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THE RELATIONSHIP BETWEEN ECONOMIC GROWTH AND REMITTANCES IN THE PRESENCE OF CROSS-SECTIONAL DEPENDENCE

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ABSTRACT

This paper reexamines the relationship between migrant remittances and economic growth using the most recent panel data (1977-2012) for some of the largest recipient countries of foreign remittances in the world namely, Bangladesh, India, Pakistan and the Philippines. A cross-sectional dependence test (CD) was employed which confirms the presence of cross sectional dependence in the panel. We employ CIPS panel unit root test that accounts for cross sectional dependence to test the stationarity of data. The long run relationship between economic growth and remittance was confirmed by the Panel Pedroni and Westerlund cointegration tests. Then, the Pooled Mean Group (PMG) regression technique was applied to estimate the short- and the long-run relationship between the two variables while controlling for country size and heterogeneity. The results indicate a highly significant long-run positive relationship between remittance and economic growth in these countries. However, there is an insignificant positive association between them in the short run. The error correction term in the short run is -0.037 suggesting that approximately 3% of the deviations in the short run from the long-run equilibrium are corrected each year. The overall results support the argument that remittances are playing increasingly important role for these countries' economies and as such, they should continue with their pro-remittance policies looking combined with diversifying their manpower exports. Although, the findings are consistent with most of the existing literature that support the positive role of migrants' remittances in spurring economic growth, scope exists for future research to identify various channels through which remittances impact not only growth but also other macro variables.

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INTRODUCTION

One of the major sources of foreign exchange for developing countries are their migrants' remittances. In the last three decades, migrants' remittances increased by more than 20 times. Further evidence shows that in 2010, total worldwide remittance flows exceeded US$ 440 billion of which US$ 325 billion were transmitted to developing countries (Nyamongo et al. 2012). This figure rose to US$ 350 billion in 2011 (World Bank, 2011),

an amount that far exceeded the volume of official aid flows and constitute more than 10% of the GDP in many developing countries. It is also evident that remittances to developing countries in 2009 were nearly three times the amount of foreign aid and almost as large as foreign direct investment flows to developing countries. This figure shows only the official statistics while it is very likely that more remittances in billions were transferred through unofficial channels. Developing countries received about 75% of all remittances and supplied 80% of global migrant workers in 2010.The remittance flow to East Asia and South Asia have increased from US$ 316 billion in 2009 to US$ 406 billion in 2012 (Imai, et al. 2014; World Bank, 2012). It is projected that this figure will climb to US$ 434 billion by 2015. These money transfers have been and will continue to be a major source of capital inflows for these small economies and are expected to reach millions of households in the next decade. The importance of such flows and the potential multiplier effect cannot be understated for these countries. Remittances have proved to be reasonably stable, anty-cyclical and more reliable source of capital flows for these countries. The staggering growth in these flows into developing countries prompted researchers to investigate the remittances' short run and long run impacts on the economic development of remittance receiving countries.

Within South Asia and Southeast Asia, Bangladesh, India, Pakistan and the Philippines have been the major sources of migrant workers who are generally spread worldwide and in particular, to Middle Eastern countries. These countries have experienced a remarkable increase in remittance flows in the last three decades. India is now the world's largest recipient of remittances earning 55.5 in 2010 (Chowdhury, 2011). The Philippines is the 4th largest (US$21.3 billion), Bangladesh (US$11.1 billion) the 5th and Pakistan (US$10.56 billion), the 6th largest remittance recipients in the world (Chowdhury, 2011). The remittance inflow to these countries accounts for more than 30% of total remittances to developing countries (Imai, et al, 2014). Bangladesh's, remittances account for 2% of global remittances and these remittances grew by a staggering 24% during 2009 but during the global financial crisis (GFC), the number of migrant workers declined by 7% as people returned home. Currently, remittances contribute more than 12% of Bangladesh's GDP (Chowdhury, 2011).

During the 1990's, a decline in remittance inflows was a major contributor to increasing poverty in Pakistan (Siddiqui and Kamal, 2002). Remittance flows are the second largest source of external funding for Pakistan behind FDI and have already proved to have played an important role in economic development. They contribute significantly to foreign exchange reserves which in turn significantly stabilize its financial sector (Qayuum et. al. 2008). Pakistan's remittance earning increased from US$1 billion in 2000 to US$10 billion in 2010. Similar to Bangladesh, Pakistan after the GFC witnessed a temporary 23% growth in remittances in the first half of 2009 as many workers returned home.

India experienced a period of stagnation in remittance inflow during the period from 1980 to 1991 after which these grew significantly. In 2009, India's remittance were US$54 billion and increased to US$55 billion in 2010. The Philippines has a long history of sending workers abroad. Its remittance earning constitutes more than 10% of its total GDP (Ang, 2007). In 2009, the number of Filipinos living and working abroad exceeded 10% of its total population. Called Overseas Filipino Workers (or OFWs), they are

recognized as modern heroes in the Philippines. The Philippines earned US$17.4 billion of remittance income in 2009, a 3.8% annual growth (Bayangos and Jansen, 2011).

It is clearly evident that Bangladesh, India, Pakistan and the Philippines contribute a large proportion of the world's migrant workers. Only a few studies involving these countries have been conducted to examine the remittance and economic growth interaction. This paper is an attempt to fill this gap and it uses the most recent data (1977-2012) available.

The rest of the paper is structured as follows; Section 2 discusses previous studies while section 3 is dedicated to data and methodology. The results are discussed in section 4 and the paper concludes with summary and conclusions in section 5.

PREVIOUS STUDIES

Remittances impact growth in three ways (Barajas et al., 2009). First, by enhancing the rate of capital accumulation, remittances not only increase the rate of physical and human capital, but also lower the cost of capital in the recipient country. This may stabilize the economy and reduce the volatility. The second effect is related to the resulting change in the labor force growth. Remittances may have a negative impact on the labor force participation as the remittance income is substituted for labor income. Third, remittances impact the efficiency of investment by affecting TFP growth. Most of the country-level studies rely on household data as insights into how remittances impact households at the micro level. Existing macro empirical literature on remittances mainly focus on growth, poverty, inequality and output growth volatility. Most of the studies on remittances use household, cross country and panel data to examine the effects of remittances.

Three main strands of economic literature exist on the role of remittances. Recent empirical studies have generally argued that remittances have a positive effect on economic growth in developing countries. Imai et al. (2014) most recently investigated the empirical link between economic growth, remittances and poverty using annual panel data for 24 Asian and Pacific countries. The GMM-IV model was used and they found that remittances spur economic growth and reduce poverty in the region. Marwan et al. (2013) in a time series study for Sudan used Johansen Cointegration technique to investigate the link between export, aid, remittances and growth and found that there is a long-run positive relationship between growth, export and remittance. Salahuddin (2013) used the panel OLS method to estimate the growth effects of remittances in Bangladesh, India, Pakistan and the Philippines and found positive relationship. But the study failed to find any long-run relationship. Rao and Hasan (2011) applied panel cointegration technique in a study of an unbalanced panel of 40 countries and analyzed the direct growth effects of remittances and the channels through which remittances affect growth. Their findings suggest that although there have been short to medium term transitory growth effects, there are no long run growth effects of remittances. The findings are consistent with those of Giudiano and Ruiz Arranz (2009).

Naiditch and Vrancianu (2010) in a study of 25 countries from Eastern Europe and Central Asia showed that an increase in migrant income lead to an increase in invested not consumed remittances. Eckstein (2010) illustrated how and why a full understanding of remittances rests on examining dynamics at both the individual, societal and institutional state level. It also points to the importance of understanding the

prospects of remittances in historical context with particular reference to Cuba. Paterno and Bugamelli (2009) showed that worker's remittances help reduce the probability of current account reversals. They recommend that efforts to reduce the cost and the risk of transferring remittances across countries should be on our political agenda both at national and international levels.

Chen (2009) developed a migration model to investigate the extent to which migration is dependent upon prior average human capital as that threshold is a crucial determinant of economic growth. The results suggested that if households perceive that there is high probability of migration in the future, they will invest more in their education enriching human capital which will eventually induce higher probabilities of migration. Pradhan et al. (2008) confirmed positive growth effect of remittance in a panel of 39 developing countries. Another finding of the same study suggests that international migration and remittances may be endogenous to poverty meaning variations in poverty cause changes in both the share of migrants going to work abroad and in the level of remittances sent home. Remittances have positive effect not only on level and growth rates of GDP per capita but also on the rates of savings and public expenditure (Ziesemer, 2010). Ahmed and Walmsley (2009) show that remittances increase net welfare in India.

Despite the fact that most of the studies advocate remittances' positive effect in developing countries, critics argue that growth effects of remittances is either negative or at best zero. Guha (2013) applied the Dutch Disease theory to explain the effects of remittances on the economy and introduced a micro-macro framework to establish channels of transmission of remittances through the economy. Their findings highlight the fact that remittances may lead to real exchange rate appreciation leading to sectoral production reallocation. The study further argues that multiple shocks in remittances may take the economy towards a negative growth path resulting from the weakening of the traded sector. Barajas et al. (2009) examined the growth impact of remittances in 84 recipient countries based on annual observations during 1970-2004 and found a negative effect on growth.

Chami et al. (2003) in a study on 113 countries found a negative relationship between remittances and economic growth as was found by Rajan and Subramaniam (2005). In another study on 114 countries, Catrinescu et al. (2009) found neither positive nor negative relationship between remittances and growth. Also the findings of Rahman's (2009) study on Bangladesh, Pakistan, India and Sri Lanka appeared inconclusive. In a discussion paper, Siddique et. al (2010) showed that growth in remittances does not lead to economic growth in Bangladesh. An IMF study in 2005 on 101 countries found no statistical link between remittances and economic growth. The above discussion on the empirics on remittances and economic growth indicates that the effects of remittances on economic growth are mixed.

Although plenty of literature on remittance-growth relationship exist now, the volume of country level studies is still relatively scarce. Some country-level time series studies also support the positive effect of remittances (Salahuddin and Alam, 2011; Ahmed and Salahuddin, 2009 for Bangladesh, Qayyum et al., 2008 and Javid et al. 2012 for Pakistan, Ang, 2007 for the Philippines). Paul, et al. (2011) showed that output alone determined long run movements in remittances in a positive direction in the last 35 years in Bangladesh.

There have been very few studies that investigated the effect of remittances on poverty. Richard et al. (2013) uses time series cointegration technique for Ghana to investigate the relationship between remittances and poverty reduction and investment on education, housing and health. His findings support strong role of remittances in reducing poverty and enhancing investment in health, education and housing.

Ziesemer (2012) used a panel of countries with per capita income less than US$1200 and studied the direct and indirect impacts of remittances . He finds that the total effect of remittances on levels and growth rates of GDP per capita, investment and literacy are positive. Vargas et al. (2009) used annual data of Asia and examine the effects of remittances on growth and poverty. His findings indicate that remittances spur economic growth and reduce poverty. Adams Jr. and John Page (2005) showed that international migration and remittances have a strong, statistically significant impact on reducing poverty in the developing world. Gupto, Patillo and Wagh (2009) analyzed the effect of remittances at the aggregate level in sub-Saharan Africa. The study also found that remittances have a direct poverty-mitigating effect and a positive impact on financial development. Mamun and Nath (2010) suggested that at household level, remittances reduce poverty while they have significant effect on macro variables in Bangladesh economy. Remittances contribute towards financial deepening also. Gupta et al. (2009) used random effect and fixed effect models for a panel of Sub-Saharan African countries and showed that remittances have direct poverty mitigating effect and it promoted financial development as well. Chowdhury (2011) using time-series cointegration and vector error correction mechanism for Bangladesh found that remittances contribute positively towards the development of financial system in the country.

Remittances also help reduce consumption instability in developing countries. Combes and Ebeke (2011) used a System GMM-IV model for a cross sectional panel of 87 developing countries and found that remittances significantly reduce consumption instability and its effect is even stronger for financially less developed countries. Remittances also increase the capacity to cope with natural disasters and macroeconomic shocks.

A summary of the above discussion reveals that remittances impact growth through various channels. The literature on remittances is yet to reach a consensus about its impacts on the economy. Although Bangladesh, India, Pakistan and the Philippines constitute 30% of the total global remittances flowing into the developing countries, literature involving these countries are still inadequate and a few are ended up with different conclusions.

The current study is an attempt to enrich the literature by revisiting remittance-growth nexus in the region. Nevertheless, this study methodologically contributes by estimating this relationship in the presence of cross sectional dependence which to the best of our knowledge, no other study has so far, addressed. Since the labor market for migrants for all these countries are mostly saturated in the middle eastern countries and there exist significant structural similarities among these economies, there is high potential for cross sectional dependence. The current study also boasts a methodological contribution by using the most recent data (1977-2012) with alternative specification and application of a very advanced econometric technique hardly used in the area.

DATA AND METHODOLOGY

Data

Data on remittances and GDP were obtained from the World Bank Development Indicators Database, 2013 published by the World Bank (World Bank, 2013) for the period from 1977 to 2012 for this study. GDP is estimated in 2000 constant US dollar prices while remittances are assessed in current US dollars. Logarithmic transformation of both variables was done to account for heteroscedasticity and other estimation problems.

Methodology

Based on Rao and Hassan (2012a,b), we model output as a function of remittance as follows;

$$y = f(A, REM) \quad (1)$$

Assuming Cobb Douglas type production function in the augmented Solow model (Solow, 1956) we can write, $y_{it} = (A.\ REM_{it}{}^{\beta})$ or

$$\ln y_{it} = \beta_0 + \beta_1 REM_{it} + \varepsilon_{it} \quad (2)$$

where, y_{it} is the GDP per capita growth rate and REM is remittances. β_0 is the intercept and β_1 is coefficient of remittance. εit is the disturbance term. Subscripts i and t denote countries and time respectively.

Estimation Procedures

After obtaining the descriptive statistics, we conduct a cross sectional dependence test to see whether the countries are cross sectionally dependent. Having found the presence of cross-sectional dependence in the panel, an appropriate panel unit root test (CIPS) that accounts for cross-sectional dependence is performed to examine whether the series are stationary or not, iii. This is followed by Pedroni and Westerlund cointegration tests to verify the long run relationship among the variables. Finally, PMG estimation technique is employed to examine the short- and the long-run relationship among the variables and to estimate the speed of convergence of short run disequilibrium towards the long-run equilibrium.

Tests for Unit Roots

Usually, the macroeconomic variables are characterized by unit root process (Nelson and Plosser, 1982) when sample period in the panel is quite long (in our case 35 years). Therefore, it is necessary to check the integration order of the variables before examining any long run relationship. Hence, unit root tests for all variables in our dataset are imperative. Considering that the panel might have cross sectional dependence, we apply

the cross-sectional dependence (CD) test developed by Pesaran (2004) to the panel. Pesaran (2004) defines CD statistic as;

$$CD = \left[\frac{TN(N-1)}{2}\right]^{1/2}\bar{\hat{\rho}},$$

where

$$\bar{\hat{\rho}} = \left(\frac{2}{N(N-1)}\right)\sum_{i=1}^{N-1}\sum_{j=i+1}^{N}\hat{\rho}_{ij}$$

in which $\hat{\rho}_{ij}$ is the pair-wise cross-sectional correlation coefficients of residuals from the conventional ADF regression, T and N are sample and panel sizes respectively.

Panel Cointegration Test

Pedroni Cointegration test

Since results from the CIPS unit root test indicate cointegrating relationships (table 2) in our dataset and because our primary focus is to investigate the long run relationship between remittances and growth, we conduct several panel cointegration tests suggested by Pedroni (1997). The key advantage of Pedroni cointegration test over other similar tests is that it controls for country size and heterogeneity for the cointegration vector to vary across different sections of the panel. Pedroni (1997) provides seven panel cointegration statistics for seven tests. Four of those are based on the within-dimension tests while the rest three are based on the between-dimension or group statistics approach.

Westerlund Coingration test

Westerlund (2007) develops four new panel cointegration tests against the null of no-cointegration. These tests are based on structural rather than residual dynamics; consequently they do not require common-factor restriction. The optimum lag lengths and leads for each series were chosen by using the Akaike Information criterion (AIC). Since all the series of interest are integrated at I(1), the study applies the Westerlund (2007) cointegration test for variables under first-difference with the null of no cointegration .

Pooled Mean Group Regression (PMG)

The literature, represented by Pesaran and Smith (1995), Pesaran (1997) and Pesaran and Shin (1999), show that simple modifications to standard methods can render consistent and efficient estimates of the parameters in a long-run relationship between both integrated and stationary variables and that inference on these parameters can be conducted using standard tests. The main requirement for the validity of this methodology is that, first, there has to exist a long-run relationship among the variables

of interest, and second, the dynamic specification of the model be sufficiently augmented so that the resulting residual is serially uncorrelated. Pesaran et al. (1999) label this as the "autoregressive distributed lag (ARDL) approach" to long-run modeling. The application of this method to our analysis is justified in that it addresses the small sample bias as in our case in addition to estimating the short- and the long-run relationship between the variables. In order to comply with the requirements for standard estimation and inference, a long-run growth regression equation is embeded into an ARDL (*p, q*) model. In error correction form, this can be written as follows:

$$\Delta(y_i)_t = \sum^{p-1} \gamma^i_j \Delta(y_i)_{t-j} + \sum^{q-1} \delta^i_j \Delta(x_i)_{t-j} + \varphi^i [(y_i)_{t-1} - \{ \beta^i_0 + \beta^i_1 (P_i)_{t-1} \}] + \varepsilon_{it} \quad (3)$$

where, y_{it} is the per capita GDP growth rate, x_i represents remittance and P_i represents a set of two growth determinants, financial development and trade openness, γ and δ are short run coefficients and β^is are the long-run coefficients, φ^i is the speed of convergence to the long-run relationship, $\sum$ is a time-varying disturbance, and the subscripts *i* and *t* represent country and time, respectively.

ESTIMATION RESULTS AND DISCUSSION

Table 1 shows the descriptive statistics of the variables which suggest that data for all countries are fairly dispersed which allowed us to procedd further with its analysis. Table 2 reports CD test results confirming the presence of the cross sectional dependence in the panel.

TABLE 1. DESCRIPTIVE STATISTICS

Variable	Observation	Mean	Std. Dev.	Min	Max
LGDPC	144	6.322	0.519	5.455	7.313
LREM	144	21.834	1.309	18.183	24.954

TABLE 2. PANEL UNIT-ROOT TEST RESULTS

Variables	*P*	CD	Levels	First differences
			CIPS	CIPS
GDP(per capita) Growth Rate	0.848	12.46***	-2.081	-2.990***
Net use (per 100 people)	0.842	12.37***	-1.576	-3.207***

Tables 3 and 4 demonstrate the results of the Pedroni and Westerlund cointegration tests. The results from Pedroni cointegration test reveals that only two out of its seven statistics (group PP statistic and group ADF statistic) reject the null of no cointegration. Therefore,

to verify further about the cointegration relationship, another cointegration test the Westerlund test was conducted. The results show that the group mean statistics does reject the null hypothesis of no-cointegration at various significance levels for every single region which support the hypothesis of the presence of cointegration or a long-run relationship among growth rate and remittances in our selected countries.

TABLE 3. PEDRONI RESIDUAL COINTEGRATION TEST RESULTS

Pedroni Residual Cointegration Test
Series: LGDPC LREM
Alternative hypothesis: common AR coefs. (within-dimension)

	Statistic	Prob.	Weighted Statistic	Prob.
Panel v-Statistic	-0.560822	0.7125	-0.857035	0.8043
Panel rho-Statistic	-0.305662	0.3799	-0.222944	0.4118
Panel PP-Statistic	-1.506587	0.0660	-1.628721	0.0517
Panel ADF-Statistic	-1.558298	0.0596	-1.764890	0.0388

Alternative hypothesis: individual AR coefs. (between-dimension)

	Statistic	Prob.
Group rho-Statistic	0.650296	0.7422
Group PP-Statistic	-2.531137	0.0057
Group ADF-Statistic	-2.667025	0.0038

TABLE 4. WESTERLUND PANEL COINTEGRATION TEST RESULTS

	Test Statistic	Z-value	P-value
G_t	-1.813**	-1.608	0.054
G_a	-4.107	-0.134	0.447
P_t	-2.196	-1.007	0.157
P_a	-2.019	-0.686	0.246

Note: G_t & G_a are group mean statistics that test the null hypothesis of no cointegration against the alternative hypothesis of cointegration among some of the selected countries. P_t & P_a are the panel statistics that test the null of no cointegration against the alternative hypothesis of cointegration among all of the selected countries.

Table 5 reports results from the Pooled Mean Group Regression estimation. The results suggest that there is highly significant (at the 1% level of significance) positive relationship between growth and remittances in the region. However, the short-run relationship is statistically insignificant. The error correction coefficient of .037 means that the short-run deviations from the long-run equilibrium are corrected at the speed of 3% each year. The long-run positive relationship matches the findings of most earlier empirical works as remittance earnings constitute a significant portion of GDPs (on

average, more than 10%) of these countries. Given the average share of remittances in the respective GDPs of these countries, the convergence speed also sounds plausible. The insignificant role of remittances is not unexpected as countries usually confront various types of shocks that temporarily distort macroeconomic dynamics and potentially undermine the short-run effects of variables.

TABLE 5. POOLED MEAN GROUP RESULTS

Dependent variable GDPPC	Pooled Mean Group estimation results	
Variable	Coefficient	Standard. Error
Long-Run Coefficients		
Remittance	0.534***	0.010
Error correction Coefficient	-0.037***	0.008
Short run coefficients		
Δ Remittance	0.024	0.022
Intercept	-0.186	0.050
Observation	144	144

CONCLUSIONS AND LIMITATIONS

This paper examines the empirical link between migrant remittances and economic growth using the most recent panel data (1977-2012) for some of the largest recipient countries of foreign remittances, namely; Bangladesh, India, Pakistan and the Philippines for the first time in the literature. This relationship is considered in the presence of cross sectional dependence. This test confirms the presence of cross sectional dependence in both series. We employ an appropriate panel unit root (CIPS) test that accounts for cross sectional dependence to test the stationarity of data. Having found that both the series contain unit root, the long run relationship between economic growth and remittance was confirmed by the Panel Pedroni and Westerlund cointegration tests. Then, the Pooled Mean Group (PMG) regression technique is applied to estimate the short- and the long-run relationship between the two variables while controlling for country size and heterogeneity. The results indicate a highly significant long run positive relationship between remittance and economic growth in these countries. The study makes a very significant methodological contribution to remittance growth literature by applying some of the most advanced econometric techniques.

There is an insignificant positive association between the variables in the short-run. This short-run insignificant findings are likely to be due to various temporary shocks that occur in the economy. The error correction term in the short run is -0.037 suggesting that approximately 3% of the deviations in the short run from the long-run equilibrium are corrected each year. The overall findings support the argument that remittances are

playing increasingly important role for the economies of these countries and as such, these countries should continue with their pro-remittance policies looking at the potential of diversifying their manpower exports.

The current study suffers from a number of limitations. First, it considers a small panel of countries for analysis although the small sample size limitation was offset by the application of a very advanced econometric technique (PMG). As such, the generalizability of the findings should be assessed with caution. Secondly, remittances affect not only economic growth but also some other macro variables that have been ignored in this study. Finally, the findings are definitely not invariant along the spectrum of different methodological applications in the same area.

Although the findings are consistent with most of the existing literature that support the positive role of migrants' remittances in spurring economic growth, future research should continue to explore various indirect channels through which remittances impact GDP growth. Also the different microeconomic effects of remittances in the economy could be further investigated.

ENDNOTE

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