

**SANEI WORKING PAPER SERIES**

**Financial Crisis and Migrant Remittances:  
Effects on Growth and Poverty in Selected  
South Asian Countries**

**No. 11 - 06**

**AZAM CHAUDHRY  
NAVED HAMID  
SALMAN ASIM**



**SOUTH ASIA NETWORK OF ECONOMIC  
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# Contents

Introduction

Chapter 1: Empirical Framework

Chapter 2: Estimation results

2.1 Pakistan

2.2 Bangladesh

2.3 Sri Lanka

Conclusion

Annexure I: Direct impact of changes in remittances on poverty

Appendix A: Projected GDP growth rates, elasticity and impact on Remittances

Appendix B: Data Sources and issues

References

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# **Financial Crisis and Migrant Remittances: Effects on Growth and Poverty in Selected South Asian Countries**

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## **INTRODUCTION**

The world has recently witnessed its worst financial crisis since the Great Depression. As the crisis worsened, its effects spread to the developing world. South Asia was no exception with the growth rates registering a sharp decline in the latter half of 2008 and in 2009. Economists have identified three channels through which the financial crisis affected the developing world: firstly, the credit crunch resulted in the flight of capital from the developing countries; secondly the falling global aggregate demand impacted industrial production with exports falling sharply following the crisis; and finally the stock of migrant workers is vulnerable to job losses which would impact remittance flows.<sup>1</sup> Thus capital flows, exports and remittances are the three channels through which the global financial meltdown is affecting the developing world—stifling the growth rates and putting millions at risk of falling below the poverty line.

The World Bank (2009) painted a rather dismal picture for the growth prospects of developing countries that were beginning to feel the full repercussions of the financial crisis that started in the developed world. Given this backdrop, it is important to look at the impact of financial crisis on the more vulnerable and fragile economies of South Asia—Pakistan, Sri Lanka and Bangladesh. Conditions in these economies at the onset of the global financial crisis were less than propitious, limping from the adverse terms of trade shock of the commodity price bubble these economies were far more vulnerable to fallouts from the financial crisis. However, these countries appear to be more protected from the first two transmission channels—trading sectors in these economies are rather underdeveloped and highly concentrated in income-inelastic low value added items in agriculture and textiles. Likewise, unlike India, the largest economy in South Asia, the political and internal instability in these countries has hindered the inflow of private capital flows making them less exposed to capital flight. Therefore, we believe that the main channel through which these economies will be impacted by the global slowdown is the decline in workers' remittances.

Remittance flows have registered remarkable growth in the past two decades resulting in remittance flows exceeding other important inflows like private capital flows and official development assistance for some developing countries (Mohapatra and Ratha, 2010). This increasing importance of remittances as a mode of transfer of resources from the developed to the developing countries has captured interest of researchers. Amongst the developing countries, South Asia is the second largest

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<sup>1</sup> We did however witness a surge in remittances immediately after the crisis as those losing jobs are stripping off their assets in the host countries and returning back to their home countries.

remittance receiving region in the world after East Asia and Pacific, accounting for 22% of the total remittances flows (Ratha et. al, 2009). Bangladesh, Pakistan and India have consistently been in the top twenty remittance receiving countries from the developing world. Bangladesh, Sri Lanka and Pakistan are highly dependent on external flows of remittances<sup>2</sup> (Table 1). Though the remittances received by these countries have remained resilient during the financial crisis but we need to understand how these flows will be impacted in the coming years, particularly if the crisis persists.

TABLE 1  
Critical Dependence on Remittances

	<i>% of GDP</i>		
	<b>Pakistan</b>	<b>Bangladesh</b>	<b>Sri Lanka</b>
Fiscal deficit	4.30	4.10	7.20
Tax	9.82	8.82	13.28
Current account	-10.72	1.16	-9.79
Official Development Assistance	1.05	2.59	1.79
Remittances	4.20	11.40	7.20
<i>Memo items</i>			
Remittances/Current Account deficit	0.39	-	0.74
Remittances/ODA	4.40	4.02	4.00

**Data sources:** World Bank, IFS, Respective ministries

This report presents an analytical framework for understanding the impact of financial crisis on remittance flows at the macroeconomic level. It employs a Keynesian framework to analyze the ramifications for growth and unemployment in the recipient countries. It also contributes to the literature in several ways. First, it augments the existing literature on the determinants of remittances and estimate the responsiveness of these flows to changes in host country's GDP; Second, we extend the dynamic Keynesian structural model to these countries to estimate the impact on home country's GDP of projected changes in remittance flows in the wake of financial crisis; Third, in Annexure I we empirically analyze the link between remittances and household welfare measured by Foster Greer Thorbecke (FGT) measures of poverty for Pakistan. Using the projected changes in home country's GDP from the projected decline in remittances we estimate the resulting increase in the incidence of poverty<sup>3</sup>.

## CHAPTER 1 EMPIRICAL FRAMEWORK

In order to assess the impact of the financial crisis at a macro level, a three step methodological framework will be adopted. This will be in line with the approach

<sup>2</sup> The documented data on remittance flows to Nepal doesn't exist and hence we restrict ourselves to the other three remittance-dependent economies in South Asia.

<sup>3</sup> We have done a detailed micro-econometric analysis for Pakistan. Due to unavailability of data, the impact on poverty of projected decline in remittance flows to Bangladesh and Sri Lanka has not been evaluated but descriptive insights are discussed in Annexure I.



employed in a recent study by Barajas et al. (2010) to quantify the impact of the financial crisis on remittances in Africa. The first step will be to estimate remittance-determinant equation for each country identifying crucial macroeconomic factors that have impacted remittance flows historically. These will be both host and receiving country characteristics which drive the remittance amounts. The impact of financial crisis on these important determinants will then be used to evaluate the projected impact on the flow of remittances to each of these countries. Finally, the impact on the home economy of this change in remittance flows will be analyzed for each of the three countries.

### **Step One: Remittance Determining Equation**

In order to estimate the remittance determination equation, it is important to identify the variables that are likely to be important in the decision making process of a migrant. Zanker and Siegel (2007) carry out a detailed review of literature and identify the economic situation in home and host country as the most important determinants at the macroeconomic level of remittances.

Based on the amount of their earnings, migrants decide how much to consume, to save and remit back to host country. An important determinant in this decision would be whether the migrant has moved with family or not. In the latter case, it is likely that the amount to be remitted is decided first, and the migrant then adjusts his/her consumption accordingly. In this case the conditions in the migrant's home country will be an important determinant of the remittance flows. Hence, literature points to the possibility of the countercyclical nature of these remittance flows to the economic situation in the home country (Quartey and Blankson, 2004; Chami et. al, 2005) ; hence the point estimate of home country's GDP will be negative. This will be expected in the case where the driving motive for remittances is predominantly consumption (cite source). The state of the economy determines the local income levels and depending on them the migrants may adjust the amount sent home. Therefore, the changes in the growth rates of real GDP are an important variable to be included which will proxy for this state of the economy.

Further, the economic conditions in the host country are likely to influence remittance flows. Changes in host country's GDP will be an important indicator of this, which is expected to be positively related to the remittance amounts. The real GDP of these countries are used instead of the nominal figures to 'difference out' inflation effects. The majority of the migrants from the three countries are based in OECD or Middle Eastern regions. Owing to the underlying differences in the nature of employment of migrants going to either region, it is important to separately study the two. Middle Eastern migrants are employed on a contractual basis (medium term contracts), where remuneration period is fixed, while the pays of those in OECD depends on the market. We therefore employ regional weighted host GDPs to capture the impact of the state of host economies (refer to Appendix B for details).

Other variables that capture the macro economic conditions in both the home and host countries are also important determinants (see Schiopu and Siegried, 2006). One such indicator is the real interest rate differential between the host and home country. This variable is included to proxy for the relative returns offered by the financial institutions in the two countries. The expected sign is ambiguous as it will be



determined by the motivation of the migrant. If s/he is making a decision to invest in financial institutions, then wherever the return is higher, the migrant will invest (positive sign). However, if the migrant is looking to invest in real assets, then high interest rates in a particular country might be reflective of the instability of the state of the economy thereby deterring investment there (negative sign). Further, relative risk perceptions of the two countries will also play an important role in this decision.

The movements in exchange rates will impact the remittance amount in two opposing ways. If the migrant is targeting a certain consumption level in the home country, then, a real exchange rate depreciation of home country's currency will decrease the amount sent home. On the other hand, it is likely to make investments more attractive as the same amount will convert into a greater principal amount of domestic currency thereby increasing the flows through this channel. However, if the migrant is planning to remit back the principal and the returns earned on the investment in the future, the flows for investment might actually decrease as domestic currency depreciates. Thus, the sign on this variable is ambiguous and will depend on which channel outweighs the other.

Further, any structural shifts in remittance flows need to be accounted for. 9/11 marks such an important global event, with tighter controls post the event on international flow of money (GEP, 2006). This means that the remittances flowing through the formal channel have increased and thus indicates not an increase in total remittance amounts but rather a shift from informal to formal channels. Another contributory factor could perhaps be the uncertainty faced by migrants in the advanced economies prompting them to remit back most of their savings and also a larger amount of their incomes.

Therefore, to account for this structural change in both the volume and the reasons for remittance flows to these countries, a dummy is included in the same spirit as in studies by Gupta (2005) and Barua et. al (2007). This acts as an indicator for the structural break, taking a value of 1 for the year 2002 onwards. Its statistical significance will indicate that there are important differences in the remittance flows before and after the event. The a priori expectation is that the coefficient of the dummy will have a positive value indicating that remittance flows through the formal channels have increased after 9/11.

Thus, remittance flows will be determined by a set of driving variables taking the following form:

$$R_{it} = \alpha_0 + \beta_1 GDP_{it}^{AE} + \beta_2 GDP_{it-1}^{ME} + \beta_3 GDP_{it}^{home} + \beta_4 \ln \Delta \ln f_{it} + \beta_5 \text{rer}_{it} + \beta_6 d_{2002} \quad (1)$$

Where  $R_{it}$  is the aggregate remittance inflow to country  $i$  during year  $t$ .  $GDP_{it}^{AE}$  is the weighted GDP of advanced economies and  $GDP_{it-1}^{ME}$  is the weighted GDP of Middle East economies which enters with a lag. All variables will be estimated in log-difference form as the resulting series is stationary while the series in levels is non-stationary. The coefficients of interest  $\beta_1$  and  $\beta_2$ , therefore, give the elasticity of changes in growth rates of these host country GDPs to changes in growth rate of remittances. The variables in the specification are consistent with that employed in previous studies (Singh et.al, 2009; Cali and Dell'Erba, 2009) but differ in how host country GDP enters the equation. This has been necessitated by the nature of analysis

required by this report and the data constraints with respect to specific information on migrant stock for the countries under study.

The rest of the variables (real exchange rate, interest rate differential) are being included just to control for other effects. As highlighted by Cali and Dell'Erba (2009), it is not feasible to evaluate the impact of these variables into the future since forecasts of these series are not available. Further, it is also expected that the host GDP-remittance growth rate elasticity will capture the major impact of the crisis.

### Step Two: Impact of crisis on Remittances

In order to trace the impact of the financial crisis on remittances in South Asia, the differences in the projected growth rates of real GDP before and after the crisis are estimated. Then the projected growth rates will be used in conjunction with the elasticity estimates from step one ( $\beta_1, \beta_2$ ) for each region; the resulting difference in the growth rate of remittances will be estimated in the following way:

$$\Delta R_{it} = \beta_1 \Delta GDP_{it}^{AE} + \beta_2 \Delta GDP_{it}^{ME} \quad (2)$$

1. Where  $\Delta R_{it}$  is the difference in growth rate of remittances due to the crisis for the period  $t$  to home country  $i$ .  $\Delta GDP_{it}^{AE}$  and  $\Delta GDP_{it}^{ME}$  is the expected difference in growth rate of host GDPs of Advanced economies and Middle East respectively before and after the crisis period.  $\beta_1$  and  $\beta_2$  are the estimates of elasticity obtained from estimation of equation (1).

2. For this study the growth rates are taken from both the World Economic Outlook (WEO) published in April 2007 and in April 2010. In the 2007 WEO, advanced economies were expected to grow at 2.8% on average for the 2010-12 period before the financial crisis hit the global economy. Subsequently, in the 2010 WEO the estimate has been revised down to 2.38% for the same period. This results in a 0.42 percentage point decrease in the projected growth of these economies as a result of financial crisis. As noted earlier, the impact of Middle East economy GDPs is expected to appear with a lag. Therefore, the difference in growth rates for the 2009-11 period will be considered in order to evaluate the changes in remittances in the 2010-12 period. This is approximated to be a 2.07 percentage point slowdown for the period<sup>4</sup>.

### Step Three: Impact of Remittances on Home Country GDP

As a next step, we will estimate the impact of this change in remittance flows, due to the crisis, on the home economy. This will be seen through two channels. One is the direct impact on the recipient households with implications for poverty levels which will be studied in-depth in the micro analysis part of the study. The other is the impact it will have on the home country's GDP. This impact will manifest through a complex interplay of factors involving the consumption and investment components of the GDP as well as the balance of payments constraint faced by the country.

<sup>4</sup> The growth rate of the Middle East economies from the WEO, April 2010 has been computed from the individual GDP forecasts of the countries that comprise the Middle East. The resulting figure is a GDP weighted average for the growth rates of the region. This exercise was necessitated because the 2010 WEO provides only a combined estimate for Middle East and North Africa

Glytsos (2005) motivates our empirical estimation as the model outlined in his study is able to incorporate dynamic effects which allow estimation of not only the contemporaneous but also subsequent period's impact on GDP of any change in remittances. This is especially pertinent for our study as our motivation is to trace the impact of the financial crisis over the next few years. The model consists of the following three behavioral equations and the income identity:

Consumption Function:

$$C_t = \alpha_0 + \alpha_1 Y_t + \alpha_2 C_{t-1} \quad (3)$$

Investment Function:

$$I_t = \beta_0 + \beta_1 Y_t + \beta_2 K_{t-1} \quad (4)$$

Where: investment (I) is assumed to be correlated with business profits, which are in turn positively related to national income; further it is assumed that businesses tend to converge towards some desired level of capital stock with a time lag. Consequently investment is assumed to be positively related to national income and negatively related to lagged capital stock ( $K_{t-1}$ ).

**Import Function**

$$M_t = \gamma_0 + \gamma_1 Y_t + \gamma_2 Y_{t-1} + \gamma_3 M_{t-1} \quad (5)$$

Where: Imports (M) are assumed to be a function of current income and current wealth – a relationship which is derived from the life-cycle hypothesis as developed for consumption.

And finally a National Income Identity:

$$Y_t = C_t + I_t + G_t + X_t - M_t + R_t \quad (6)$$

Where Y, C, I, M enter as endogenous variables and X, R, M are exogenous variables.

Using the four equations above, we form a reduced form:

$$X_{it} = \pi_0 + \pi_1 C_{t-1} + \pi_2 K_{t-1} + \pi_3 Y_{t-1} + \pi_4 M_{t-1} + \pi_5 G_t + \pi_6 X_t + \pi_7 R_t \quad (7)$$

Where: X is any of the endogenous variables C, I, M, Y. Estimates of  $\pi$ 's are the partial derivative of any endogenous variable X with respect to the variables entering equation 7 as explanatory variables. The coefficient of interest for our analysis is  $\pi_7$  which gives the short term multiplier. This gives an estimate of the contemporaneous impact of remittances on any of the endogenous variables X.

These  $\pi$ 's can be estimated either directly through OLS estimation of equation (7) or through the derivation of these reduced form estimates from the structural estimates obtained from two stage least squares (TSLS) estimation of equations 3-7. Glytsos (2005) uses both methods in his paper, depending on which method yields consistent estimates for a particular country.

The dynamic nature of the model allows the long term impact on the macro economy of changes in remittances to be traced in addition to the short term impact. These interim multipliers can be estimated from the reduced form estimates and take the following form:

Second year multiplier =  $\pi_T * \pi_Y$

Third year multiplier =  $\pi_T * \pi_Y^2$

N-th year multiplier =  $\pi_T * \pi_Y^{N-1}$

Where  $\pi_Y$  is the multiplier of the dependant variable Y with respect to its own one year lagged value and  $\pi_T$  is the multiplier to current change in remittances. Specifically, we can calculate overall impact of a current change of remittances on current and future GDP values, over a number of years t as:

$$\sum_{t=0}^{t=N} \Delta Y_t = (\Delta R_t) \sum_{j=0}^{j=N} \partial Y_t / \partial R_{t-j} \quad (8)$$

Where  $\partial Y_t / \partial R_{t-j}$  are interim multipliers, j is the number of years till the multiplier converges to 0 or the number of years over which analysis is carried out.

The impact on home GDP will then be used to evaluate the impact on the unemployment rates in the country. This is done through the use of employment elasticity<sup>5</sup> which is estimated for each of the three countries using employment figures from the Asian Development Bank's Key Indicators for Asia and the Pacific (2010).

## CHAPTER 2

### ESTIMATION RESULTS

When deciding how much to remit, a complex set of factors interplay in this decision making process of a migrant. Several different motivations may exist simultaneously and also, migrants within the same regions will have different reasons to remit. Therefore, at the macro level we can at best get an approximation of how migrants to a particular region respond as an aggregate group. The remittance determining equation (1) defined above was estimated for all three countries (consistent estimates reported in table 2.1). The advanced economy GDP coefficient is positive and significant for Pakistan and Bangladesh while it is negative for the case of Sri Lanka. Further, while the home country GDP is insignificant for Pakistan and Bangladesh<sup>6</sup>, it is significant and positive for Sri Lanka. The results seem to signal that consumption motive appears to be dominant in the case of Pakistan and Bangladesh while for Sri Lanka, other considerations seem to outweigh purely altruistic motives of the migrants. Also, remittances to Sri Lanka with respect to its GDP turn out to be pro-cyclical and seem to positively respond to home country conditions.

The dummy to indicate the events that unfolded post 9/11 while positive does not come out to be significant for the case of Bangladesh and Pakistan. This might be

$$\text{Employment elasticity} = \frac{[(\text{Employed})_t - \text{Employed}_{t-1}]}{\text{Employed}_{t-1}} \div \frac{[(\text{GDP})_t - \text{GDP}_{t-1}]}{\text{GDP}_{t-1}}$$

<sup>5</sup>

<sup>6</sup> The statistical insignificance of the coefficient is perhaps resulting from relatively small number of time series observations. Availability of monthly/quarterly data would have improved the robustness of results presented the study.

attributable to data limitations: small sample size with low frequency annualized time series. It turns out to be significant and negative for the case of Sri Lanka, possible reasons for this result are discussed in section 2.3.

The responsiveness of GDPs of the three economies to changes in remittances is estimated by employing TSLS on equations 3-7 (results in table 2.2). All data series employed are in levels and at constant prices from 1975 to 2007. The signs on all coefficients are as hypothesized and the results are consistent with the findings of Glytso (2005) for selected developing countries in Africa. Lagged consumption and this period's income are important determinants of the consumption decision. In line with theory, accumulated capital stock negatively impacts investment barring the case of Sri Lanka while income is positively linked as business profits are expected to rise with rising income levels. This in turn stimulates investment in the economy. The coefficient of interest is the derived reduced form estimate of the short run remittance multiplier. For the purpose of our analysis, we are only interested in the impact that will result in the 2010-2012 period and will therefore be considering the interim multipliers till year 3 (see table 2.3). Its value gives the change that result in GDP due to a 1 unit change in remittances. Hence, in the short run, the impact of changes in remittances is a slightly more than one change in GDP for all three countries. The estimated impact on GDP growth rates of these economies are detailed in the country wise sections that follow.

TABLE: 2.1  
**OLS Estimates of Remittance Determination Equation<sup>7</sup>**  
 Dependant Variable: Log of Growth Rate of Remittances

	Pakistan (1)	Sri Lanka (2)	Bangladesh (3)
Yearly Dummy (=1 for after 2001)	0.172 (1.38)	-0.145* (- 1.98)	0.0942 (1.62)
Weighted GDP of Advanced Economies	2.031*** (3.45)	-5.770* (- 2.02)	4.021** (2.55)
Lagged Weighted GDP of Middle East	1.399** (2.34)	1.584** (2.41)	--
Lagged GDP of KSA	--	--	0.833* (1.93)
Home GDP	-0.387 (- 0.17)	3.447** (2.14)	-1.805 (- 0.90)
Interest rate differential (not in log)	2.394 (1.36)	1.004* (1.93)	--
Real Exchange Rate	-0.567 (- 0.60)	--	--
Adjusted R-squared	0.31	0.38	0.28
Observations	31	29	25

**Notes:** *t*-statistics reported in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.10$  (two-tailed significant tests).

<sup>7</sup> All explanatory variables are in log difference unless otherwise stated

TABLE 2.2  
**TSLS Estimates of Structural Regression Coefficients**

	$C_t$				$I_t$				$M_t$				
	Con	$Y_t$	$C_{t-1}$	$R^2$	Cons	$Y_t$	$K_{t-1}$	$R^2$	Cons	$Y_t$	$Y_{t-1}$	$M_{t-1}$	$R^2$
Pakistan	2265 (0.10)	0.283 (0.83)	0.65*** (11.64)	99	-38294*** (2.85)	0.414*** (5.22)	-0.068*** (-2.35)	99	-1064 (-0.89)	0.559 (1.27)	-0.541 (-1.00)	0.831*** (7.61)	96
Bangladesh	12734 (0.42)	0.349*** (4.40)	0.541*** (4.74)	99	-42343 (-1.45)	0.111*** (4.08)	7.489*** (6.84)	98	-15268 (-0.74)	0.0954* (1.81)	-0.0875 (-1.69)	1.066*** (11.07)	99
Sri Lanka	36110** (5.85)	0.232*** (6.24)	0.635*** (10.08)	99	39699*** (-4.84)	0.386*** (12.89)	-0.0461*** (-5.21)	98	9697 (1.49)	0.510*** (6.30)	-0.513*** (-5.76)	0.962*** (8.68)	99

Notes:  $t$ -statistics reported in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.10$  (two-tailed significant tests).

TABLE 2.3

**Time Distribution of the Effects of a Unit Change in Remittances ( $\Delta R=1$ ) on GDP (Y)**

	Short Run (1)	Interim dynamic multipliers	
		2	3
Pakistan	1.16	0.73	0.46
Bangladesh	1.57	0.03	0.22
Sri Lanka	1.12	0.64	0.37

**2.1 Pakistan**

Past studies on determinants of remittance flows to Pakistan have established the consumption needs of worker's families in the home country to be the dominant motive for migrant's to remit (see Nishat and Bilgrami, 1991). As discussed above, estimation results for the 1976-2007 period indicate that remittance flows at the macro level are determined by the conditions in the host country with a strong statistically significant link between the growth rate of host country GDP and remittance growth rate (see table 1.1). In line with the findings of previous studies, investment channel is found to be less dominant. This is indicated by the insignificance of the interest rate differential as well as the signs on the host GDPs (positive). Further, for our given sample period, changes in real exchange rate does not come out to be a significant determinant of remittances for the case of Pakistan.

The weighted average of the growth rates of US and UK GDPs, the two regions from which 18% of remittances flow on average (1975-2007 average), is elastic with respect to the remittances growth rate. This weighted average is included to proxy for the flows from the advanced economies. A 1 percentage point increase in the growth rate of the GDPs of the two countries combined, leads to a 2 percentage point increase on average in the growth rate of remittances to Pakistan.

Remittance flows from Kuwait, UAE and KSA together account for about half of the total flows to the country on average from 1976-2007. The weighted average of the GDPs of these countries is a good proxy for the total flows coming from the Middle East region. While the coefficient indicates an elastic relationship between remittance and lagged GDP growth rates for the Middle Eastern countries (1.4), this is lower than the impact of GDP growth rates of developed economies (2.04).

These elasticity estimates allow us to forecast what the impact of the financial crisis will be on the remittances growth rates over the 2010-12 period. Employing equation 2, we find that the yearly decline in the growth rate of remittance flows to Pakistan is expected to be on average 3.75 percentage points over this period. The smaller contribution comes from the changes in developed economies (0.86 percentage point) while the impact from Middle East is a slowdown of about 2.90 percentage point (results in Appendix A).

It is reasonable to assume that absent the crisis the remittance growth trends for the post 2001 era would have continued hitherto. Therefore, the average growth rate (11%) for the 2003-07<sup>8</sup> period is taken as a proxy for the expected growth rate for the

<sup>8</sup> Due to the extraordinary growth of 143% in nominal flows to the country in the year 2002, it has been excluded from the average

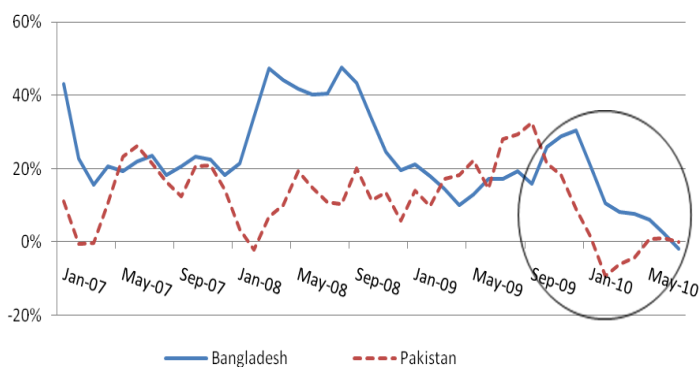


period under study had the crisis not hit. With an expected decline each year of 3.75 percentage point, we can conclude that post the financial crisis, this growth rate of 11% will decline to an average of 7.25% for the 2010-12 three year period.

Having estimated the slowdown in growth rate of remittances as a result of the financial crisis, the next and final step is to trace the impact of this on the economy of Pakistan. As discussed earlier, any change in remittances in one period will just not impact GDP contemporaneously but rather affect the GDP over the future also. The dynamic nature of the model employed allows this long term impact to be traced. The coefficient on lagged GDP in the reduced form (0.628 for our case) along with short run impact multiplier of remittances is used to derive values of interim multipliers for each year (results in table 2.3). These values are then used to see the impact in the following years of any change in remittances today. The highest impact is in the same year with the impact subsequently becoming smaller.

The data on migrant transfers and worker's remittances is not recorded separately for the case of Pakistan and Bangladesh (for details refer to Appendix B). This renders it difficult to differentiate between the flows from workers abroad and the transfer of assets of those who are shifting back in the wake of the crisis. The contribution of this asset transfer might be the reason for the short term surge in remittances contrary to a priori expectations after the crisis. However, it is worth noting how this trend now seems to have reversed with the latest monthly figures pointing to a decline in growth rates. Figure 1 illustrates how for both countries since the end of 2009, there has been a dip in remittance growth rates over the same period last year.

**Figure 1: Year on year growth\* in Remittances flow to Pakistan and Bangladesh**



\*Growth of 3-month moving average

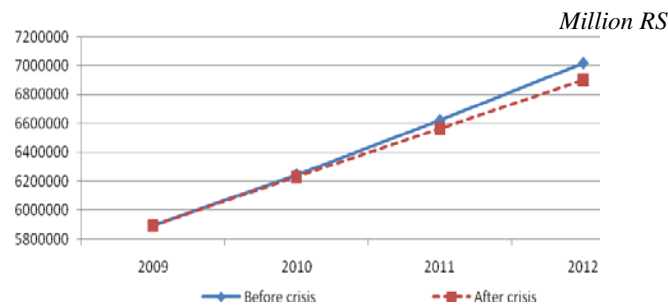
**Data Source:** World Bank

Based on the actual figure of remittance in 2009, remittances are projected into the future based on both the expected growth rate before crisis (11%) and the growth rate estimated after crisis (7.25%). The difference in the two estimates allows us to then trace the contemporaneous impact on GDP as well as the impact in the subsequent years of a decrease remittances due to the financial crisis using the dynamic multipliers calculated.

If the GDP growth rate trend of the five years immediately preceding the financial crisis was to continue, Pakistan's GDP would have grown at 6%. Based on this, our analysis suggests that the impact for this three year period will be an average decline in this growth rate of 0.4 percentage point given the projected fall in remittance growth rates. Figure 2 shows the level of GDP Pakistan would have attained by 2012 as well as the expected decline in the GDP in the wake of the financial crisis.

Using the estimated figure for employment elasticity (0.64) for Pakistan, we next estimate the impact on the unemployment rate in the country. The result is an approximate predicted increase of 0.26 percentage points in the unemployment rate because of the estimated decline of 0.4 percentage points in the GDP over the 2010-12 period.

**Figure 2:** Expected GDP of Pakistan before and after crisis for the 2010-2012 period



## 2.2 Bangladesh

Barua et al (2007) study the macroeconomic determinants of workers' remittances using a panel data of host countries for the period 1993-2005 and conclude that for the case of Bangladesh interest rate differential, migrant stock and exchange rate positively impact remittance flows while inflation differential between host and home country and home country GDP impact the remittance flows negatively. They establish that a negative coefficient on the home country GDP is suggestive of an altruistic motive since deterioration in home country conditions led to an increase in the remittances sent back.

Our study also points to the altruistic nature of the migrants from Bangladesh. However, we find that there is high correlation of both interest rate differential and real exchange rate with the host and the home country GDPs. Hence, they could not be included as explanatory variables resulting in the estimation of a simplified version of equation (1) using OLS for the 1980<sup>9</sup> to 2007 period (see table 6.1).

Employing weighted average of both regions results in inconsistent estimates due to the high correlation between the two host GDPs and resulting collinearity induced by the inclusion of these variables. As an alternative, the GDP of KSA is included to proxy for the Middle Eastern region since it has consistently been the largest remittance source for Bangladesh for the 1980-2007 period. Consistent with the findings for Pakistan, lagged GDP growth rate of Saudi Arabia comes out as a

<sup>9</sup> Due to the availability of country wise remittance flows only after 1980

significant determinant of changes in remittance flows to the country with a 1 percentage point change in GDP growth rate yielding a 0.83 percentage point change in remittance growth rate.

U.K and U.S.A account for 20% of the total remittances to Bangladesh on average and are therefore representative of the impact of changes in advanced economies' GDP growth rates. Once again, the elasticity number is very high (4.02) and statistically significant.

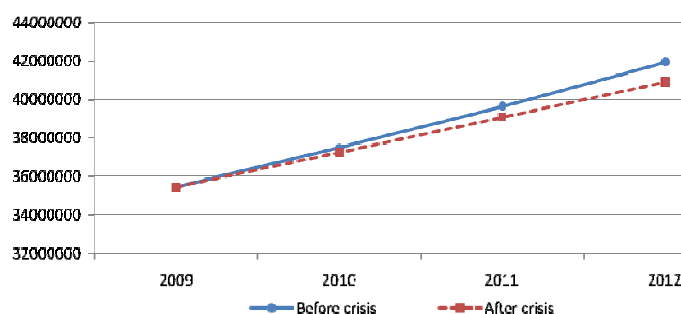
Having estimated the impact of important host country's GDP growth rates on changes in remittances historically, we can next project the changes that will come in the wake of the financial crisis by estimating equation (2). The estimated impact from the two regions is almost identical (1.69 and 1.89 percentage point decline from the developed and Middle East economies respectively). The result is a cumulative decline in remittance growth rate of 3.53 percentage point.

Bangladesh has experienced phenomenal growth in remittances since 2002 with the growth averaging at 21.2% till 2007. Assuming that in the absence of the financial crisis this trend would have continued into the future, then despite the predicted decline of 3.53 percentage points we conclude that remittances will still grow at a rate of 17.67% from 2010 through 2012 on average.

The final part of the analysis yields a high short run multiplier of 1.57 but the impact in subsequent periods diminishes rapidly (see table 2.2 above). Using these and the estimated slowdown in remittances growth rate, the estimated decline in GDP is 0.87 percentage point for the 2010-12 period. Figure 3 illustrates the gap that is expected to appear due to the crisis.

The latest figures available on Bangladesh's employment levels were till 2006 which yielded a high figure of 0.8 for the employment elasticity of the country. This in turn allowed us to predict a yearly increase of 0.7 percentage points in the unemployment rate which stands at around 2%. The estimated impact is largest for Bangladesh because of the huge inflows of remittances to the country as compared to the other three<sup>10</sup>.

Figure 3: Expected GDP of Bangladesh before and after crisis (million Takas)



<sup>10</sup> Note that Bangladesh also has the highest remittance/GDP ratio amongst the three countries

### 2.3 Sri Lanka

Our third and final analysis will be on the determinants of remittance flows for the case of Sri Lanka employing equation (1) on the macroeconomic time series for the 1976-2007 period. The model is estimated in its standard form with the host GDP, domestic GDP, dummy for 2002 and the interest rate differential included as explanatory variables.

Consistent with the findings of Leuth and Arranz (2007) the coefficient on the domestic GDP is positive indicating the pro-cyclical nature of remittance flows for the case of Sri Lanka. A possible explanation presented by them is the non altruistic nature of the motives for remitting. Remittances can be impacted by the investment climate of the home country which is reflected in the rates of growth of real GDP. The interest rate differential also comes out to be significant. A priori expectation was that the sign would be negative since a person making portfolio allocation decision in financial assets will be inclined to invest where interest rates are higher. Hence, a high interest rate differential, which indicates high real interest rates in host country, would negatively impact remittances. However, we find that interest rate differential positively impacts remittance flows. This is in line with the findings of previous studies (Singh et al., 2009) who argue that a higher interest rate in the home country reflects instability. This will in turn mean that returns on real assets are lower in such time periods and migrants will be sending lesser money home for such investment purposes. A positive sign in case of Sri Lanka suggests that the latter argument dominates with investments in real assets driving the result. Historically, this impact has been large with a 1 percentage point increase in the growth of domestic GDP resulting in a 3.56 percentage point increase in remittance growth.

The flows from Middle East are elastic with respect to host GDPs and are being impacted with a lag as in the case of Pakistan and Bangladesh. Any increase in the growth rate of host GDPs results in double the increase in the growth rate of remittances in the next period. On the other hand the remittance flowing in from the advanced economies (European Union and North America) are negatively impacted by the GDP growth rates of these regions. It might be because host country GDP growth rates will reflect that the economy is thriving thereby providing lucrative investment opportunities. These migrants thus might be cutting remittances being sent home for investment purposes and instead investing them in the host country. On the other hand the relatively limited investment opportunities in the Middle East and the nature of migrants (low skill level and non family migrants) could be resulting in the positive elasticity figure, which is consistent with the results for the other two South Asian countries<sup>11</sup>.

The objective of our analysis is to quantify the change in remittance growth rates resulting from the changes in GDP growth rates in the host countries due to the financial crisis. As before equation (2) is employed for this purpose. It points to 4.18 percentage point decrease in growth rate of remittance flows from Middle East. The impact from the decline in GDP of advanced economies is however expected to actually increase the remittance flows to Sri Lanka. The large negative elasticity implies a positive change in the growth rate of remittances to Sri Lanka. If the investment motive dominates and with opportunities for investment worsening in advanced countries in the wake of the financial crisis, migrants will send more money back. The positive sign on Middle East GDP on the other hand is a result of the

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<sup>11</sup> An in-depth micro study on the motivations of migrants to remit can give us a clearer picture of what right now appear to be a complex interplay of factors that motivate a migrant to remit.

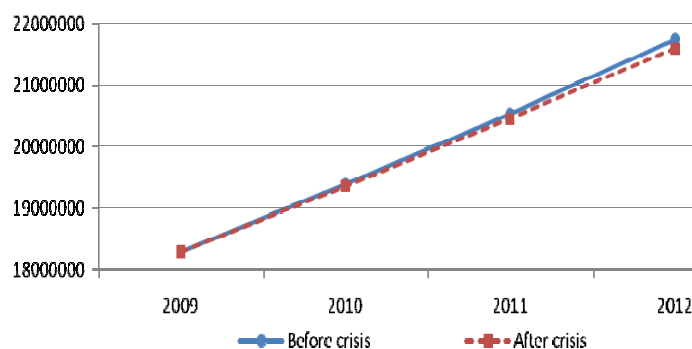
differences in migrant profiles to these regions. According to Lasagabaster et.al (2005) a large number of the migrants are employed as housemaids in the Middle East with families back home that are dependent on their income. Hence, obviously for these migrants, investment is not the primary motive.

The net effect is expected to be a mere 1.75 percentage point decline resulting in an average expected growth rate of 12.15% over the 2010-12 period assuming the 2003-07 trend of 13.9% would have continued into the future. Further, given the pro cyclical nature of remittance flows to the Sri Lankan GDP, any decline felt during the crisis in the home GDP is expected to lower the growth rate of remittances from the projected decrease of 1.75 percentage points. In order to assess whether this impact will be seen, the Hodrick-Prescott filter is employed which allows the cyclical movements to be separated from the long term trend. This reveals that historically GDP has been growing at a rate of 4% on average. According to WEO April, 2010, growth rate is expected to remain above this trend with only a slight dip in the year 2009. Therefore, it is safe to assume that for the crisis period, there will be no adverse effect on the GDP growth rate and hence the remittance growth rate is not overestimated.

A direct estimation of the impact on the economy of any change in remittances yields a short run multiplier of 1.12 (results in table 2.2). Thus, a Rs. 1 million decline in remittances results in a Rs. 1.12 million decline in Sri Lankan GDP in the same period. The overall impact of the dip in remittances is approximated to be a mere 0.3 percentage point decline (see figure 4). This is due to the very small decline in remittances growth rate expected in the case of Sri Lanka.

Using the most recently available data for Sri Lanka, the estimate for employment elasticity yields a value of 0.2. The predicted decline in GDP over the 2010-12 period will mean that the unemployment figure which stood at 5.6% in 2009 is expected to rise by 0.06 percentage points over average during 2010-12 which is a 1% increase in the unemployment rate.

**Figure 4:** Expected GDP of Sri Lanka before and after crisis (million Rs)



## CONCLUSION

Figure 3 illustrates the expected remittance flows to the three countries both before and after the crisis for the next three years. It is evident that the decrease after crisis is larger for the case of Bangladesh and Pakistan as compared to that for Sri Lanka. This is attributable in part to the negative sign of advanced economy GDP for Sri Lanka which means that as these economies slowdown in the aftermath of the

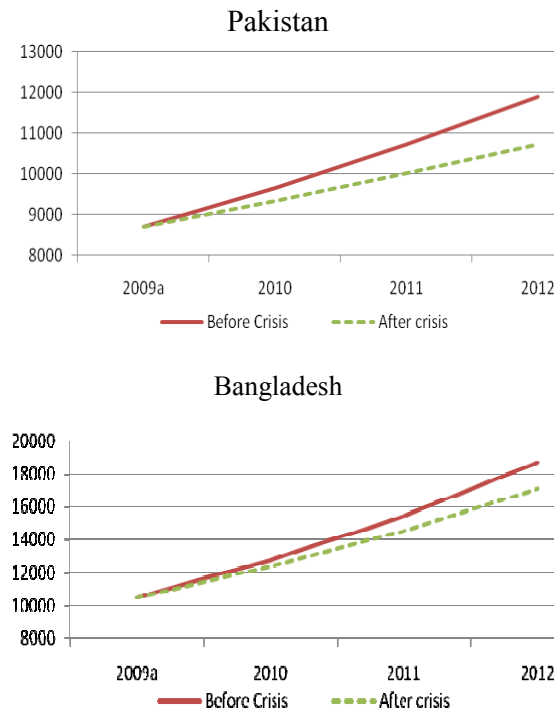
financial crisis, remittance flows are actually expected to rise. This rise nullifies some of the negative impact on remittances coming from the slowdown in the Middle Eastern regions resulting in a smaller decline in growth rates for Sri Lanka in comparison to the other two countries. Even though Sri Lanka is expected to witness the smallest decline, the exponential growth in remittances to Bangladesh in the period before the crisis means that the growth rate of remittances flowing to the country are still expected to be the highest amongst the three countries.

For all three countries, the final impact on the macro economy yielded an impact multiplier of greater than one. The value of greater than one for the multiplier makes intuitive sense and is consistent with the results found for several developing countries in Africa by Glytsos (2005). The smallest resulting impact both on GDP and unemployment levels is not surprisingly on the economy of Sri Lanka where remittance flows are also estimated to be least impacted.

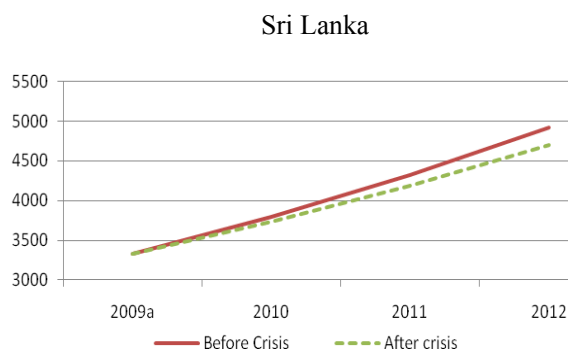
It should be noted that given the conditions unfolding in Pakistan post the catastrophic floods that have hit the country last year, the reality might differ from these estimates. If migrant families are in flood hit areas, then despite the financial crisis, remittances flows might rise, nullifying the impact of the slowdown in host country GDPs. Further, the floods are expected to have a detrimental impact on the growth rate of Pakistan's GDP. The counter-cyclical nature of the GDP to remittance flows might further increase the actual flows coming in<sup>12</sup>.

**Figure 3:** Expected Remittance flows before and after crisis, 2010-2012

(million US\$)



<sup>12</sup> The relationship is found to be statistically insignificant for the time period used in the analysis. It would be worthwhile to do a decade wise analysis to see if the nature of relationship and its significance varies



Given the importance of two much diversified regions – North America/Europe and Middle East – to the remittance flows coming into the three countries, this analysis presents a unique approach to accounting for the differences in the two types of economies. The exercise yielded a very interesting result establishing the lagged impact of the growth of the GDPs of Middle Eastern economies to the remittance flows coming into these countries. This result is driven by the relatively homogenous nature of migrants going to the region from all three countries and the contractual employment that is a characteristic of the entire region.

Migrant transfer by natives of these countries who lost their jobs in the aftermath of the crisis made it difficult to decipher the real impact of the crisis on the long term flows of remittances. As the world settles in after the initial shock of the financial crisis, the situation with respect to remaining migrant stocks from each of these countries in the respective regions will become clearer. This in turn will allow an even better understanding of the depth and magnitude of the impact financial crisis.



## ANNEXURE I

**Direct Impact of Changes in Remittances on Poverty**

## 1. INTRODUCTION

The effect of remittances on household welfare is a priori unclear as the remittance inflows generated by emigrant workers might be more than outweighed by the forgone earnings and local production generated by the migrant member if s/he were to stay back and work in the local markets. A sizeable number of studies have attempted to highlight the welfare effects of remittances at the microeconomic level using household level survey data (Seminal papers include: Adams, 1989; Adams 2004; Adams and Page, 2005; Brown and Jimenez, 2005). With the number of international migrants in the world reaching more than 200 million (Maimbo and Ratha, 2005) the effects of remittance inflows on the families left behind has become an increasingly important question for empirical researchers and policy makers; the sign of expected impact of these voluntary income transfers on the incidence, depth and severity of poverty on remittance receiving family members has important implications for devising appropriate safety nets for the vulnerable households, particularly if these inflows are to plummet in the wake of current financial crisis.

The earlier studies in the literature that tried to shed some light on welfare impacts of remittance flows suffered from external validity issues due to their limited scope and sample sizes.<sup>13</sup> In the past decade, a body of literature has emerged that has effectively used more comprehensive household level data sets to study the relationship between remittances and aspects of household welfare. Despite this burgeoning evidence and availability of better data sets there is still no uniform standpoint amongst empirical researchers on the effect of remittances on poverty indicators. In a study using nationally representative household survey in Guatemala, Adams (2004) has found that international remittances reduce severity and depth of poverty. The author finds that including international remittances in household expenditure reduces poverty by 19.8%, when he uses the squared poverty gap measure to capture severity of poverty. Likewise for Ghana, Adams (2006) finds that international remittances reduce the severity of poverty by 34.8%. For both of these studies, however, the authors do not find a robust reduction in headcount ratios and hence poverty incidence in home countries from receiving international remittances. In another study, Brown and Jemine (2008) find strong evidence of remittances on all measures of poverty for Tonga and Fiji. In the most celebrated study in the literature to date spanning cross sectional data from 71 developing countries, Adams and Page (2005) find that remittances do in fact reduce the level, depth and severity of poverty for all these countries. However, after inserting a dummy variable for South Asia in the growth-poverty model for 71 countries as estimated by Adams and Page (2005), Munzele (2005) finds that official remittances have no effect on the level and depth of poverty for a group of five South Asian countries in the sample.

There are three stylized facts that emerge from previous studies in the literature—1) in general there is robust evidence across various methodologies and regions that remittances tend to reduce the depth of poverty in most of the developing countries, however, the results are ambiguous for incidence of poverty as measured by reduction in headcount ratio; 2) reductions in poverty are achieved mostly through increases in incomes of migrant sending

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<sup>13</sup> See Gilani and Iqbal, 1981; Stahl, 1982; Stark et al, 1986; Adams, 1991

households and the second order effects through reduction in household income inequalities are at best weak and ambiguous; 3) there is considerable variation in the intensity of these effects across countries/regions and the magnitude of effects are also sensitive to the methodological assumptions adopted by the authors to estimate these relationships.

In spite of the significantly large share of South Asia in global international remittance flow, surprisingly little attention has been paid to analyze the impact of remittances on poverty measures using household level data set. Generally, it is argued that until recently it has been very difficult to estimate poverty headcounts for South Asian countries because of a lack of poverty data and also until 2002 most of the remittance inflows were sent through informal channels making it harder to analyze the overall development of remittances in these economies. The importance of these unofficial flows for South Asian countries is brought home by Munzele (2005) with his earlier findings of no statistically significant impact on level and depth of poverty for these countries reversed once he adds estimated unofficial flows to the tally of official remittances received by these countries—‘on average, the point estimates for the poverty head count measure suggests that a 10% increase in total remittances (official and unofficial) will lead to a 0.9% decline in the level of poverty’. Other than a recent ADB study (Vaqaar et al. , 2010) for Pakistan that uses Household Integrated Economic Survey (2005-2006) data very little research has been done on welfare effects of remittances on household poverty in the context of South Asian countries.

## **2. METHODOLOGY**

Taking into account the characteristics of the MICS data set, this study uses a standard counterfactual approach to analyze the impact of remittances on poverty in Pakistan. It is now well established in the literature that remittances cannot be treated simply as an exogenous increase in income of the household. The household with a migrant member is in receipt of remittance income but had he not migrated he would have earned wages in the domestic market or contributed his time to local production. This forgone earning of the migrant member must be included in the counterfactual income of the remittance-receiving household to study the net effects of remittances on household welfare. This is done simply by estimating the predicted income of remittance-receiving households based on the estimated parameter coefficients in a mean-income regression for non-remittance receiving households.

Before specifying the econometric model, it is important to outline the basic assumptions that underlie the methodology of this study. Firstly, migration decisions as well as other decisions regarding the allocation of household labor to economic activities are assumed to be made at the household level. Hence, we estimate an income determinant equation with households’ income as dependent variable and household characteristics as the determinants. Secondly, the methodology does not treat remittances as exogenous additions to income and recognizes that the earning potential of a migrant household member had he not migrated. Under this counterfactual approach, both the direct and indirect effects of migration on earnings of remaining household members are computed and the net effect of remittances on poverty and inequality is established. In this study we only look at the partial equilibrium effects of remittance flows and assume that the general equilibrium labor

market conditions are unaffected by the outflow of migrants and inflow of remittances.

We start by specifying a simple linear regression model for household  $i$  relating total household income to whether or not household receives international remittances,  $R_i$ , and a set of observed characteristics of the household,  $X_i$ :

$$Y_i = \beta R_i + \delta X_i + \varepsilon_i \quad (1)$$

The objective is to identify the causal effect of remittances on household income by estimating the coefficient  $\beta$  in equation (1). OLS estimation of equation (1) is problematic as it tends to overestimate the impact of remittances on poverty by treating it as an exogenous addition to income. The indirect effects of migration in the form of forgone earnings of absent migrant members are not accounted for in the estimation. In order to overcome this problem we need to estimate counterfactual income of the remittance-receiving household, i.e. the income that migrants' household would have received, had the migrants members decided to stay rather than emigrate. For the purpose of our analysis, it is assumed that migration decisions are made at the household level, and throughout the study the unit of analysis is the household and not the individual. A mean regression of log incomes of non-remitting households is estimated against a set of explanatory variables at the household level. The basic income determinant equation is estimated using standard OLS techniques and makes use of only the non remitting households from the data set:

$$\text{Log(Monthly Income)} = \alpha_0 + \beta_1 \text{Log(Household size)} + \beta_2 \text{Age of household head} + \beta_3 \text{Years of Education of household head} + \beta_4 \text{Gender of the household head}$$

We use the natural log of monthly income to smooth out any variation coming from the outliers in the reported household income data. The household size also enters the equation in the natural log form to allow for economies of scale at the household level; the marginal returns to an additional adult member are higher for smaller households (Brown et. al, 2008). The age of household head is used as a proxy to capture marginal returns of experience in the labor market. Then the education variable is simply the years of schooling for household head and captures the human capital endowment of the household.<sup>14</sup> We have also included the primary occupation variable based on contextual hierarchy of different vocations in the country—the variable takes a value of 0 for unemployed, 1 for wage laborers, 2 for farm based employment, 3 for self employment and 4 for government/army employee. The dependency ratio is simply the proportion of non-earning members in the household, defined as any child under the age of 12 and retired members of the household above the age of 65, expressed as a ratio of total number of adult members in the household. In the context of Pakistan where a large part of female population is not economically active it is important to control for the adult number of women in the household expressed as a proportion of total adult members—added as gender ratio in the above regression. In addition, wealth characteristics are added in the form of land ownership dummy and a dummy for household physical condition which are structural characteristics of the household, and thus unlikely to be influenced by monthly income flows; with more than two-third of the sample from rural

<sup>14</sup> The results are robust to other variants of education variable and the household's education was highly correlated with the average education of adult members in the household.

areas the land ownership dummy captures the income generating potential of agrarian households and the Katcha/Pucca dummy captures the endowment of household wealth when that structure was built. The selection of these variables for the income determinant regression is based on a careful review of the empirical literature and the characteristics of available data.

Under the strong assumption of no self selection of migrant households we use the parameter estimates from equation (2) to predict the income of remittance-receiving households. These predicted incomes are then used to calculate poverty and inequality measures including the headcount ratio, poverty gap and inequality measures like the GINI coefficient. Comparison is then drawn between the values of these measures resulting from the counterfactual income constructed and the observed income of the households both with and without remittances. Poverty measures across the following three basic scenarios are estimated and the comparisons are drawn :

**Observed income without remittances:** For this case the poverty indicators are estimated using actual observed income of the households, excluding the remittance amount for the remittance receiving households. . Indicators calculated under this scenario therefore treat remittances as an exogenous addition to income from other sources.

**Counterfactual income:** For this scenario indicators are calculated using observed income for households not receiving remittances and the counterfactual income for those in receipt of remittances is estimated using equation (2). This approach assumes that remittances are a substitute for emigrants' home earnings and uses the basic counterfactual methodology to estimate what the poverty and inequality indicators would be without migration. Therefore this approach accounts for the income the migrant would have earned at home had he decided not to migrate.

**Observed income with remittances:** For this case the poverty and inequality indicators for all households are calculated using observed income, including the remittance amount for the case of remittance receiving households.

For each of the above three scenarios income per capita is calculated for each household in order to construct the poverty measures. In line with literature, this is computed using a simple transformation in which the monthly income for a household is divided by the adult equivalent members in the household where each child less than 14 years of age is treated as equivalent to half an adult (Brown et al 2008).

The standard concern with the above methodology is that the households self-select themselves into migration. It is possible that there are unobserved characteristics of the households, such as entrepreneurial ability and ambition that might be correlated both with the decision of the household to send migrants and the income that the household earns. If this is the case, then the predicted incomes of remittance-receiving households are underestimated under the assumption of no self selection. In turn, the contribution of remittances on household welfare is overestimated. The best we can overcome this form of selectivity in a non-experimental setting is to match the households on pre-existing characteristics before migration and then look at the impact of remittances on household income of matched compatriots. It must be noted, however, that even with the propensity score matching method

we can still not dispense with the assumption of conditional mean independence or selection on observables. Intuitively, under this method we match the remittance-receiving households (treated units) with households not in receipt of remittances (control units) with close to identical values of a scalar-valued function of covariates, measuring the likelihood of a household self selecting into migration. Propensity Score Matching (PSM) ensures that the conditional probability of a household receiving remittances is the same between treated and controls units. Since, both groups have similar distributions in terms of observed characteristics, it is argued that it is plausible to assume that they have similar distributions of unobserved characteristics as well ( Ravallion, 2006).

The propensity score is used to match households that receive remittances to households that do not receive remittance but have similar household characteristics. Propensity score summarizes the pre-treatment characteristics of each household in a single index which is then used to match individuals across treatment and control groups. We expect to reduce non-randomization bias if we compare outcomes of individuals who are as similar as possible. The basic idea is to assume that receiving remittances is “treatment” and then to compare the probability of being poor for remittance receiving households to the probability of being poor for non remittance receiving household. The propensity score is then the probability of being in the treatment group conditional on pre-treatment variables.

We estimate a simple probit model by regressing  $R_i$  on covariates  $Z_i$  and functions of covariates for the entire sample.  $Z_i$  is the vector of household characteristics that best predict migration decision and  $R_i$  is a dummy whether household receive remittances or not. The estimated parameters from this regression are used to predict  $P(Z_i)$ , the propensity score for the likelihood of receiving remittances.

$$P(Z_i) = F(Z; \delta)$$

where  $\delta$  is obtained from a regression of  $R_i$  on  $Z_i$ . The set of explanatory variables used for this estimation are the following: age and age squared of the household head, household size, number of children below the age of ten, dummy for rural/urban location and proportion of household members who have completed education at least up to the middle level.

Once we have matched households with the propensity score we eliminate all control and treated units that do not have comparable values in the other group to increase the robustness of estimators of treatment effect based on matching (Todd and Smith, 2001). Intuitively, for the units that lie in the common support we are computing the difference in the outcome between the treated and control units and averaging this difference across all treated units. We use both income and asset based poverty measures as the outcome variable to demonstrate the robustness of our results.

### 3. DATA SECTION

The data used in this report comes from the Multiple Indicator Cluster Survey (MICS) 2007-2008. The choice of this data set is based on the fact that the latest household level data available for Pakistan is MICS for Punjab only. In the absence of nationally representative data this is the best data set that we can work with given that earlier work by Vaqar et al (2010) has used HIES (2005-06). Since, most of the remittances receiving households are concentrated in Punjab we can generalize the findings based on Punjab to the other provinces.

A total of 91,280 households from each of the 143 tehsils were surveyed in the Punjab Province of Pakistan and the survey was implemented between December 2007 and April 2008. The sample was selected in two stages—in the urban areas first stage selection unit is

an enumeration block;<sup>15</sup> in rural areas village is the primary sampling unit. A random sample of 16 and 12 households were drawn from each primary sampling unit for both rural and urban areas respectively. The first-stage sampling units are selected with probability proportional to size of the tehsil while the second stage units are selected with equal probability; the final sample is more or less self-weighting within each selection stratum.<sup>16</sup> The survey provides detailed information on household economic and demographic characteristics, income and employment profile of the members of the household, and information on emigrant members and overseas remittances received by the household (See Appendix I for the list of questions that were used for analysis in this study).

The final data set obtained from Punjab Bureau of Statistics contains data on 91,075 household. In this data information is available for the household and for each individual within the household, giving a total of 592,843 sampled individuals. The coverage unit of the survey is a household that is defined as household members that live together in one place and share the same kitchen. The household members may not necessarily be blood-related but they all live in one place. The domestic/overseas migrant members are not considered part of the household and member level information is reported only for the present members<sup>17</sup>. The income generated both by domestic and international migrants is not a part of overall household income and is reported separately as ‘money (cash) received by the household in the last year’ both from within Pakistan and overseas. This study focuses only on international remittances defined as cash transferred formally/informally through the financial system to the recipient household. Out of the total sample of 91,075 households 4,277 report at least one international migrant worker in the household. As expected, most households with an international migrant member received remittances (86.68%). Again, consistent with previous knowledge about remittances we find very few households with no international migrant that are in receipt of remittances (1.69%). The total number of remittance-receiving households from overseas in our sample is 3754 households.

The questionnaire provides detailed information on household demographic characteristics, income and employment sources and household assets. In MICS (2007-08) we find that the average number of reported household members is 6.53 in Punjab province. In our sample we find that the reported overall income of households (excluding remittances) is 8.83% higher than those reporting no migrants. In our sample 65% of the households are drawn from rural areas while the other 35% are urban households. The remittance receiving households follow the same distribution with 67% located in rural areas and the remaining 33% in the urban areas. The remittance-receiving households in our sample are disproportionately concentrated in the northern and central parts of the Punjab province (See Table 1). This distribution of migrants is similar across both rural and urban areas under this geographic classification of districts across the four belts (See Appendix II). Northern and Central Punjab are generally considered to be wealthier sections of the province compared to western and southern part (Cheema et. al, 2008). Even for this sample the household income for those located in Central Punjab is about 43% higher than households in Southern Punjab and 24.5% higher than those in Western Punjab. Likewise, overall household income for

<sup>15</sup> The Federal Bureau of Statistics has divided every city/town into a number of small compact areas of average size 200-250 households with well-defined boundaries called Enumeration Blocks (EB). The number of EBs drawn from each tehsil in urban areas are proportional to the size of the tehsil.

<sup>16</sup> For a detailed description of the sample design for MICS 2007-2008 see the Appendix A of MICS Report; p195-p201.

<sup>17</sup> No Migrant level information other than the location of migrant members and cash remitted by these members is recorded in the questionnaire.

those located in Northern Punjab is higher by a factor of one-third than those in Southern Punjab and turns out to be 15.8% higher than those in Western Punjab. This observation is important as it suggests that the concentration of migrant households in northern and central Punjab makes them appear wealthier in the overall sample than they actually are and it will be important to account for these regional income differences for evaluating the impact of remittances on household welfare.

One of the limitations of the MICS (2007-08) is that it only reports data on sources of household income and not on the consumption expenditure of the household. It is now well documented in the literature that household consumption is a better proxy for household welfare than income; however, given the non-availability of consumption data and the fact that we are only interested in evaluating the differential impact by income source (remittances and non-remittance incomes) we have decided to use per capita household income for estimating poverty measures and check robustness of our results using asset based poverty measures that best relate to consumption profile of the household. The total household income is defined as the sum total of income and comprises both primary and secondary<sup>18</sup> income along with domestic remittances. We need the household size including both domestic and international migrants to estimate per capita values of household income. In the questionnaire we do not have information on the number of domestic and international migrants in the household. The number of domestic and international migrant workers in a household is deduced from the information provided in the questions on where the emigrant member is located. We add the number of members located outside the village to the reported household size at the time of the survey to come up with the counterfactual household size for households with domestic and international migrants. Once, the total income and household size has been estimated for each household, this amount was divided by the adult-equivalent number of household members, where each child under 14 years of age was counted as 0.5 adults.<sup>19</sup> Table 3 shows the extent of mean differences in the demographic and socio-economic characteristics of non-remitting and remitting households.

TABLE 1

**Geographic Distribution of Remitting and Non Remitting Households of Punjab**

	Non Remittance	Remittance	Total
Northern Punjab	10,153 11.63	804 21.42	10,957 12.04
Western Punjab	18,389 21.07	391 10.42	18,780 20.63
Central Punjab	36,600 41.93	2,151 57.3	38,751 42.57
Southern Punjab	22,139 25.37	408 10.87	22,547 24.77
Total	87,281 100	3,754 100	91,035 100

\*Standard deviation in parenthesis

<sup>18</sup> Primary source is the major source of income for a household and is specified by the occupation of the household. Any additional source of income over and above income generated from primary occupation is treated as a secondary source.

<sup>19</sup> Brown and Jimenez (2008) use adult equivalent scales in their study of migration and remittances in Fiji and Tonga. The approach has been used earlier in Narsey (2006) to study urban poverty in Fiji.



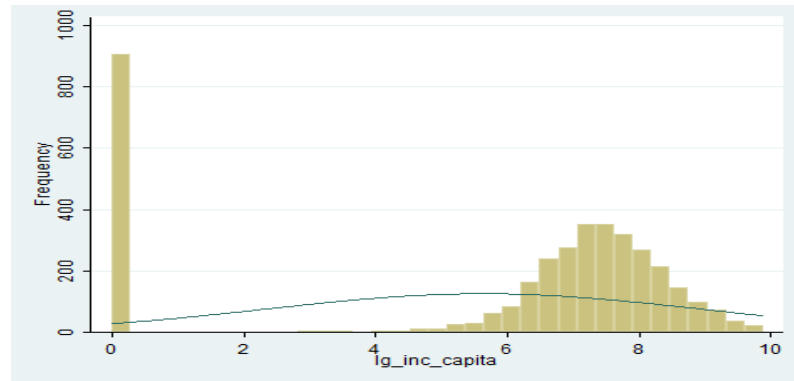
TABLE 3  
Mean Differences of Explanatory Variables

Variable definition	Mean for non-remitting	Mean for remitting	t-stat for difference in means
Age of Household Head	47.19 (14.13)	52.63 (15.59)	-22.99
Household head education in years	4.72 (4.95)	5.39 (4.94)	-8.09
Household size including international migrants	6.61 (2.95)	7.91 (3.47)	-26.21
Dependency ratio (Dependents under 12 and above 65)	0.34 (0.23)	0.27 (0.20)	18.34
Income per capita excluding international remittances	2431.10 (5833.60)	2371.91 (7730.56)	0.60
Gender ratio (no of adult women as a proportion of total adult members)	0.29 (0.15)	0.31 (0.12)	-8.05
Marital status of the Household head (Is 1 if household head is married and 0 otherwise)	88.76% (0.32)	82.12% (0.38)	-7.54
Rural/urban (Is 1 if household is in urban area and 0 otherwise)	34.45% (0.48)	37.59% (0.48)	-3.69
Household owns land (Is 1 if household owns agriculture land and 0 otherwise)	35.37% (0.47)	42.51% (0.49)	-10.83
Toilet (Is 1 if household owns a toilet and 0 otherwise)	67.97% (0.47)	90.81% (0.29)	-29.74

\*Standard deviation in parenthesis

Excluding foreign remittances we observe a bi-modal distribution of household per capita income for remittance-receiving household (See Figure 1). 25% of the remittance-receiving households are entirely dependent on remittance income and did not report any other income source. Then, we also observe a significant number of households who are not only in receipt of remittances, but are getting significant income stream from other primary and secondary income sources. This observation suggests that roughly 75% of households in our remittance-dependent sample are cushioned with other sources of income and are less susceptible to a fall in remittance flows in the wake of financial crisis. That said, it is still possible that the other sources of income are not sufficient enough to sustain the current living standards and these household will find themselves pushed under the poverty line in the absence of remittance income.

In the absence of a provincial poverty line for Punjab we rely on the national poverty line for income based poverty measures. The poverty line is therefore taken as the national poverty line which for the year 2007-08 for Pakistan was Rs 944.47 according to the Pakistan Economic Survey. Using this income based poverty line about 25% of the people are below the poverty line for our sample which is more or less consistent with 24% people below the poverty line at the national level, justifying its use for our analysis.

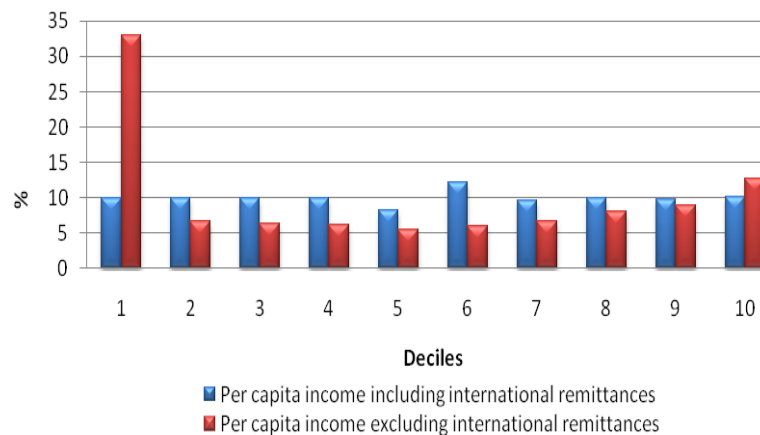
**Figure 1:** Distribution of per Capita Income for Remittance-receiving Household

## 4. RESULTS AND DISCUSSION

### 4.1 Pakistan

Before we present the results based on counterfactual approach it is important to observe the distribution of remittance-receiving household according to income deciles using income data for all households in the sample. For non remittance receiving households, the average per capita income is 2,431 while that of remittance receiving households excluding remittances is 2,371. Although these averages are almost same across the two groups the income distribution differs markedly across the two sets of households.

As observed earlier, in the data section, a large proportion of remittance receiving households have no other source of income and therefore without remittances, roughly 42.5% of households will be below the official poverty line of Rs 944.47 per adult equivalent. As shown in Figure 2, the income distribution of remittance-receiving households after we include remittances income is strikingly uniform across all income deciles. At first blush, the figure seems to suggest that remittance receiving households would be poor in the absence of remittances. It must be noted that the graph and the 42.5% head count ratio are both deceptive as they are treating remittances as an *exogenous* addition to household income. What this figure totally ignores is that the income generating capacity of these households is limited because at least one of its economically active members is working abroad.

**Figure 2:** Decile Wise Income Distribution of Remittance-Receiving Households

And, this is precisely the reason for using the counterfactual approach discussed in the earlier section. The empirical problem is that at any given point we either observe a household with remittances or a household without remittances but without the local income that could have been generated by the sender. We need to impute income for the households in the counterfactual scenario had the remittance sender not migrated and was earning wages in the local market. We use simple OLS method to estimate income determinant equation (1) for households not receiving remittances (results are reported in Table 4)

TABLE 4  
Results for OLS Estimation

	(1) Log (monthly income)	(2) Log (monthly income)	(3) Log (monthly income)	(4) Log (monthly income)
Log (Household Members)	0.815*** (48.84)	0.851*** (50.67)	0.813*** (52.34)	0.848*** (54.47)
HH head age	0.005*** (11.10)	--	0.005*** (11.98)	--
HH head education	0.031*** (17.57)	--	0.031*** (18.81)	--
Primary Occupation of HH	0.160*** (20.66)	0.160*** (20.23)	0.162*** (22.11)	0.162*** (21.60)
Gender of HH head	0.524*** (10.63)	0.519*** (10.63)	0.507*** (10.68)	0.504*** (10.66)
Dependency Ratio	-1.069*** (-40.65)	-1.160*** (-40.68)	-1.063*** (-40.74)	-1.151***
Gender Ratio	-0.449*** (-8.73)	-0.538*** (-9.97)	-0.440*** (-8.73)	-0.530*** (-10.05)
HH owns Land (Dummy)	0.289*** (19.06)	0.284*** (18.73)	0.301*** (20.55)	0.296*** (20.27)
Type of House (Pacca=1)	0.177*** (9.50)	0.183*** (10.15)	0.199*** (15.00)	0.203*** (15.84)
Urban HH (Dummy)	0.181*** (8.23)	0.164*** (7.28)	0.132*** (7.13)	0.118*** (6.05)
Regional Dummy	0.122*** (4.71)	0.131*** (5.16)	--	--
HH head Age - Mean(Age HH Head)	--	0.003*** (6.97)	--	0.003*** (7.86)
[HH Head Age - Mean(Age HH Head)] <sup>2</sup>	--	0.000*** (10.13)	--	0.000*** (10.21)
HH Head Edu - Mean(Edu HH head)	--	0.019*** (10.82)	--	0.020*** (11.40)
[HH Head Edu - Mean (Edu HH Head)] <sup>2</sup>	--	0.005*** (15.82)	--	0.005*** (15.70)
HH Head Edu * Urban HH	--	0.004 (0.22)	--	0.001 (0.08)
Fixed Effects	None	None	District	District
R-squared	0.259	0.268	0.273	0.281
Observations	86277	86277	86277	86277

Notes: *t*-statistics reported in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.10$  (two-tailed significant tests).

The estimated results are robust across the four specifications reported in the Table 4. The first column shows the most parsimonious specification with no fixed effects. All the variables in this specification are statistically significant and have signs consistent with the theoretical literature. Larger the household size, greater the earning capacity of the household as indicated by the significant positive coefficient on log household size. Age, which is a

proxy for work experience also impacts the income positively and so do the years of education of the household head capturing the positive returns to higher education. Also, households headed by males and located in urban areas are likely to earn more income than those that are not, *ceteris paribus*. We also see a positive effect of households belonging to a higher occupation group—the government employees and army are earning more than wage labourers and farming households. Likewise, we see a positive impact on income of both ownership of land and the type of dwelling that the household has. The higher number of females and dependents in the household has a negative effect on household income. Additional controls have been introduced in specification (2) to check for the robustness of our results. The results in column (2) are consistent with those in the first specification. We have introduced squared age and education variable in specification (2) to account for non-linearity in the human capital production function. These variables are also differenced from their means to mitigate any concerns for collinearity across independent variables. Both the squared terms for age and education are statistically significant. The point estimate for the coefficient on squared age is economically insignificant implying mildly increasing returns to experience for an additional year of age over and above the mean. For education, however, we do find significantly increasing returns to an additional year of schooling over the mean education level. There is no differential effect of years of schooling in urban areas relative to the rural areas as captured by the interaction term.

In columns (3) and (4) we estimate both of these specifications replacing the regional dummy with district level fixed effects. The results are again consistent with the earlier two specifications but the fit has improved slightly and the point estimates are more precise. We use specification (4) to predict counterfactual income of households receiving remittances. The average predicted per capita income imputed from estimation of equation (4) is about Rs. 2011. With this imputed income, we find that only 18.14% of the remittance-receiving households end up below the poverty line as opposed to 42.5% when the observed income without remittances is used for measuring incidence of poverty. The poverty gap, squared poverty gap and inequality for both these scenarios are reported in the Table 5 Estimate the squared poverty gap for specification (4) and insert table.

TABLE 5  
Poverty Indicators for the Three Scenarios

Case 1: Observed income without remittances		
	Receiving HH	Non Receiving HH
Poverty Head Count Ratio	42.50%	24.26%
Poverty Gap Ratio	31.4%	8.4%
Squared Poverty Gap	28.09%	4.44%
Case 2: Counterfactual income without remittances		
	Receiving HH	Non Receiving HH
Poverty Head Count Ratio	18.10%	24.26%
Poverty Gap Ratio	2.47%	8.4%
Squared Poverty Gap	0.61%	4.44%
Case 3: Observed Income with Remittances		
	Receiving HH	Non Receiving HH
Poverty Head Count Ratio	5.40%	24.26%
Poverty Gap Ratio	0.5%	8.4%
Squared Poverty Gap	1.15%	4.44%

The results suggest reduction both in the incidence and depth of poverty for remittance-receiving households. We find that the headcount ratio under the counterfactual approach for remittance-receiving households fall from 18% to 5% and poverty gap ratio falls from 2.47% to 0.5%. The income inequality, however, as measured by the GINI coefficient has worsened compared to the counterfactual scenario; the value of income GINI has deteriorated from 0.33 to 0.52. It must however be noted that the income inequality in the remittance receiving sample is the same as in the overall sample. The predicted income is estimated by setting the stochastic term to zero using the deterministic equation with estimated parameter coefficients. This estimation is tantamount to artificially reducing the variability in the data which might explain the unusually low value of GINI coefficient with the counterfactual income.

The problem in the above estimation is that the assignment of subjects to treatment and control groups is non-random and therefore the estimated effects could perhaps be biased in the presence of confounding factors. One possible way to reduce this bias is to condense the pre-treatment characteristics of each individual into a single-index called the propensity score and use this predicted score to match the treated units with their closest possible control. This strategy minimizes bias as we compare outcomes between matched and control compatriots that are as similar as possible on a vector of observed covariates. For observations with the same or nearly identical propensity score the distribution of pre-treatment characteristics is the same across both control and treatment groups. Next we present results from propensity score matching.

Only pre-treatment characteristics which are unaffected by migration decision are included in the first stage probit regression. The human capital variables included are age and age squared of household head, proportion of adult members in the household with more than eight years of schooling, while the household characteristics include a dummy for the presence of children below the age of 10 and household size. We also include regional characteristics including a dummy for rural/urban area and a dummy for household belonging to the more developed belt of Punjab—the northern and central districts. Human Capital variables are likely to affect migration because more educated and experienced people enjoy greater employment and expected income earning potential in destination countries (Schultz, 1982) and the migration decision is also influenced by household characteristics (Lipton, 1980, Adams, 1993). The problem however is that we do not have data on this variable prior to the migration decision and also the information on the timing of migration decision is not available. We are very careful in constructing appropriate variables that are time invariant or likely to be exogenous to the migration decision.

Table 6 shows the results of the first stage probit regression. All the variables included in this regression are statistically significant. The importance of education and experience is highlighted by the positive and significant effects of education and age on remittance-receiving status of the household. This regression is then used to compute the predicted probability of assignment to the treated units—the propensity score which in turn is used to match treated units with observationally similar control units. A number of different matching algorithms can be used to match the treated units based on propensity scores. All these methods including nearest neighbor, kernel, radius and stratification matching yield similar results asymptotically. Though estimates are sensitive to matching methods in small sample but in large sample like ours all methods will yield similar results. To make our sample even more comparable we limit ourselves to observations in the common support region—thereby eliminating units for which there are no comparable observations in the other

group. Next, we proceed with the balancing test on the difference in means of all the covariates in the regression. The balancing property is satisfied for all the blocks except for the first 2; in all the thirteen strata of propensity scores the difference in means between all the observed covariates except for household size and urban dummy are statistically insignificant.<sup>20</sup>

We use both income and asset based measures of poverty as our dependent variable for estimating average treatment effects on the treated (ATT). The first measure is the officially defined income poverty line as defined in the earlier chapter; another asset based poverty measure is constructed based on the poverty score card designed by the World Bank.<sup>21</sup> In the absence of food-based poverty line based on consumption data we computed poverty scores based on three categories of indicators available in the MICS data set [See Appendix III for details]. We construct a dummy for the poor household which takes a value of 1 for households that are below the income poverty line using total income for all households (including remittances). For the asset based poverty we have fixed the national poverty line at 24% to define the poverty score cut off for each of the four belts of Punjab Province. Based on these cutoffs the household is again classified as poor and non-poor.

TABLE 6  
**First Stage Probit Results**  
Dependant Variable: Dummy for Remitting Household

Household Size	0.064*** (24.49)
HH head Age - Mean(Age HH Head)	0.004*** (7.00)
[HH Head Age - Mean(Age HH Head)] <sup>2</sup>	0.000*** (11.74)
Adults with > 8 Yrs of School/Total Adults	0.520*** (21.48)
HH has children under age of 10	-0.169*** (-8.85)
Urban HH (Dummy)	-0.100*** (-5.74)
Regional Dummy	0.452***
Pseudo R-squared	0.082
Observations	90365

**Notes:** *t*-statistics reported in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.10$  (two-tailed significant tests).

<sup>20</sup> We ran number of different specifications but we could not satisfy the balancing property for all variables in all the blocks. A disproportionately large sample of controls (87000 units) for 3754 controls makes it harder to satisfy balancing condition for all the covariates. To set aside any concerns we report our results after eliminating units in the first 2 Blocks where the balancing test failed for household size and urban dummy.

<sup>21</sup> Based on PSLM 2005-06, the score card was designed with three categories of indicators attending to the best predictive capacity of household consumption expenditures. The weight for each variable is determined by an OLS regression when explaining consumption expenditure and then converted into a 0-100 scale using a linear transformation. In the absence of food-based poverty line based on consumption data we computed poverty scores based on three categories of indicators available in the MICS data set [See Appendix for details].

Table 7 shows the results of the estimation of Average Treatment Effects on Treated using both these poverty measures. For both measures of poverty we find results similar to the ones obtained earlier. We find a 14.4% reduction in the incidence of poverty using income based poverty line and a 13.4% reduction in asset based poverty. Across the different methodologies we find robust evidence of a 13%-15% reduction in the incidence of poverty amongst households receiving remittances. Given the nationally representative poverty rates of 24%, this effect, depending on who actually migrates and sends remittance back, could be equivalent to a reduction of 50%-60% in the poverty rates of remittance-receiving households compared to households not receiving remittances.

Table 7  
Measures of Poverty

Method	Asset Based	Income Based
Nearest Neighbor (ATT)	<b>-0.132</b>	<b>-0.144</b>
N. Treated	3746	3746
N. Control	24238	24238
Standard Error (Analytical)	0.008	0.007
t	-16.29	-20.819
Standard Error (Bootstrap)	0.008	0.008
T	-17.541	-18.481
Kernel (ATT)	<b>-0.151</b>	<b>-0.176</b>
N. Treated	3746	3746
N. Control	86580	86580
Standard Error (Analytical)	-	-
t	-	-
Standard Error (Bootstrap)	0.006	0.004
T	-27.079	-41.348

We have established empirically that households similar on observable characteristics are 15% less likely to fall below the national poverty line relative to non-remittance receiving households. This leads to the second order question of how the decline in remittance growth rates, estimated earlier, will impact the poverty levels in our sample countries. In the absence of a computable general equilibrium model with micro/macro linkages the precise estimates for the impact on poverty levels of the decline in the growth rate of remittances is beyond the scope of this study. That said, however, we can develop some intuitive and descriptive insights by synthesizing the results from both macro and micro level analyses.

Absent the financial crisis the remittances would have continued to grow at 11% per annum as discussed earlier in the macro results. Since, consumption motive is driving a migrant's decision to send money home, established empirically in the macroeconomic model, it is reasonable to assume that most of this growth in remittances is equivalent to an increase in the number of remittance receiving households in the home country. Using the 2007-08 province-wide distribution of households in MICS as a baseline, the proportion of households in receipt of remittances will rise from 4.1% to 4.5%, given an 11% growth in



remittance flow in the absence of financial crisis. With the estimated decline in the growth rate of remittances to 7.25% after the crisis the proportion of households in receipt of remittances in Punjab will be 4.4% as opposed to 4.5%, given the 2007-08 baseline. Given this nominal change, in the overall distribution of households in receipt of remittances, resulting from changes in the growth rate of remittances, any impact of financial crisis on provincial and national level poverty rate is limited and is likely to be statistically indistinguishable from zero in a more structured computational general equilibrium model of the economy.

#### **4.2 Bangladesh**

Unfortunately, the latest round of household level data on foreign remittances is not available for Bangladesh. Earlier studies on the impact of foreign remittances on household welfare have already used the earlier rounds of available data. Khan (2008) uses Household Income and Expenditure Survey Data for 2005 to analyze the impact of remittances on incidence of poverty<sup>22</sup>. Using propensity score matching, Khan (2008) finds that households in receipt of remittances, on average, are 18% less likely to fall below the poverty line relative to non-remittance receiving households. The projected decline in the growth rate of remittances in Bangladesh is 3.53% from 21.2% in the absence of financial crisis to 17.67% after the crisis. This annual decline in growth is modest and is consistent with the findings in earlier studies (Murshid et al. 2010). Given this nominal decline in the growth rate of remittances there will be little, if any, impact on poverty levels in Bangladesh from the projected fall in the growth rate of remittances.

#### **4.3 Sri Lanka**

Again, the detailed micro-econometric analysis for Sri Lanka is not feasible because of unavailability of household level data sets<sup>23</sup>. Even, the authors did not come across any study in the literature that documents the link between poverty and receipt of remittances at the household level using household level survey data for Sri Lanka. That said, the projected decline in the growth rate of remittances is 1.75%, thus, it is argued, that this modest decline in the growth rate will have limited impact on national poverty levels in Sri Lanka in the wake of current financial crisis.

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<sup>22</sup> No information on international migrants and remittances is reported in the Multiple Indicator Cluster Survey for Bangladesh (2006)

<sup>23</sup> The authors have written to the Bureaus of Statistics in Sri Lanka for access to the latest round of Household Income and Expenditure Survey but these oft-repeated requests were of no avail

APPENDIX I  
**Questions from the MICS that Were Used in this Study**

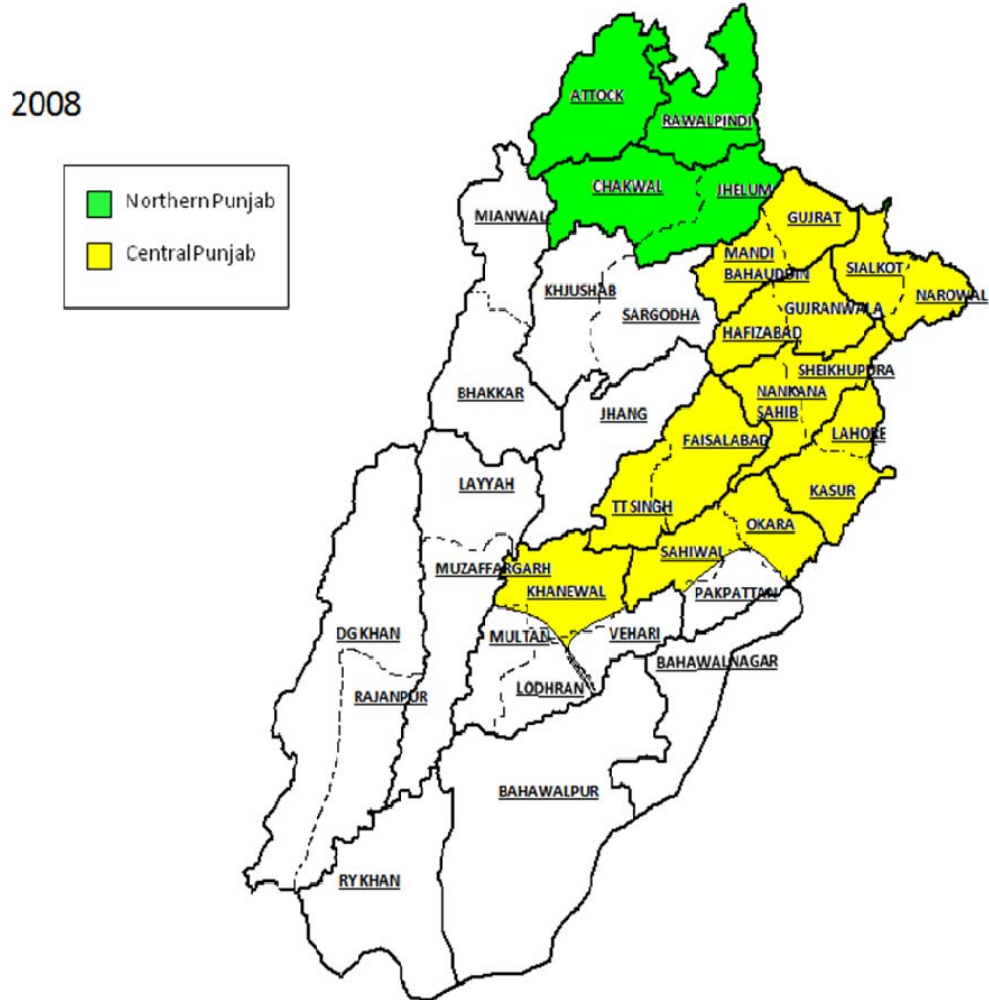
Variable name	MICS question
i_age	Write name & age of all members of the HH in completed years as per last birthday.
i_gender	Sex of the (name)
i_relhead	WHAT IS THE RELATIONSHIP OF (Name) WITH THE HEAD OF THE HOUSEHOLD?
i_marital	Marital status of the members 10+ years
i_everattend	HAS (name) EVER ATTENDED SCHOOL OR PRE-SCHOOL?
i_highestattend	WHAT IS THE HIGHEST LEVEL OF SCHOOL/ COLLEGE (name) ATTENDED AND THE CLASS (name) COMPLETED AT THAT LEVEL?
i_gradeattend	WHAT IS THE HIGHEST LEVEL OF SCHOOL/ COLLEGE (name) ATTENDED AND THE CLASS (name) COMPLETED AT THAT LEVEL?
i_currentattend	DURING 2007-08 SCHOOL YEAR, DID (name) ATTEND SCHOOL/ PRESCHOOL?
i_sourcepriinc	What is the major source of income of [name]?
i_monthlypri	Calculation of monthly income
i_monthlysec	Calculation of monthly income
h_dwelling	Type of Dwelling:(circle relevant code)
h_houseown	Ownership (circle relevant code)
h_sleeprooms	How many rooms in this household are used for sleeping?
h_floormaterial	Main material of the dwelling floor:
h_roofmaterial	Main material of the roof.
h_wallmaterial	Main material of the walls
h_tv	Does your household have the followings: television
h_phone	Does your household have the followings: telephone
h_mobilephone	Does your household have the followings: mobile telephone
h_internet	DOES YOUR HOUSEHOLD HAVE THE FOLLOWINGS: Internet connection
h_fridge	DOES YOUR HOUSEHOLD HAVE THE FOLLOWINGS: Refrigerator/freezer
h_ac	DOES YOUR HOUSEHOLD HAVE THE FOLLOWINGS: Air conditioner
h_washm	DOES YOUR HOUSEHOLD HAVE THE FOLLOWINGS: Washing Machine/dryer
h_cook	DOES YOUR HOUSEHOLD HAVE THE FOLLOWINGS: Cooking range/microwave

*Cont. Appendix I*

Variable name	MICS question
h_motorcycle	DOES ANY MEMBER OF YOUR HH OWN: Motorcycle/Scooter
h_car	DOES ANY MEMBER OF YOUR HH OWN: Car or other vehicle
h_ownland	DOES ANY MEMBER OF THIS HOUSEHOLD OWN ANY AGRICULTURAL LAND?
h_landarea	IF YES! THEN WHAT IS TOTAL ESTIMATE IN RUPEES AND ACRES?
h_cows	HOW MANY OF THE FOLLOWING ANIMALS DOES THIS HOUSEHOLD HAVE? Cows/calf
h_buffaloes	HOW MANY OF THE FOLLOWING ANIMALS DOES THIS HOUSEHOLD HAVE? Buffaloes/ calf
h_bulls	HOW MANY OF THE FOLLOWING ANIMALS DOES THIS HOUSEHOLD HAVE? Bulls/oxen
h_goats	HOW MANY OF THE FOLLOWING ANIMALS DOES THIS HOUSEHOLD HAVE? Goats/Sheep
h_memoutsidevil	IS ANY FAMILY MEMBER WORKING OUTSIDE THE VILLAGE/TOWN?
h_nomemoutsid	IS ANY FAMILY MEMBER WORKING OUTSIDE THE VILLAGE/TOWN? If Yes, indicate how many
h_memoutside	IS ANY FAMILY MEMBER WORKING OUTSIDE THE VILLAGE/TOWN? IF YES, WHERE?
h_memoutside1	IF YES, WHERE? Other village/town
h_memoutside2	IF YES, WHERE? Other District
h_memoutside3	IF YES, WHERE? Other Province
h_memoutside4	IF YES, WHERE? Overseas
h_domremit	DID THE HOUSEHOLD RECEIVE ANY REMITTANCE (IN CASH) DURING THE LAST YEAR? (MONEY WHICH WILL NOT BE REPAID) FROM WITHIN PAKISTAN
h_domremitamount	DID THE HOUSEHOLD RECEIVE ANY REMITTANCE (IN CASH) DURING THE LAST YEAR? (MONEY WHICH WILL NOT BE REPAID) IF YES, WHAT WAS THE TOTAL AMOUNT?
h_intremit	DID THE HOUSEHOLD RECEIVE ANY REMITTANCE (IN CASH) DURING THE LAST YEAR? (MONEY WHICH WILL NOT BE REPAID) FROM OVERSEAS
h_intlremitamount	DID THE HOUSEHOLD RECEIVE ANY REMITTANCE (IN CASH) DURING THE LAST YEAR? (MONEY WHICH WILL NOT BE REPAID) FROM OVERSEAS
h_benefits	DID ANY MEMBER OF FAMILY BENEFIT FROM GOVERNMENT SOCIAL PROTECTION SCHEMES LAST YEAR.

Variable name	MICS question
h_district	District
h_tehsilcode	Tehsil/Town
h_rural	Area: Urban.....1 Rural..... 2
h_hhsex	Name of the head of household: Male .....1 Female.....2
h_wlthscor	Wealth score
h_members	Total household members:
h_childernu5	No. of eligible children under 5 years:
h_twomen	Circle Line no. Of a Married woman of 15-49 years
h_children5	For each Child age 5-14: WHO IS THE MOTHER OR PRIMARY CARETAKER OF THIS CHILD?
h_toilet	WHAT KIND OF TOILET FACILITY DO MEMBERS OF YOUR HOUSEHOLD USUALLY USE?

## APPENDIX II



## APPENDIX III

**Score Card Information**

The three categories of indicators in the MICS dataset are household listing, education and household characteristics. These measures are based on household variables that capture consumption. The scorecard gives a score to each household based on their education level, the state of their house and household utilities and possessions they have. A score of zero is given if they don't have the utility mentioned otherwise the score changes depending on the indicators.

## Data Entry for the National Scorecard for Pakistan

Indicators		0-2	3-4	5-6	7 or more
1	How many people in the household are under the age of 18 or over the age of 65?	15	10	5	0
2	What is the highest educational level of the head of the household (completed)?	Never attended school 0	Less than class 1 to class 5 included 1	Class 6 to class 10 included 3	Class 11, college or beyond 10
3	How many children in the household between 5 and 16 years old are currently attending school?	There are no children between 5 and 16 years old in the household 4	All the children between 5 and 16 years old are attending school 4	Only some of the children between 5 and 16 years old are attending school 3	None of the children between 5 and 16 years old are attending school 0
4	How many rooms per person does the household owns? (calculate the room per person ratio by dividing the number of rooms by the household members)	$\geq 0 - \leq 0.2$ 0	$> 0.2 - \leq 0.3$ 2	$> 0.3 - \leq 0.4$ 4	$> 0.4$ 12
5	What kind of toilet is used by the household?	Flush connected to a public sewerage, to a pit or to an open drain 3	Dry raised latrine or dry pit latrine 2	There is no toilet in the household 0	
6	Does the household own at least one refrigerator, freezer or washing machine?	Yes 3	No 0		
7	Does the household own at least one air conditioner, air cooler, geyser or heater?	Yes 9	No 0		
8	Does the household own at least one cooking stove, cooking range or microwave oven?	Yes 5	No 0		
9	Does the household own the following engine driven vehicles...?	At least one car / tractor and at least one motorcycle / scooter 24	At least one car / tractor but no motorcycle / scooter 24	No car / tractor but at least one motorcycle / scooter 7	Neither car / tractor NOR motorcycle / scooter 0
10	Does the household own at least one tv?	Yes 2	No 0		
11	Does the household own the following livestock...?	At least one buffalo / bullock AND at least one cow / goat / sheep 6	At least one buffalo / bullock BUT NO cow / goat / sheep 6	No buffalo / bullock BUT at least one cow / goat / sheep 2	Neither buffalo / bullock NOR cow / goat / sheep 0
12	How much <u>agricultural</u> land does the household own? (converted into acres)	0 0	$> 0 - \leq 12.5$ 4	$> 12.5$ 7	

APPENDIX A  
**Projected GDP Growth Rates, Elasticity and Impact on Remittances**

TABLE A.1  
**Projected Real GDP Growth Rate**

	<b>Before Crisis April '07</b>	<b>After Crisis April '10</b>	<b>Change</b>
Advanced economies*	2.8%	2.38%	0.42%
Middle East**	5.44%	3.73%	2.07%

\*2010-12 average, \*\*2009-2011 average

Source: World Economic Outlook, 2007 & 2010

TABLE A.2  
**Elasticity of GDP Growth Rate to Remittances Growth Rate**

	<b>Advanced Economies</b>	<b>Middle East (lagged)</b>
Pakistan	2.03	1.40
Bangladesh	4.021	0.890
Sri Lanka	-5.77	2.018

Source: Author's own calculations

TABLE A.3  
**Impact on Remittances Growth Rate**

	<b>Flows from Advanced Economies</b>	<b>Flows from Middle East</b>	<b>Total Flows</b>
Pakistan	0.86%	2.90%	3.75%
Bangladesh	1.69%	1.84%	3.53%
Sri Lanka	-2.42%	4.18%	1.75%

TABLE A.4  
**Expected Growth Rate of Remittances for the 2008-12 Period**

	<b>Before crisis*</b>	<b>Expected decrease in flows</b>	<b>After crisis</b>
Pakistan	11%	3.75%	7.25%
Bangladesh	21.2%	3.53%	17.67%
Sri Lanka	13.9%	1.75%	12.15%

\* Based on average 2003-07 period growth rate of remittances

## APPENDIX B

**Data Sources and Issues**

In order to fulfill our objectives of tracing first what drives remittance flows and then establishing how these remittances will be impacted by the financial crisis, we require historical data. Annual time series data is the highest frequency available for macroeconomic analysis and has therefore been most commonly employed in literature on macro studies of remittances. The following section details the sources for each series employed and any issues that were encountered.

**Remittances**

The worker's remittance series in \$ is extracted from the current account portion of the IFS Balance of Payments Statistics 2010 country tables for all three countries. The series are aggregate amounts available for all countries on a calendar year basis since the year 1976.

**Issues**

Worker's remittances are distinct from migrant transfers. As shown by Chami et al. (2008), they have different properties and therefore respond differently to economic shocks (in a pro-cyclical manner) rendering their aggregation useless. This is because the figure of migrant transfers results from the money being brought upon the return of the migrant to the home country. Therefore, this flow is expected to be volatile over time making it both difficult to estimate and irrelevant for the purpose of our analysis. However, IFS does not report these figures separately for the case of Pakistan and Bangladesh and we are limited to the use of an aggregate figure of worker's remittances.

The figure obtained from IFS is the flows coming through the formal channels and therefore understates what the actual amounts remitted are. This is because especially in the case of South Asia informal channels are strong (World Bank (2006) uses econometric analysis to place the estimate at 50%). This is in part due to the profile of migrants from this region and in part due to the low development of the formal channels till recently.

**Gross Domestic Product (GDP)**

The analysis in step one is using explanatory variables in real terms for both home and host countries. Both the host and home country GDP series have been taken in US\$ constant 2000 terms for all countries used in the analysis from the WDI.

The important question is which countries to include in the analysis out of the countries that the migrants reside in. The optimal choice will be the construction of migrant stock weighted host GDPs (Hacker and Lee (2009) weight the GDP of top-4 expatriates receiving countries while Barajas et al. (2010) use the top-10). However, due to the unavailability of data on the exact number of migrants to each country,



weighted average of GDP of countries according to the volume of remittances coming from each will be used instead.

Based on country-wise remittance data obtained from the Central Banks of Bangladesh and Pakistan<sup>24</sup>, USA, UK, KSA, Kuwait and UAE came out to be the top five remittance sources for the years 1976-2007 accounting for about 75% of all remittance flows to Pakistan and more than 85% to Bangladesh. Hence, it is reasonable to take a weighted average of these five host countries. Within these countries, UK and USA are identified as the major host countries from the advanced economies while KSA, Kuwait and UAE from the developing Middle Eastern region. In order to construct the two weighted host GDPs, we first estimate the respective weights for each year as:

$$W_{it} = \frac{R_{it}}{\sum_{i=1}^n R_{it}}$$

Where:  $W_i$  is the weight for country  $i$  for year  $t$ ,  $R_{it}$  is the amount of remittances coming in to home country from country  $i$  in year  $t$  and  $n$  is the number of countries in the region, taking a value of three for the Middle Eastern countries and two for the advanced economies.

Once the weight for each country for each year are calculated, a weighted host GDP is formed for each year  $t$  as follows:

$$\text{Weighted } GDP_t^{\text{host}} = \sum_{i=1}^n W_{it} * GDP_{it}^{\text{host}}$$

This yields weighted GDPs for each region which are entered into the remittance determining equation separately. As discussed earlier the nature of the employment of migrants in two regions differ, with most overseas workers in Middle East hired on a contractual basis. These are for a minimum of 1-2 years and so the impact of the economy is expected to be felt with lag on the earnings and consequently on the remittances from the migrants. Further, majority of them are working in the construction or hotel industry which is impacted by the GDP growth with a lag. This is because the decision making process to start or halt projects requires considerable deliberation and is therefore not contemporaneously affected by the changes in GDP growth rates.

This is however not the case for the OECD cases where the changes in growth rate of GDP is expected to be contemporaneously felt on the earnings of the workers there. Hence, weighted average GDP growth rate of advanced economies enters in the same period in our remittance determining equation while that of Middle East economies is entered with a lag.

<sup>24</sup>Known as the Bangladesh Bank and State Bank of Pakistan respectively

### **Issues**

The weighting technique could not be applied to Sri Lanka due to data unavailability of country-wise remittance flows. The data available is for region wise remittance inflows for the years 2000-09. On average, 66% of all worker remittance flows to Sri Lanka have been from Middle Eastern countries while 26% and 7% flow from European Union and North America respectively. The weighted average of the host GDP for Advanced economies in the case of Sri Lanka is constructed using weights based on migrant stocks in the North American and European Union regions. As we do not have information on flows or migrants to specific countries in European Union, we employ the GDP for the entire region which is obtained from WDI.

For the case of Middle East, data on migrant stocks in each country is available from the Sri Lanka Bureau of foreign employment (SLBFE) allowing us to identify the major sources of remittances from the region. These are Kuwait, KSA and UAE which collectively account for 80%<sup>25</sup> on average of the migrants to the region. The weighted GDP for the Middle East region is based on the GDPs of these three countries as in the case of Bangladesh and Pakistan. However, in this case migrant stocks are used to construct weights due to the unavailability of remittance flow data for each country.

### **Real Exchange Rate**

The real exchange rate (RER) has been constructed using the nominal exchange rate (NER) from the IFS and the CPI for US and for the home country at 2000 base year<sup>26</sup>:

$$RER = (NER) * \left( \frac{CPI_{home}}{CPI_{host}} \right)$$

Where NER is the \$ to home country currency exchange rate. This RER is then indexed taking 2000 as the base year.

### **Issues**

This calculation was necessitated by the unavailability of Real exchange rate data for both Sri Lanka and Bangladesh. Therefore, for consistency purposes, the RER for all three countries were estimated using the above method. The RER has been constructed in such a way that a decrease in its value signals the depreciation of the home currency.

### **Interest Rate Differential**

Existing literature employs either a weighted average of interest rates of host countries or the interest rate in the largest remittance source country (see Singh et. al, 2009). For the purposes of our analysis, the largest host country for all three countries

<sup>25</sup> For the 1997-2008 period

<sup>26</sup> CPI for Pakistan and US has been obtained from WDI (2008) and for Bangladesh from the Statistics Department, Bangladesh Bank

is Saudi Arabia. However, deposit rate data for Saudi Arabia was available for only a limited number of years. This deposit rate was found to be highly correlated (99%) with the deposit rate prevalent in USA and so therefore interest rate of USA was used to calculate the interest rate differential. All interest rates were obtained from IFS and were adjusted using the CPI (at base year 2000) for all countries to arrive at estimates of real interest rates.

### **Issues**

An important decision to be made with this regard was which interest rate to employ. The interest rate most pertinent to our analysis would be the deposit rate which would reflect the relative return to assets in financial institutes. However, this data was only available for the host country, USA and for Sri Lanka. Hence, in the case of Sri Lanka, deposit rate differential is used. For the case of Pakistan and Bangladesh, discount rates differentials have been used instead. Discount rates are considered to be a good proxy for deposit rates since the interest rates in the economy are expected to move with this discount rate.

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