Through Which Channels Can Remittances Spur Economic Growth in MENA Countries?

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Abstract This paper studies the remittances' effect on economic growth. Using panel data techniques, the authors estimate several specifications to provide support of such relationship for MENA countries over the period 1980–2009. The findings provide new robust evidence on how remittances are used in MENA countries and detect the main channels which may interfere in this process. Estimation outcomes show that the most important part of remittances is consumed and that remittances stimulate growth only when they are invested. Moreover, empirical results suggest that remittances can enhance growth by encouraging human capital accumulation. Human capital is therefore an effective channel through which remittances stimulate growth in MENA countries.

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1 Introduction

International remittance inflows, or "The money that migrants send home to their families" have experienced a significant increase in developing countries over the past decades. The importance of remittances is becoming recognized because their scale and growth has made them stand out both on a per capita and in an aggregate basis. For many developing countries, such flows represent a source of foreign exchange earnings, even exceeding private capital flows, public aids or foreign direct investment. Official international remittances to developing countries have grown dramatically in recent years from U.S. $3.3 billion in 1975 to U.S. $289.4 billion in 2007 (World Bank, 2009) making them the second largest source of external finance for developing countries after foreign direct investment (FDI).This represents about twice the amount of official aid received, both in absolute terms and as a proportion of GDP (Aggarwal, Demirguc-Kunt and Martinez Peria, 2011). The ratio of remittances to GDP exceeds 1% in 60 countries (Bhaskara and Hassan, 2011). However, according to the World Bank (2006) if remittances sent through informal channels are included in official transfers, total remittances could be as much as 50 per cent higher than the official record. These unofficial channels are attractive because the cost of transferring funds through official channels is high for some countries. With regards to MENA countries, workers' remittances have become an increasingly prominent source of finance as depicted in figure 1. In 2009, workers' remittance receipts of MENA countries stood at $8,536 billion, much higher than total official flows and private non-FDI flows (Figure 1).

The relative importance of these transfers stems from the fact that compared to other capital flows, workers' remittances are more stable and rather increase during periods of economic downturns and natural disasters (Yang, 2008). Moreover, Rajan and Subramanian (2005) highlight the fact that while a surge in inflows, including aid flows, can erode a country's competitiveness by restricting export performance; remittances do not seem to have this adverse effect. However, by increasing the recipient family's income and living standards, workers' remittances directly alleviate poverty levels (Adams and Page, 2005; Siddiqui and Kemal, 2006; and Gupta, Pattillo and Wagh, 2009).

*Figure 1:*Workers' Remittances and Other Inflows to MENA Countries, 1980–2009
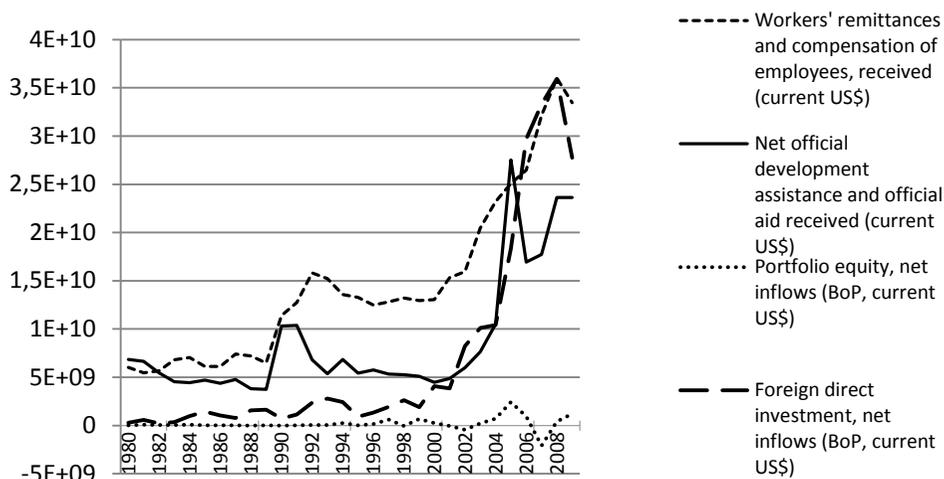
Sources: World Bank, Global Development Finance.

Workers' remittances are current private transfers from migrant workers to their home countries. IMF's Balance of Payments Yearbook distinguish three components generally mentioned as constituting remittances, namely worker's remittances (part of current transfers in the current account), migrants' transfers (part of the capital account) and compensation of employees (part of the income component of the current account). When the migrants have lived in a host country for less than a year, their entire income should be classified as compensation of employees. It is worth noting in this regard that the quality and the coverage of data on remittances are still subject to limitations. This is mainly due to the difficulty in classifications, to problems of misclassification, to unrecorded flows due to weakness in data collection or to informal channels.

With regards to motivations of workers' remittances, three main reasons are provided in the literature. First, an important proportion of these inflows are for altruistic reasons to support the living standards of family members. Second, these inflows are also motivated by pecuniary gains through taking advantage of the incentives offered by the recipient countries such as preferential interest rates and exemptions from income tax. In this case, remittances are motivated by pure self-

interest. The third reason behind these transfers is a combination of altruistic reasons and pecuniary gains.

There is now a growing interest regarding remittances among governments in developing countries and international financial institutions. Alongside, other literature focused in recent years on the impact of these flows on economic growth. From an economic development point of view, the key question regarding these flows is how are they spent or used. Are these transfers spent on consumption, or are they channeled into investments? Remittances economics literature highlights the existence of three main points of view in this regard. The first point of view shows that remittances are spent at the margin like any other income and their positive contribution to development will be the same as that from any other source of income. The second point of view argues that remittances can cause adverse behavioral changes at the household level that may lower their development impact relative to income from other sources. Studies supporting this kind of relationship argue that a significant portion of remittances flows are spent in "status-oriented" consumption and that a smaller part goes into economically unproductive saving and investments, mainly in housing, land and jewelry (Chami et al., 2005). A third recent view supports rather an optimistic and positive effect arguing that remittances increase investments in physical and human capital relative to other forms of household income. In this regard, a recent study of remittances reports a high positive correlation between international remittances on student retention rates in El Salvador' schools (Cox-Edwards and Ureta, 2003).

This paper provides new robust evidence on how remittances are used in MENA countries and investigates the main channels which may interfere in this process. It is worth noting that previous studies suffered from a lack of inclusive and reliable data on remittances which impeded any comprehensive empirical analysis. This study intends to contribute to this empirical literature by refining and extending the debate concerning how remittances are spent or used and how they can affect economic growth. Understanding through which channels remittances influence economic growth could help policymakers designing appropriate economic policies regarding these flows. To the best of our knowledge, this is the first paper to provide a cross-country empirical analysis of this relationship in these countries.

The rest of the paper is organized as follows. In Section 2 we discuss the relevant literature on the economics of remittances. Section 3 presents

methodological aspects: variables and data used in the Study, model specification and econometrics techniques. Section 4 presents the empirical results and discussion. In Section 5 we summarize the main findings of the study and discuss the relevant recommendations.

2   Remittances and Economic Growth. Recent Empirical Debate

Sources of economic growth have been the subject of an old debate in empirical macroeconomic. While numerous studies have been devoted to physical capital investment and technological change (Solow, 1956), to foreign direct investment (De Mello, 1999), to openness of the economy, to investment in human capital (Schultz, 1980), to research and development (Romer, 1986) as a source of economic growth, relatively little attention has been accorded to workers' remittances flows as a potential source of economic growth in developing countries.

This insufficient attention addressed to workers' remittances as a source of growth stems mainly from the fact that these flows were for a long time considered as used for consumption purposes and, therefore, their impact on investment is insignificant or totally absent. The recently growing attention to the importance of remittances stems mainly from the fact that in the majority of developing countries, remittances are mostly profit-driven. Empirical evidence in this regard suggest that these external monetary flows are particularly used for investment where the financial sector does not meet the credit needs of local entrepreneurs (Giuliano and Ruiz-Arranz, 2009), but also because consumed remittances may have a positive effect on growth because of their possible multiplier effect (Stahl and Arnold, 1986).

The recent literature on economics of remittances considers both direct and indirect macroeconomic effects of these funds. A first indirect effect lays on the existence of a robust and negative relationship between output growth and its volatility (Hnatkovska and Loayza, 2003). World Bank (2006) and IMF (2005) findings show that remittances indirectly increase the growth rate by reducing output volatility. Other studies provide evidence suggesting that remittances indirectly increase growth rate by speeding up the development of the financial

sector (Giuliano and Ruiz-Arranz, 2009; and Aggarwal et al., 2011). Empirical results also indicate that remittances may indirectly affect real exchange rate leading to the ''Dutch Disease'' phenomenon, where remittances inflow causes a real appreciation, or postpones depreciation, of the exchange rate. Exchange rates appreciate in countries with large remittances which will in turn hurt the economic growth (Lopez, Molina and Bussolo, 2007; Lartey, Mandelman and Acosta, 2008; Acosta, Lartey and Mandelman, 2009). Two other indirect effects of remittances that received little attention are the effects on human capital formation, through education (Cox-Edwards and Ureta, 2003; Lopez-Cordova, 2005; Yang, 2008; Calero et al., 2009; Adams and Cuecuecha, 2010), and the effect on investment in microenterprises (Massey and Parrado, 1998; Woodruff, 2007; Woodruff and Zenteno, 2007) that are generally seen to have large growth effects.

Studies that consider direct channels through which remittances affect growth regresses the growth rate on remittances using a set of control variables. While numerous studies reported a positive relationship (Stark and Lucas, 1988; Taylor, 1992), others showed that remittances flows negatively impact (Chami et al., 2005) or have no impact on growth (IMF, 2005). Remittances can also reduce labor market participation rates as receiving households opt to live of migrants' transfers rather than by working. Moreover, remittances' effect on growth and poverty might reduce the incentives for implementing sound macroeconomic policy or to institute necessary structural reforms (Catrinescu, Leon-Ledesma, Piracha and Quillin, 2009). These differences in results stem certainly from differences across countries regarding institutional aspects and various structural features, from different empirical frameworks and from various channels involved in such relationship.

There is empirical evidence that remittances contribute to economic growth, through their positive impact on consumption, savings, or investment. In this regard, several studies report supporting evidence on the positive impact of remittances in accelerating investment in Morocco, India and Pakistan (Lucas, 2005) and in Mediterranean countries (Glytsos, 2002). Similarly, Leon-Ledesma and Piracha's (2004) findings show the existence of such relation for 11 transition economies of Eastern Europe during 1990–99, arguing that remittances have a positive impact on productivity and employment both directly and indirectly through their effect on investment. A similar study investigates the effect of remittances on investment in Nigeria and reports that a 10 percent increase in

remittances income raises the probability of investing in housing by 3 % in Nigeria (Osili, 2004).

In a microeconomic context, empirical literature shows that the investment channel is effective in accelerating economic growth in several countries. For instance, Dustmann and Kirchamp (2002) find that the savings of returning migrants is an important source of startup capital for microenterprises. Similarly, in a cross community setting, Massey and Parrado (1998) show that workers' remittances from the United States provide an important source of startup capital in 21% of the new business formations in 30 communities in West-Central Mexico. Woodruff and Zenteno (2001) study reports that remittances are responsible for almost 20% of the capital invested in microenterprises throughout urban Mexico.

Additional studies based on different data sets, alternative specifications and estimation methods would be useful to examine if remittances have any significant growth effects. Our study is a step in this direction. It assesses empirically and analyzes how strong and significant are the relationships between growth and the intermediate variables, mainly consumption, investment and human capital, through which remittances may affect growth.

3   Methodology

In this section, we describe the data and discuss the variables, tools and technique used to assess the effect of remittances on economic growth.

3.1   Data and Variables used in the Study

We use macroeconomic annual data for a sample of 15 MENA countries namely: Algeria, Egypt, Djibouti, Iran, Jordan, Lebanon, Mauritania, Morocco, Oman, Sudan, Syria, Tunisia, Turkey, West Bank and Gaza, and Yemen.[1] It is worth noting that there is no standard list of countries belonging to the MENA zone. Based on the World Bank and the IMF classifications, we adopted the largest

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[1] Most of oil exporter countries were dropped from the sample because they are not concerned by the remittances problem: Bahrain, Libya, Iraq, Kuwait, Saudi Arabia, Qatar and United Arab Emirates.

possible definition of the MENA zone. Our goal is to include all countries concerned by remittances. All statistics were drawn from the GDF-World Bank database. Data covers the period from 1980 to 2009.

Growth is measured by per capita GDP annual growth rate (*pcgrowth*). The set of independent variables includes traditional growth determinants. The investment rate, defined as gross fixed capital formation to GDP, is expected to produce a positive effect on per capita growth, whereas the population growth rate should affect growth negatively (Solow, 1956). Human capital development is measured by the secondary school enrollment rate (*school*). The endogenous growth theory predicts that human capital accumulation should stimulate growth (Romer, 1986). Trade openness is computed as the sum of exports and imports to GDP. Openness accelerates growth by facilitating exchanges of goods and services and by improving capital allocation efficiency. We use credits provided to private sector in percentage of GDP as a proxy for financial development. Recent theoretical and empirical analysis offer strong evidence for a positive effect of financial development on growth (Levine, 1997). Final government spending controls for fiscal policy effect on growth. Conditional convergence theory predicts that massive capital inflows should stimulate growth in countries where initial GDP level is low. Initial GDP is however not suitable for panel data estimations, because it is time invariant within each cross-section. Following recent empirical literature, we use lagged GDP as proxy for initial GDP. Finally we adopt the IMF's definition which considers remittances as the sum of three items: workers' remittances, compensation of employees and migrant transfers.

Descriptive statistics for the model variables are reported in Table 1. They show that remittances represent 6.45% of GDP over the sample period, with a maximum of 64.05% for Lebanon in 1990, a year after the end of the civil war. Remittances exhibit also a great volatility with a standard deviation of 8.17. Per capita average growth rate is around 1.58%. However, we notice that the MENA zone suffers from output volatility with a standard deviation largely greater than the average growth over the sample period (5.38).

The correlation matrix is presented in Table 2. Most results are consistent with theory. Per capita growth is positively and significantly correlated to investment and human capital and negatively correlated to population growth (–0.26). The correlation coefficient between growth and remittances is positive (0.098) but not

Table 1: Descriptive Statistics

	Mean	Median	Max	Min	Std. Dev.	Observations
PCGDP GROWTH	1.578	2.092	34.609	-42.88	5.387	399
LOG (INVESTMENTGDP)	3.082	3.135	3.893	1.7118	0.334	368
LOG (POPULATION)	0.819	0.897	2.414	-3.437	0.516	439
LOG (SCHOOL)	3.867	4.061	4.541	2.114	0.603	243
OPENNESS	69.566	65.464	154.64	11.087	30.400	389
CREDITS	34.530	30.966	93.115	1.615	23.684	391
GOVERNMENT	17.525	16.234	45.297	4.835	6.445	388
REMITTANCES GDP	6.457	3.403	64.048	0.056	8.172	387

significant. Results also show a positive and significant correlation between remittances on one hand and investment, openness, government spending and credits to private sector on the other hand. Another important result is the positive and significant correlation between remittances and school enrollment (0.309). This result suggests that remittances may foster growth by enhancing human capital development.

The relationship between remittances and openness stems from the positive effect that migration produces on trade. While traditional recardian models consider trade and migration as substitutes, new extensions of these models suggest a complementarity relationship under specific conditions (Venables, 1999). The new trade theory, based on models with increasing returns to scale, also demonstrates that migration and trade are complements (Krugman, 1995). Number of empirical studies show that trade and migration are becoming positively and increasingly connected. Hence, the increasing number of migrants accelerates simultaneously remittances and trade between countries.

Table 2: The Correlation Matrix, Model (1)

	PCGDP GROWTH	LOG (INVESTGDP)	LOG (POP)	LOG (SCHL)	OPEN	CRED	GOV	REMITGDP
PCGDP GROWTH	1.000							
LOG (INVESTGDP)	0.153**	1.000						
LOG(POP)	-0.260***	-0.095	1.000					
LOG(SCHL)	0.188***	0.444***	-0.259***	1.000				
OPEN	-0.008	0.157**	0.254***	0.066	1.000			
CRED	0.095	0.238***	-0.244***	0.295***	0.532***	1.000		
GOV	-0.224***	-0.113	0.365***	-0.23***	0.636***	0.175**	1.000	
REMITGDP	0.098	0.242***	0.166**	0.309***	0.421***	0.331***	0.274***	1.000

Note: *** significant at 1 percent; ** significant at 5 percent; * significant at 10 percent

The relationship between remittances and financial development and its impact on growth was the object of an extensive empirical literature. Two different conclusions emerge from this literature. First, the remittances effect on growth is stronger in countries with developed financial systems. Financial development leads to an efficient use of these capital inflows (Bettin and Zazzaro, 2009). A second set of results suggest that remittances enhance growth in countries with less developed financial systems. In this case they simply substitute to the existing financial system by offering an alternative source of funding to small investors (Giuliano and Ruiz-Arranz, 2009).

In both cases remittances and financial development indicators will show positive correlation. In the first case developed financial systems are more attractive for remittances, whereas in the second case remittances will promote financial development through financial inclusion: number of new small investors that beneficiated from remittances will integrate the financial system after the implementation of their projects (Toxopeus and Lensink, 2007).

The correlation between remittances and government spending can be seen explained in two different ways. First, more remittances from workers towards their home countries may allow recipient households to send children to school rather than to the labor market. Therefore, more remittances need more public

spending in education, health and infrastructure to meet the growing needs of the population. Second, from an economic policy perspective, government spending, mainly in infrastructure, can been seen as a prerequisite to fostering economic development in less developed countries by developing the needed public investment to go along with private investment. In both cases, remittances inflows to developing countries require and/or stimulate public investment which increases government spending.

Finally, remittances may affect school enrollment mainly by increasing the family's revenue. The revenue channel may act in two complementary ways. First, additional revenue will help low income families to finance their children's schooling expenses. Second, low income families often enforce their children to work. Hence, the additional revenues offered by remittances may contribute to reduce the children's work time, which enables them to dedicate more time to school and to follow their studies in better conditions.

3.2   Model Specification and Estimation Methodology

To examine the effect of remittances on economic growth, we estimate a linear regression model in the following form:

$$Growth_{it} = \alpha_0 + \alpha_1 Rem_{it} + \alpha_2 X + \mu_i + \varepsilon_{it} \tag{1}$$

where growth is represented by per capita GDP growth rate; *Rem* stands for remittances to GDP; *X* is a matrix composed of the control variables mentioned above; μ_i is a country specific effect and ε_{it} is the error term. [2]

We estimate model (1) using three different methods. First, we run regression using the standard Ordinary Least square method (OLS). According to Hsiao (1986), pooled OLS yields biased and inconsistent coefficient estimates because omitted cross-section specific variables may be correlated with the explanatory variables. The assumption of zero unobservable individual effect is too strong given the large heterogeneity across countries. Thus, we include country specific effects in the model. The Hausman test will be used to choose the best specification among the fixed and random effects models. Finally, we run a third

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[2]Statistical tests show that fixed time effects are not relevant for the different models.

set of regressions using System Generalized Method of Moment (SGMM), which corrects for measurement errors and simultaneity problems. Measurement errors may concern remittances as well as human capital and financial development. The last two variables cannot be measured with precision because they include qualitative dimensions. Simultaneity problems concern financial development and remittances. It is largely admitted that the size of an economy is one of the main determinants of the financial system's size. In this case, growth will accelerate financial development. As far as remittances are concerned, recessions may encourage migrants to send more money to their families if remittances are motivated by altruism. If remittances are motivated by self-interest, then they may rise when growth rate accelerates to profit from high returns on investment. In both cases, remittances can be largely influenced by the growth rate. The SGMM method corrects for these problems and offers robust results compared to the two first set of estimations. Thus, conclusions will be mainly based on this method's results.

4   Results and Discussion

Table 3 provides the empirical results of our first set of regressions of model (1) using the three methods mentioned above. According to the OLS results, population growth, trade openness and government spending are the only significant independent variables. The remittances' coefficient is positive, but not significant in both cases (0.0801).

More conventional results are obtained when we control for country fixed effects. Results in column 2 show that investment and human capital both produce positive and significant effects on growth. However, the coefficient assigned to remittances is still positive and not significant (0.085). The SGMM results are the most consistent with theory. Investment, human capital and openness produce positive effects on growth. Growth, however, slows down when a population grows fasters. Credits to private sector and government spending are the only non-significant independent variables. Finally, remittances produce positive and significant effect on growth (0.166). This effect is quite weak compared to investment and human capital effects, but is much stronger than that produced by openness.

Table 3: Model (1) Estimation Results, Dependent Variable pcgrowth

	OLS	Random Effects	SGMM
Log (PCGDP(-1))	0.019	-16.088***	-8.159***
	[0.031]	[-4.064]	[-3.280]
Log (INVESTMENTGDP)	-0.099	3.208**	3.035**
	[-0.086]	[-2.054]	[2.441]
Log (POPULATION)	-3.275***	-4.397***	-2.975**
	[-3.133]	[-2.972]	[-2.423]
Log (SCHOOL)	-0.021	5.588***	3.938***
	[-0.018]	[3.039]	[2.954]
OPENNESS	0.034**	0.081**	0.049*
	[2.210]	[2.323]	[1.682]
CREDITS	-0.013	0.064**	0.026
	[-0.705]	[1.998]	[1.019]
GOVERNMENT	-0.249***	-0.144	-0.144
	[-2.873]	[-1.215]	[-1.495]
REMITTANCESGDP	0.081	0.085	0.166**
	[0.674]	[0.743]	[2.196]
Constant	6.152	84.561***	
	[1.315]	[3.197]	
Observations	198	198	182
Cross-sections	15	15	15
Rsquared	0.132	0.296	-
AR(1) test	-	-	0.004
AR(2) test	-	-	0.768
Sargan stat.	-	-	25.343
Sargan p-value	-	-	0.884

Note: *** significant at 1 percent; ** significant at 5 percent; * significant at 10 percent; Robust standard errors in parentheses.

Empirical and theoretical literature stress on investment and consumption channels to explain how remittances may influence growth. To test which of these two channels is the most effective in our case, we introduce two models capturing

the investment and consumption behaviors respectively. Model (2) includes remittances among the independent variables explaining investment behavior:

$$Investment_{it} = \beta_0 + \beta_1 Rem_{it} + \beta_2 X_1 + \mu_i + \varepsilon_{it} \qquad (2)$$

Where *Investment* is represented by investment to GDP of country *i* at period *t*. The matrix X_1 is composed of per capita growth rate, which stands for the accelerator theory, and the lending interest rate as a proxy for capital cost. Per capita growth and the lending rate are expected to produce respectively positive and negative effects on investment. Model (3), describes the consumption behavior:

$$pcconsumption_{it} = \gamma_0 + \gamma_1 Rem_{it} + \gamma_2 X_2 + \mu_i + \varepsilon_{it} \qquad (3)$$

pcconsumption is real per capita consumption in country *i* at period *t*. In addition to real per capita *GDP*, the matrix X_2 includes the deposit interest rate to control for the tradeoff between consumption and saving. According to literature, countries with higher per capita GDP have higher consumption rates. A higher deposit rate can produce a negative or a positive effect on consumption, depending on which of the traditional substitution and revenue effects is stronger.

The correlation matrix of variables included in models 2 and 3 is presented in Table 4. We can notice a high positive and significant correlation between consumption and remittances (0.684).

Tables (5) and (6) report estimation results of the investment and consumption models respectively. The SGMM results show that remittances produce a positive and significant effect on investment (0.132). Investment depends also on per capita growth rate. Remittances effect on consumption is much stronger (1.554). This result indicates that the most important part of remittances is consumed. Consumption depends also positively on per capita real GDP and negatively on deposit interest rate.

Since remittances produce positive effects on both consumption and investment, the channel through which economic growth is affected is not obvious. To investigate which of the consumption and investment channels explains the remittances' impact on growth, we proceed to a country by country correlation

analysis. Results in Table 7 show that correlation between investment and remittances varies considerably between countries. While in countries such as

Table 4: Correlation Matrix, Models (2) and (3)

	Investment	Consumption	PCGDP growth	Real PCGDP	Lending rate	Deposit rate	Remittances
Investment	1.000						
Consumption	0.035	1.000					
PCGDP growth	0.068	0.094	1.000				
Real PCGDP	-0.209	-0.337**	0.192	1.000			
Lending rate	0.078	0.421***	0.378***	-0.201	1.000		
Deposit rate	0.132	0.165	0.378***	-0.031	0.755***	1.000	
Remittances	0.217	0.684***	0.285**	-0.041	0.275*	0.254*	1.000

Table 5: Model (2) Estimation Results, Dependent Variable Investmentgdp

	OLS	Random Effects	SGMM
PCGDPGROWTH	0.043 [0.399916]	0.045 [0.511]	0.146** [2.301174]
LENDING RATE	0.193** [2.024]	0.094 [0.938]	0.013 [0.275]
REMITTANCESGDP	0.048 [0.809]	0.272 [1.080]	0.132** [2.205]
Constant	20.084 [17.699]	22.080*** [16.805]	
Observations	216	216	194
Cross-sections	13	13	13
Rsquared	0.046	0.005	-
AR(1) test	-	-	0.000
AR(2) test	-	-	0.879
Sargan stat.	-	-	24.565
Sargan p-value	-	-	0.598

Note: *** significant at 1 percent; ** significant at 5 percent; * significant at 10 percent. .

Table 6: Model (3) Estimation Results, Dependant Variable Real pcconsumption

	OLS	Random Effects	SGMM
PCGDPREAL	0.439***	0.183***	0.041***
	[18.800]	[10.871]	[33.379]
DEPOSIT RATE	18.535***	-0.034	-3.163***
	[12.930]	[-0.020]	[-31.694]
REMITTANCESGDP	34.543***	0.833	1.554**
	[5.574]	[0.175]	[2.361]
Constant	-43.134	934.148***	
	[-0.732]	[6.731]	
Observations	214	214	180
Cross-sections	14	14	14
Rsquared	0.799	0.589	-
AR(1) test	-	-	0.000
AR(2) test	-	-	1.000
Sargan stat.	-	-	138.563
Sargan p-value	-	-	0.375

Note: *** significant at 1 percent; ** significant at 5 percent; * significant at 10 percent; Robust standard errors in parentheses.

Oman, Egypt and Djibouti remittances are highly correlated to investment, countries such as Iran, Algeria and Yemen show a strong negative correlation between remittances and investment. This heterogeneity also stands for the growth-remittances correlation. Moreover, six of the seven countries showing positive correlation between investment and remittances are concerned by a positive correlation between growth and remittances. These results suggest that the remittances' effect on growth is mainly due to their effect on investment, and that this channel is valid only for a restricted group of countries. Along with these results, we split our sample into two groups according to the remittances-investment mean correlation. We call *high correlation* the group composed of Oman, Egypt, Djibouti, Syria, Morocco, Jordan and Sudan, and *low correlation* the group composed of the eight remaining countries.

Table 7: Remittances, Investment and Growth Correlations

Country	Investment / Remittances		Country	pcgrowth / remittances
Oman	0,764		Lebanon	0,744
Egypt	0,624		Jordan	0,342
Djibouti	0,546		Djibouti	0,340
Syria	0,356		Syria	0,277
Morocco	0,320		Sudan	0,196
Jordan	0,258		Algeria	0,124
Sudan	0,248		Oman	0,114
Mauritania	-0,019		Yemen	0,091
Turkey	-0,143		Egypt	0,064
WBGaza	-0,173		Tunisia	0,007
Tunisia	-0,350		Morocco	0,003
Lebanon	-0,395		Turkey	-0,097
Yemen	-0,429		Mauritania	-0,150
Algeria	-0,448		Iran	-0,592
Iran	-0,689		WBGaza	-0,636
Sample mean	0,031		Sample mean	0,055

We estimate model (1) for each group of countries. SGMM results are summarized in Table 8.[3] Estimation outcomes show that investment, population growth, human capital and financial development effects on growth are consistent with theory for both groups of countries. However, remittances produce a positive and significant effect on growth only for the *high correlation* group. Remittances coefficient for *low correlation* countries is negative and not significant (–0.016). The results also show that the remittances' effect on growth for the high

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[3] In the remaining paragraphs we will focus only on SGMM estimates.

correlation group (0.238) is more important than the effect recorded for the whole sample (0.166, Table 1).

To get further support for these results, we tested for investment and consumption channels by running regressions of models (2) and (3) for each group of countries. Results are reported in Tables 9 and 10. Our findings show strong evidence to support that the investment channel is operational only for the high correlation group, while the consumption channel is valid for both groups of countries, suggesting that remittances may boost economic growth when invested.

Table 8: Remittances and Growth: Subsample Results

	High correlation countries	**Low correlation countries**
Log (PCGDP(-1))	-5.839**	-26.493***
	[-2.624]	[-4.487]
Log (INVESTMENTGDP)	5.429***	7.786***
	[6.787]	[2.709]
Log (POPULATION)	-3.462***	-3.904**
	[-3.879]	[-2.323]
Log (SCHOOL)	3.662***	9.946***
	[3.761]	[2.831]
OPENNESS	-0.044***	0.219***
	[-5.079]	[4.874]
CREDITS	0.073**	0.084**
	[2.445]	[2.593]
GOVERNMENT	-0.198***	-0.455***
	[-2.668]	[-2.731]
REMITTANCESGDP	0.260***	-0.016
	[2.679]	[-0.210]
Observations	97	85
Cross-sections	7	8
AR(1) test	0.000	0.000
AR(2) test	0.834	0.563
Sargan stat.	35.422	41.979
Sargan p-value	0.276	0.135

Note: *** significant at 1 percent; ** significant at 5 percent; * significant at 10 percent; Robust standard errors in parentheses.

Table 9: Remittances and Investment, Subsample Results

	High correlationcoutries	**Low correlation countries**
PCGDPGROWTH	0.146***	0.020
	[16.916]	[0.233]
LENDING RATE	0.087	-0.060
	[5.236]	[-0.762]
REMITTANCESGDP	0.077***	0.089
	[2.917]	[0.882]
Observations	117	72
Cross-sections	6	7
AR(1) test	0.000	0.000
AR(2) test	0.962	0.408
Sargan stat.	90.688	23.648
Sargan p-value	0.545	0.649

Note: *** significant at 1 percent; ** significant at 5 percent; * significant at 10 percent; Robust standard errors in parentheses.

Table 10: Remittances and Consumption, Subsample Results

	High correlation countries	**Low correlation countries**
PCGDPREAL	0.040***	0.034***
	[5.995]	[37.428]
DEPOSIT RATE	-4.190***	-3.821***
	[-3.499]	[-44.713]
REMITTANCESGDP	2.935**	1.025***
	[2.099]	[3.260]
Observations	102	78
Cross-sections	6	8
AR(1) test	0.000	0.000
AR(2) test	1.000	1.000
Sargan stat.	53.924	45.367
Sargan p-value	0.291	0.581

Note: *** significant at 1 percent; ** significant at 5 percent; * significant at 10 percent; Robust standard errors in parentheses.

Countries where remittances are consumed do not benefit from any additional growth. Hence, we would have noticed a more important effect of remittances on growth for the whole sample if the low correlation countries have used these funds for investment purposes instead of consumption.

Our findings provide evidence that remittances produce a larger effect on consumption for high correlation countries (2.936 of the first group against 1.026 for the second group). This result suggests also that, when used for investment, remittances will enhance growth, generate more revenues and produce an important increase in consumption. Low correlation countries will gain to switch towards an investment use of remittances because it will lead to both growth and consumption acceleration.

Three main reasons may explain why consumed remittances do not produce any effect on growth. First, remittances may act as compensatory revenues which role is just to stabilize households' consumption patterns (Chami et al., 2005). Second, remittances can cause adverse behavioral changes at the household level that may lower their development impact relative to income from other sources. Studies supporting this kind of relationship argue that a significant portion of remittances flows are spent in "status-oriented" consumption and that a smaller part goes into economically unproductive saving and investments, mainly in housing, land and jewelry (Chami et al., 2005). Finally, remittances can reduce labor market participation rates as receiving households opt to live of migrants' transfers rather than by working (Chami et al., 2005). In all three cases remittances will produce no significant effect on growth.

As mentioned above, we notice a positive and significant correlation between remittances and human capital (0.309, Table 2). An explanation of this result is that a significant part of remittances may be used to finance schooling expenses which low income families cannot afford. Bansak and Chezum (2009) showed that in Nepal remittances had a significant effect on the families' decision to invest in their children's scholarship. Yang (2008) showed that remittances influence positively schooling expenses in Philippines. A part of the recent empirical literature focused on assessing the remittances effect on different schooling indicators. Cox-Edwards and Ureta (2003) report a high positive correlation between remittances and student retention rates in El Salvador' schools. Examining data from 2400 Mexican municipalities, Lopez-Cordova (2005) finds that remittances contribute to reduce analphabetism by 40% and to promote school

enrollment by 4%. Based on Mexican data, Hanson and Woodruff (2003) find that remittances extended the duration of studies by 0.7 to 1.6 years. In Indonesia, Painduri and Thangavelu (2011) found that remittances increased the probability of observing children continuing their studies by 23%.

Higher school completion rates will enhance human capital development and foster growth in the long run. Along with these ideas, we ran a last set of regression to check whether remittances can enhance growth by encouraging human capital accumulation. We first eliminated secondary school enrollment from the set of independent variables. Model (1) estimation results are reported in the first column of Table 11. Estimation results show that the remittances coefficient becomes higher (0.186) when no human capital indicator is included in the regression. This result indicates that remittances affect economic growth through human capital development. The second column of Table 11 reports estimation results when remittances are dropped from the independent variables set. In this case, results show a lower coefficient of school enrollment, which supports the idea that a part of the human capital effect on growth is explained by remittances. We finally introduce an interaction variable in the model, "remittances×school", to control for complementarity between remittances and human capital. Results in column 3 show that the interaction variable is positive and significant, which confirms our previous conclusions. Therefore, results in Table 11 provide strong evidence for a human capital channel in addition to the investment channel.

To get final evidence for this channel, we estimate the following model, which considers that school enrollment can be explained by remittances in addition to per capita GDP:

$$school_{it} = \lambda_0 + \lambda_1 \, Rem_{it} + \lambda_2 \, pcgdp + \mu_i + \varepsilon_{it} \qquad (4)$$

Model (4) results are reported in Table 12. We notice that remittances produce a positive and significant effect on secondary school enrollment, which is consistent with conclusions driven from Table 11. Human capital seems to be an effective channel through which remittances stimulate growth in MENA countries.

Table 11: Remittances and Growth: the Human Capital Channel

Log (PCGDP(-1))	-6.890***	-0.539***	-9.686***
	[-3.544]	[-4.831]	[-3.310]
Log (INVESTMENTGDP)	2.773**	2.266404*	2.901**
	[2.522]	[1.830]	[1.990]
Log (POPULATION)	-4.500***	-4.293***	-3.219**
	[-4.737]	[-2.684168]	[-2.212]
Log (SCHOOL)		3.651**	4.008***
		[2.214]	[2.664]
OPENNESS	0.057***	0.089***	0.050
	[2.935]	[3.155]	[1.492]
CREDITS	0.024	0.055*	0.037
	[1.456]	[1.823]	[1.345]
GOVERNMENT	-0.185**	-0.119	-0.151
	[-2.188]	[-1.051]	[-1.279]
REMITTANCESGDP	0.186***		
	[2.837]		
REMITTANCESGDP*LOG(SCHOOL)			0.053***
			[2.693]
Observations	312	186	182
Cross-sections	15	15	15
AR(1) test	0.000	0.000	0.000
AR(2) test	0.301	0.590	0.724
Sargan stat.	18.455	13.635	14.456
Sargan p-value	0.888	0.692	0.634

Note: *** significant at 1 percent; ** significant at 5 percent; * significant at 10 percent; Robust standard errors in parentheses.

Table 12 : Remittances and Human Capital: Dependent Variable
Secondary School Enrollment

PCGDP	-0.001
	[-1.413]
REMITTANCESGDP	0.023**
	[2.041]
Observations	133
Cross-sections	15
AR(1) test	0.000
AR(2) test	0.000
Sargan stat.	11.853
Sargan p-value	0.374

Note: *** significant at 1 percent; ** significant at 5 percent; * significant at 10 percent;
Robust standard errors in parentheses.

5   Conclusions and Policy Recommendations

This paper has analyzed both growth effects of remittances and the channels through which they may affect economic growth. Remittances economics stress on investment and consumption channels to explain how remittances may influence growth. In this regard, we estimate several specifications to examine the relevance of these two channels in MENA countries.

Our results show that remittances produce a positive and significant effect on growth. This effect is relatively weak because most of the remittances are directed towards consumption. A country by country analysis suggests that all countries do not make the same use of remittances. Moreover, results support the fact that remittances effect on growth is due to the investment channel. This conclusion concerns only a restricted group of countries. Remittances do not produce any significant effect on growth in countries where they are used for consumption. Moreover, when remittances are allocated to finance new projects they will produce a larger effect on consumption due to the additional revenue generated by investment.

From an economic policy perspective, governments should implement policies encouraging the investment use of remittances to foster their effect on growth.

Empirical results also suggest that remittances can encourage human capital accumulation. Therefore, human capital seems to be an effective channel through which remittances stimulate growth in MENA countries, in addition to the investment channel.

These results can add to the body of comparative evidence available in this issue and relevant for countries at varying stages of development.

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