0.003)	
ICRG Corruption			0.003 (0.004)		0.002 (0.004)	
ICRG Ethnic Tensions			-0.000 (0.002)		0.000 (0.002)	
ICRG Law and Order			0.001 (0.003)		0.001 (0.003)	
ICRG Democratic Accountability			-0.002 (0.004)		-0.001 (0.004)	
ICRG Government Stability			-0.003 (0.004)		-0.001 (0.003)	
ICRG Socio-Economic Conditions			0.010*** (0.002)		0.010*** (0.002)	
ICRG Investment Profile			0.000 (0.003)		-0.001 (0.003)	
ICRG Political Risk Indicator				0.001 (0.000)		0.001* (0.000)
ICRG Bureaucracy Quality*WR					-0.004 (0.002)	
ICRG Corruption*WR					-0.000 (0.002)	
ICRG Ethnic Tensions*WR					-0.002* (0.001)	
ICRG Law and Order*WR					-0.001 (0.002)	
ICRG Democratic Accountability*WR					0.001 (0.002)	
ICRG Government Stability*WR					-0.001 (0.002)	
ICRG Socio-Economic Conditions*WR					0.003 (0.003)	
ICRG Investment Profile*WR					-0.002 (0.001)	
ICRG Political Risk Indicator*WR						-0.000** (0.000)
Constant	-0.069*** (0.026)	-0.060** (0.028)	-0.046 (0.032)	-0.066** (0.030)	-0.048 (0.034)	-0.063** (0.031)
Observations	119	104	90	90	90	90
R-squared	0.13	0.20	0.43	0.17	0.49	0.22

Robust standard errors in parentheses  
\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

**Table 3: Remittances (in percent of GDP) and Economic Growth: Panel Estimation  
(1970-2003)**

Dependent Variable: Log(GDP Per Capita Growth)	(1)	(2)	(3)	(4)	(5)	(6)
Growth GDPpc (t-1)	0.098*** (0.020)	-0.075 (0.055)	0.005 (0.028)	0.017 (0.028)	0.005 (0.028)	0.021 (0.028)
<b>Log (Remittances / GDP)</b>	0.005*** (0.001)	0.007* (0.004)	0.001 (0.002)	0.000 (0.002)	0.011** (0.005)	0.008* (0.004)
Log (GCF / GDP)	0.036*** (0.004)	0.055*** (0.010)	0.044*** (0.006)	0.045*** (0.006)	0.043*** (0.006)	0.043*** (0.006)
Log(NPCF/GDP)	0.001 (0.001)	-0.001 (0.003)	-0.001 (0.001)	-0.000 (0.001)	-0.001 (0.001)	-0.000 (0.001)
TI Corruption Index		0.004 (0.004)				
ICRG Bureaucracy Quality			-0.004 (0.003)		-0.003 (0.003)	
ICRG Corruption			0.000 (0.002)		0.000 (0.002)	
ICRG Ethnic Tensions			-0.005** (0.002)		-0.004* (0.002)	
ICRG Law and Order			0.002 (0.002)		0.002 (0.002)	
ICRG Democratic Accountability			-0.001 (0.002)		-0.000 (0.002)	
ICRG Government Stability			-0.000 (0.001)		-0.000 (0.001)	
ICRG Socio-Economic Conditions			0.002* (0.001)		0.002 (0.001)	
ICRG Investment Profile			0.002* (0.001)		0.002* (0.001)	
ICRG Political Risk Indicator				-0.000 (0.000)		0.000 (0.000)
ICRG Bureaucracy Quality*WR					0.001 (0.001)	
ICRG Corruption*WR					0.001 (0.001)	
ICRG Ethnic Tensions*WR					-0.004*** (0.001)	
ICRG Law and Order*WR					0.002* (0.001)	
ICRG Democratic Accountability*WR					-0.001 (0.001)	
ICRG Government Stability*WR					-0.000 (0.001)	
ICRG Socio-Economic Conditions*WR					-0.001* (0.001)	
ICRG Investment Profile*WR					0.001 (0.001)	
ICRG Political Risk Indicator*WR						-0.000* (0.000)
Constant	-0.095*** (0.014)	-0.156*** (0.030)	-0.116*** (0.020)	-0.117*** (0.019)	-0.118*** (0.020)	-0.115*** (0.019)
Observations	1913	397	1111	1108	1111	1108
Number of ID	123	99	91	91	91	91

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R-squared	0.08	0.12	0.08	0.06	0.10	0.07
Standard errors in parentheses						
* significant at 10%; ** significant at 5%; *** significant at 1%						

**Table 4: Remittances (in percent of GDP) and Economic Growth: Panel Estimation  
(1991-2003)**

Dependent Variable: Log(GDP Per Capita Growth)	(1)	(2)	(3)	(4)	(5)	(6)
Growth GDPpc (t-1)	0.078*** (0.027)	-0.075 (0.055)	-0.047 (0.035)	-0.027 (0.034)	-0.045 (0.035)	-0.028 (0.034)
<b>Log (Remittances / GDP)</b>	0.003 (0.002)	0.007* (0.004)	-0.004 (0.002)	-0.004 (0.002)	-0.002 (0.009)	0.003 (0.010)
Log ( GCF / GDP )	0.056*** (0.007)	0.055*** (0.010)	0.060*** (0.008)	0.061*** (0.008)	0.060*** (0.008)	0.060*** (0.008)
Log(NPCF/GDP)	0.002 (0.001)	-0.001 (0.003)	-0.000 (0.002)	-0.000 (0.002)	-0.000 (0.002)	-0.000 (0.002)
TI Corruption Index		0.004 (0.004)				
ICRG Bureaucracy Quality			0.000 (0.003)		0.001 (0.003)	
ICRG Corruption			-0.002 (0.002)		-0.002 (0.002)	
ICRG Ethnic Tensions			-0.007** (0.003)		-0.008*** (0.003)	
ICRG Law and Order			0.009*** (0.003)		0.009*** (0.003)	
ICRG Democratic Accountability			-0.001 (0.002)		-0.002 (0.002)	
ICRG Government Stability			-0.001 (0.001)		-0.001 (0.001)	
ICRG Socio-Economic Conditions			0.001 (0.002)		0.001 (0.002)	
ICRG Investment Profile			0.003** (0.001)		0.003** (0.001)	
ICRG Political Risk Indicator				0.000 (0.000)		0.000* (0.000)
ICRG Bureaucracy Quality*WR					0.000 (0.002)	
ICRG Corruption*WR					-0.001 (0.001)	
ICRG Ethnic Tensions*WR					0.001 (0.002)	
ICRG Law and Order*WR					0.001 (0.001)	
ICRG Democratic Accountability*WR					0.000 (0.001)	
ICRG Government Stability*WR					-0.000 (0.001)	
ICRG Socio-Economic Conditions*WR					-0.001 (0.001)	
ICRG Investment Profile*WR					-0.000 (0.001)	
ICRG Political Risk Indicator*WR						-0.000 (0.000)
Constant	-0.156*** (0.021)	-0.156*** (0.030)	-0.170*** (0.027)	-0.194*** (0.028)	-0.170*** (0.028)	-0.195*** (0.028)
Observations	1079	397	807	807	807	807
Number of ID	122	99	91	91	91	91
R-squared	0.10	0.12	0.12	0.10	0.12	0.10
Standard errors in parentheses						

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\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

**Table 5: Worker Remittances and Growth:  
Dynamic Panel Estimation (1970-2003)**

Dependent Variable: growth of GDP Per Capita	(1)	(2)	(3)	(4)	(5)	(6)
Endogenous Variable: Log (Remittances/GDP)	AH	AH-IV	AH-IV	AH-IV	AH-IV	AH-IV
Growth GDPpc (t-1)	0.202*** (0.014)	0.170*** (0.006)	0.132*** (0.005)	0.083*** (0.000)	0.035 (0.071)	0.056*** (0.013)
<b>Log(Remittances/GDP)</b>	<b>-0.005</b> <b>(0.010)</b>	<b>0.002*</b> <b>(0.001)</b>	<b>0.002</b> <b>(0.001)</b>	<b>0.001**</b> <b>(0.000)</b>	<b>0.021**</b> <b>(0.090)</b>	<b>0.008***</b> <b>(0.001)</b>
Log(GCF/GDP)			0.082*** (0.004)	0.070*** (0.000)	0.086** (0.035)	0.037*** (0.008)
Log(NPCF/GDP)				-0.004*** (0.000)	-0.001 (0.007)	-0.002 (0.002)
TI Corruption Index					-0.020* (0.011)	
UNHDI					-0.455 (0.657)	
ICRG Bureaucracy quality						-0.005 (0.006)
ICRG Corruption						-0.004 (0.004)
ICRG Ethnic tensions						-0.034*** (0.006)
ICRG Law and order						0.030*** (0.003)
ICRG Democratic accountability						0.016 (0.004)
ICRG Government stability						0.005*** (0.002)
ICRG Socioeconomic conditions						0.005*** (0.002)
ICRG Investment profile						0.002 (0.002)
ICRG Political risk indicator						
Observations	2946	2946	2860	1790	217	1020
Number of ID	155	155	152	121	65	89
Wald	0.000	0.000	0.000	0.000	0.004	0.000
Sargan	0.083	0.251	0.4290	0.701	0.634	0.392
AR(1)	0.000	0.000	0.000	0.000	0.005	0.000
AR(2)	0.671	0.790	0.819	0.992	0.544	0.459
<b>Long-run remittances coeff.</b>	<b>-0.006</b> <b>(0.012)</b>	<b>0.003*</b> <b>(0.002)</b>	<b>0.002</b> <b>(0.002)</b>	<b>0.001**</b> <b>(0.000)</b>	<b>0.022**</b> <b>(0.011)</b>	<b>0.009***</b> <b>(0.002)</b>
Standard errors in parentheses						
* significant at 10%; ** significant at 5%; *** significant at 1%						

**Table 5 continued.**

Dependent Variable: growth of GDP Per Capita	(7)	(8)	(9)	(10)
Endogenous Variable: Log (Remittances/GDP)	AH-IV	AH-IV	GMM	GMM
Growth GDPpc (t-1)	0.079*** (0.001)	-0.029 (0.091)	0.060*** (0.004)	0.068*** (0.006)
<b>Log(Remittances/GDP)</b>	<b>0.010***</b> <b>(0.001)</b>	<b>0.011</b> <b>(0.011)</b>	<b>0.008***</b> <b>(0.001)</b>	<b>0.000</b> <b>(0.002)</b>
Log(GCF/GDP)	0.054*** (0.004)	0.078** (0.037)	0.054*** (0.002)	0.061*** (0.002)
Log(NPCF/GDP)	-0.006 (0.007)	-0.001 (0.005)	0.000 (0.000)	
TI Corruption Index		-0.018 (0.012)		
UNHDI		-0.516 (0.764)		
ICRG Bureaucracy quality			0.004*** (0.001)	0.004** (0.002)
ICRG Corruption			-0.001 (0.001)	
ICRG Ethnic tensions			-0.007*** (0.001)	-0.002* (0.001)
ICRG Law and order			0.006*** (0.001)	0.004* (0.001)
ICRG Democratic accountability			-0.003*** (0.001)	-0.000 (0.001)
ICRG Government stability			0.003*** (0.000)	0.002*** (0.000)
ICRG Socioeconomic conditions			0.001* (0.000)	0.002^ (0.001)
ICRG Investment profile			-0.001*** (0.000)	-0.001* (0.000)
ICRG Political risk indicator	-0.001*** (0.000)	0.002 (0.001)		
Observations	1017	212	1020	1714
Number of ID	89	60	89	119
Wald	0.000	0.073	0.000	0.000
Sargan	0.731	0.634	0.473	0.167
AR(1)	0.000	0.005	0.000	0.000
AR(2)	0.808	0.366	0.755	0.436
<b>Long-run remittances coeff.</b>	<b>0.010***</b> <b>0.001</b>	<b>0.009</b> <b>0.090</b>	<b>0.009***</b> <b>(0.004)</b>	<b>0.000</b> <b>0.002</b>

Standard errors in parentheses  
\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

Notes: specifications (1) to (7) were obtained using the 2-step Anderson-Hsiao estimator (AH) and the AH estimator with instruments for the remittances variable. Specifications (8) to (10) were obtained using the 2-steps GMM estimator of Arellano and Bond (1991) with robust standard errors.

**Table 6: Worker Remittances and Growth:  
Dynamic Panel Estimation (1970-2003) with interaction terms**

Dependent Variable: growth of GDP Per Capita	(1) AH-IV	(2) GMM	(3) AH-IV	(4) AH-IV
Endogenous Variable: Log (Remittances/GDP)				
Growth GDPpc (t-1)	0.038 (0.029)	0.099*** (0.008)	0.080*** (0.009)	0.023 (0.023)
<b>Log(Remittances/GDP)</b>	<b>0.045***</b> <b>(0.007)</b>	<b>0.048***</b> <b>(0.003)</b>	<b>0.044***</b> <b>(0.004)</b>	<b>0.041***</b> <b>(0.005)</b>
Log(GCF/GDP)	0.053*** (0.011)	0.058*** (0.005)	0.044*** (0.005)	0.009* (0.004)
Log(NPCF/GDP)	-0.006** (0.003)	-0.001 (0.001)	-0.010* (0.005)	-0.007** (0.002)
ICRG Bureaucracy quality	0.019 (0.012)	0.008 (0.006)		
ICRG Corruption	0.001 (0.006)	-0.003** (0.001)		
ICRG Ethnic tensions	-0.024* (0.009)	-0.008** (0.003)		-0.026*** (0.005)
ICRG Law and order	0.021** (0.006)	0.009*** (0.002)		0.028*** (0.005)
ICRG Democratic accountability	-0.010 (0.007)	-0.003 (0.002)		
ICRG Government stability	0.006** (0.002)	0.002*** (0.000)		0.006** (0.002)
ICRG Socioeconomic conditions	0.005* (0.003)	-0.000 (0.001)		0.005** (0.003)
ICRG Investment profile	0.001 (0.003)	-0.001 (0.001)		
ICRG Political risk indicator			0.000 (0.000)	
ICRG Bureaucracy quality*WR	-0.004 (0.004)	0.003 (0.002)		
ICRG Corruption*WR	-0.003 (0.003)	-0.003** (0.001)		
ICRG Ethnic tensions*WR	-0.013*** (0.000)	-0.004*** (0.001)		-0.015*** (0.002)
ICRG Law and order*WR	0.004** (0.002)	0.003*** (0.001)		0.003** (0.001)
ICRG Democratic accountability*WR	0.001 (0.002)	-0.002 (0.002)		

**Table 6 continued.**

Dependent Variable: growth of GDP Per Capita	(1) AH-IV	(2) GMM	(3) AH-IV	(4) AH-IV Only selected interacted
Endogenous Variable: Log (Remittances/GDP)				
ICRG Government stability*WR	0.003*** (0.001)	0.002* (0.001)		0.003*** (0.001)
ICRG Socioeconomic conditions*WR	0.004*** (0.001)	0.004* (0.002)		0.003*** (0.000)
ICRG Investment profile*WR	-0.006 (0.005)	0.000 (0.000)		
ICRG Political risk indicator*WR			-0.001*** (0.000)	
Observations	1020	1020	1017	1020
Number of ID	90	90	90	90
Wald	0.000	0.000	0.000	0.000
Sargan	0.403	0.740	0.850	0.461
AR(1)	0.000	0.000	0.000	0.000
AR(2)	0.126	0.688	0.663	0.169
<b>Long-run remittances coeff.</b>	<b>0.047***</b> <b>(0.008)</b>	<b>0.053***</b> <b>(0.004)</b>	<b>0.049***</b> <b>(0.005)</b>	<b>0.042***</b> <b>(0.005)</b>

Notes: specifications (1), (3) and (4) were obtained using the 2-step Anderson-Hsiao estimator (AH) with instruments for the remittances variable. Specification (2) was obtained using the 2-steps GMM estimator of Arellano and Bond (1991) with robust standard errors.

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## APPENDIX : DATA DEFINITIONS

**Workers' remittances and compensation of employees, received (US\$):** Current transfers by migrant workers and wages and salaries earned by nonresident workers. This new WDI category comprising both workers' remittances and compensation of employees was introduced in mid-2005. Data are in current U.S. dollars. Source: Workers' remittances and compensation of employees, received (US\$): World Bank Development Indicators.

**GDP per capita (constant 2000 US\$):** GDP per capita is gross domestic product divided by midyear population. 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. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources. Data are in constant U.S. dollars. Source: GDP per capita (constant 2000 US\$): World Bank national accounts data, and OECD National Accounts data files.

**GDP (current US\$):** Definition: GDP at purchaser's prices 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. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources. Data are in current U.S. dollars. Dollar figures for GDP are converted from domestic currencies using single year official exchange rates. For a few countries where the official exchange rate does not reflect the rate effectively applied to actual

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foreign exchange transactions, an alternative conversion factor is used. Source: World Bank national accounts data, and OECD National Accounts data files.

**Gross capital formation (current US\$):** Definition: Gross capital formation (formerly gross domestic investment) consists of outlays on additions to the fixed assets of the economy plus net changes in the level of inventories. Fixed assets include land improvements (fences, ditches, drains, and so on); plant, machinery, and equipment purchases; and the construction of roads, railways, and the like, including schools, offices, hospitals, private residential dwellings, and commercial and industrial buildings. Inventories are stocks of goods held by firms to meet temporary or unexpected fluctuations in production or sales, and "work in progress." According to the 1993 SNA, net acquisitions of valuables are also considered capital formation. Data are in current U.S. dollars. Source: World Bank national accounts data, and OECD National Accounts data files.

**Private capital flows, net total (DRS, current US\$):** Definition: Net private capital flows consist of private debt and nondebt flows. Private debt flows include commercial bank lending, bonds, and other private credits; nondebt private flows are foreign direct investment and portfolio equity investment. Data are in current U.S. dollars. Source: World Bank, Global Development Finance.

**Transparency International (TI) Corruption Perception Index (CPI):** The 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, drawing on corruption-related data in expert surveys carried out by a variety of reputable institutions. It reflects the views of business people and analysts from around

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the world, including experts who are locals in the countries evaluated.

<http://www.icgg.org/>

**Governance Indicators:**

**ICRG Indicators (yearly averages<sup>x</sup>):**

**Bureaucracy Quality:** (maximum 4 points) Institutional strength and quality of the bureaucracy is a shock absorber that tends to minimize revisions of policy when governments change. In low-risk countries, the bureaucracy is somewhat autonomous from political pressure.

**Corruption:** (maximum 6 points) A measure of corruption within the political system that is a threat to foreign investment by distorting the economic and financial environment, reducing the efficiency of government and business by enabling people to assume positions of power through patronage rather than ability, and introducing inherent instability into the political process.

**Law & Order:** (maximum 6 points) Two measures comprising one risk component. Each sub-component equals half of the total. The "law" sub-component assesses the strength and impartiality of the legal system, and the "order" sub-component assesses popular observance of the law.

**Ethnic Tensions:** (maximum 6 points) A measure of the degree of tension attributable to racial, national, or language divisions. Lower ratings (higher risk) are given to countries where tensions are high because opposing groups are intolerant and unwilling to compromise.

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**Government Stability:** (maximum 12 points) A measure of the government's ability to stay in office and carry out its declared program(s), depending upon such factors as the type of governance, cohesion of the government and governing parties, approach of an election, and command of the legislature.

**Democratic Accountability:** (maximum 6 points) A measure of, not just whether there are free and fair elections, but how responsive government is to its people. The less responsive it is, the more likely it will fall. Even democratically elected governments can delude themselves into thinking they know what is best for the people, regardless of clear indications to the contrary from the people.

**Investment Profile:** (maximum 12 points) A measure of the government's attitude toward inward investment as determined by four components: the risk to operations, taxation, repatriation, and labor costs.

**Socioeconomic Conditions:** (maximum 12 points) An estimate of the general public's satisfaction or dissatisfaction with the government's economic policies, covering a broad spectrum of factors ranging from infant mortality and medical provision to housing and interest rates. Different weights are applied in different societies, depending upon the relative political impact.

**ICRG Composite Political Risk Indicator:** A means of assessing the political stability of a country on a comparable basis with other countries by assessing risk points for each of the component factors of government stability, socioeconomic conditions, investment profile, internal conflict, external conflict, corruption, military in politics, religious tensions, law and order, ethnic tensions, democratic accountability, and bureaucracy

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quality. Risk ratings range from a high of 100 (least risk) to a low of 0 (highest risk), though lowest de facto ratings generally range in the 30s and 40s.