The impact of remittance inflows on inflation and GDP growth in the Indian Subcontinent

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Abstract

This paper examines the effect of remittances on economic growth and inflation in the Indian Subcontinent. It uses panel data from four countries (Pakistan, India, Bangladesh, and Sri Lanka) for the period 1976-2015. In the first part of the empirical section, we regressed real GDP growth on real remittance growth, while for the second part inflation was regressed on nominal remittance growth. Four empirical models were estimated for each of these, where country fixed effects and time fixed effects were used to control for variations across countries and years. In our final model, we added interaction variables to examine the effect of remittance inflows on each country separately. We found that remittance inflows hinder economic growth in Bangladesh and Sri Lanka. Also, we found that remittance inflows result in higher inflation for Sri Lanka. We conclude by discussing our findings.
1. Introduction

The Indian subcontinent is the largest exporter of human resources to the developed world. Workers who leave their home countries to seek better employment opportunities which most of them find abroad, usually cannot afford to bring their families along with them. This is primarily due to the high living cost in the countries where they have migrated to, so they share accommodations with other fellow immigrants instead. Therefore, when the immigrant workers ultimately send funds to their dependents, these become remittance inflows for the receiving countries. Remittances are generally more stable and predictable than foreign direct investment or international aid. Furthermore, several developing countries rely heavily for their expenditures on remittance inflows, which not only provide funds and liquidity, but also greatly improve the balance of payments. Therefore, the inflow of remittances is a very important macro-economic variable, the behavior of which still has much scope for development research. In one empirical paper, for example, it was found that remittance inflows could sometimes even affect unemployment rates (Mekawy, 2016). However there is no clear indication on whether remittances help towards economic growth of the receiving country or not.

In this paper, we attempt to examine the effect of remittance inflows on the receiving countries’ GDP growth using data from four main countries of the Indian subcontinent (Pakistan, India, Sri Lanka and Bangladesh) over the period 1975-2014. Additionally, we examine whether remittance inflows induce inflation in the Indian subcontinent. To come up with robust empirical findings, we use panel data for the four countries and control for some other important variables in the model, which are suggested by macroeconomic theory.

This paper is structured as follows. Section 2 reviews the literature that includes the findings of several relevant scholarly works. Section 3 describes the data and methodology.
Section 4 presents the empirical results. Section 5 discusses the conclusion and policy recommendations.

2. Literature Review

Mekawy (2016) shows how remittance inflows have varying impacts on different countries. He chose countries within the North African region and concludes that remittance inflows worsened the unemployment rate in Algeria, yet over the same time period helped reduce the unemployment rates in Morocco and Sudan. He added that the findings were different for Algeria since Algerians were eligible for up to 50 percent of their monthly salary as unemployment benefits. This factor, combined with incoming remittances, increased the reservation wage for Algerian workers and therefore raised unemployment. Nevertheless, the general phenomenon observed in the other two North African countries was that emigrating workers, by migrating to other countries would nonetheless decrease the domestic unemployment rate by reducing the labor force participants and the unemployed in their home countries.

It is evident that remittance inflows favorably influence both consumption of goods and services and the balance of payments. In particular, the increase in consumption spending technically aids the developing countries in poverty alleviation. Adams and Page (2005) examined this research question empirically using data on poverty, inequality, migration, income, and remittances from 71 developing countries and found a strongly negative correlation between poverty and remittance inflows. This was also true when poverty was regressed on international migration. Hence Adams and Page (2005) concluded that remittance inflows into the country and emigrating workers outside the country have been two key factors that have assisted developing countries in their fight against poverty. These findings have been broadly accepted by researchers and were not subject to much debate.
However the impact of remittance inflows on economic growth of developing countries has been much more controversial.

Some researchers, rather, argue that remittance inflows have made the developing countries less vulnerable to economic growth. Bajaras et al. (2009) state that there has been a lack of empirical evidence when it comes to the relationship between remittance inflows and economic growth. They mention that there have been several countries with their remittance inflows significantly above 10 percent of their GDP; however, there has not been a single success story of any of these countries being developed due to incoming remittances. The reason that they provide is that the inflow of remittances is effectively a kind of social insurance that helps dependents finance their purchases. Therefore, these remittances affect household consumption but have no significant impact on investments or savings that cause economic growth. Additionally, the paper suggests there could be a problem of reverse causality and multi-collinearity (between remittances and migration) in the studies that have been conducted on remittances. For instance, even if remittance inflows would help families get better education, the family members might later migrate, and the long-term impact of remittances may not be realized. Other researchers, as we shall see below, have shown a more optimistic viewpoint in favor of remittance inflows as a development tool for developing countries. Their argument is mainly based on the fact that remittance inflows have a multiplier effect in the receiving country that results in the expansion of both households and industries. Some hypothesize that remittance inflows also provide developing countries with the means to afford better education and healthcare and thus help achieve better macroeconomic results in the long run.

Akter (2016) specifically studied the impact of remittance inflows on the economic growth of Bangladesh. She mentioned that most of the remittances received by dependents in Bangladesh were mostly from the GCC countries. By using time-series regression and
correlation analysis, she found that remittance inflows have positively affected the GDP growth rate of Bangladesh, and therefore concluded that remittance inflows have been an important source of economic development for the country. The effect of remittances thus has a multiplier effect, which makes it an essential macro-economic tool, the effects of which could also be studied on other countries in the region which also rely on remittance inflows to a varying degree.

In addition to economic growth, there has been another effect of remittance inflows on the economy of Bangladesh. Khan and Islam (2013) have examined the effect of remittance inflows on inflation in Bangladesh using vector autoregressive techniques with annual data from the period 1972 to 2010. They concluded that there is a strongly positive and significant relationship between inflation and remittance inflows that prevails only in the long run. They further conduct the Granger Causality test and show that the causal relationship is unidirectional, and it is remittance growth that causes inflation and not vice versa.

Balderas and Nath (2008) found similar results for Mexico, which also relies greatly on remittance inflows. They cited Durand et al. (1996) who explained that nearly three quarters of remittances received by Mexico would be consumed right away. This would cause a rightward shift in the demand curve for these goods and services that would cause a disproportionate increase in the relative prices. They estimated the impact of remittance inflows on inflation and found a statistically significant and positive correlation between the variables.

Ngoc and Nguyen (2014) conducted their empirical study using quarterly data on Vietnam and found that the impact of remittance inflows on inflation could rather be seen with a lag of two quarters. Furthermore, they found that under a fixed exchange rate regime (as was the case with Vietnam), remittance inflows would increase the money supply in the
immediate quarter. They concluded that countries with flexible exchange rate regimes may not have such severe impacts on their inflation rates due to remittance inflows as was the case with Vietnam.

Narayan et al. (2011) used dynamic panel data for 54 developing countries that included 19 from Africa, 17 from Central and South America, 8 from Europe and 7 Asian countries. They conducted System Generalized Method of Moments (GMM) estimation and came up with 11 different models, finding the coefficient of remittance growth statistically significant across all of the 11 models. The control variables varied across these models but were mainly the following: trade (as a percentage of GDP), GDP growth, current account deficit (as a percentage of GDP), total debt (as a percentage of GDP), crude oil price growth, U.S. interest rate, democracy, government stability, military, and law and order. This was a very important contribution to the literature that studied the overall impact of remittances on inflation as a generalizable trend for developing countries.

Al Kaabi (2016) undertook a different study on remittances examining the outflows and their impact on GDP growth and inflation. He conducted a panel study on the GCC (Gulf Cooperation Council) countries (UAE, Bahrain, Saudi Arabia, Kuwait, Qatar, and Oman). He showed that remittance outflows negatively affected the real GDP growth rate of Saudi Arabia, whereas investments had a positive impact on their economies all over the GCC. The policy implication was that expatriates should be encouraged to keep their families with them, since this would reduce remittance outflows for the GCC countries. Furthermore, the study also found that remittance outflows negatively affected inflation in Bahrain, while having no significant impact on other GCC countries. This was particularly since Bahrain was the smallest country in the study and thus most vulnerable to price level drops due to increases in remittance outflows and vice versa.
3. Data and Methodology

The data for this study has been collected from the World Bank for 4 countries of the Indian Subcontinent (Pakistan, India, Bangladesh, and Sri Lanka) over the 1975-2015 period. Here, we are primarily interested in growth in remittance inflows (both real and nominal), real GDP growth, and inflation. The following charts depict the behavior of these key variables over time:
The analysis is divided into two parts. The first part looks at the impact of growth in real remittances on growth in real GDP, while the second part examines the impact of growth in nominal remittances on inflation. Four models are estimated for each, all using panel data from 1975 through 2015. The first model does not include fixed effects, while the second model includes both time and country fixed effects. Next, separate Wald tests are conducted to see if the time dummy variables and the country dummy variables are needed. Then, based on the Wald test results in Model 2, we estimate Models 3 and 4. Model 4 includes four interaction variables in order to identify the effects on individual countries separately. Finally, we conduct the Wald test in order to see whether it is reasonable to assume that remittance inflows affect real GDP and inflation of the four countries differently.

In the second part for inflation, we initially thought of using one-year lags for growth in nominal remittance inflows, because we expected the effect of remittance inflow growth on inflation would not be realized immediately as explained by the Keynesian view of sticky prices. Not all remittances are consumed simultaneously as they are received by the households, and even if they were to be consumed immediately, the price levels may not change immediately. However, based on the preliminary estimations, we found that the effect of remittance inflows was realized within a year, and hence the lagged variables were not used for the estimations in this paper.

Furthermore, since it is essential to take into consideration other factors that may play a role in affecting the dependent variables, we include several control variables from economic theory: These are growth in government spending, money supply, consumption, exports and imports of goods and services, and population in addition to the rate of depreciation in the domestic currency. Details of these variables are provided in the following table:
<table>
<thead>
<tr>
<th>Variable</th>
<th>Brief description</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>$g$</td>
<td>Real GDP growth rate: growth in real gross domestic product using constant 2010 USD.</td>
<td>GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources.</td>
</tr>
<tr>
<td>RREM</td>
<td>Growth in real remittance inflows using constant 2010 USD.</td>
<td>Personal remittances comprise personal transfers and compensation of employees. These include all current transfers between resident and nonresident individuals in cash or kind.</td>
</tr>
<tr>
<td>NREM</td>
<td>Growth in nominal remittance inflows using current USD.</td>
<td></td>
</tr>
<tr>
<td>RCON</td>
<td>Growth in real household final consumption using constant 2010 USD.</td>
<td>The term that has traditionally been used is private consumption.</td>
</tr>
<tr>
<td>RGOV</td>
<td>Growth in real general government final consumption expenditure using constant 2010 USD.</td>
<td>This variable includes purchase of goods and services (including employee compensations) and expenditure on national defense and security (but excludes the military expenditure that is a part of government capital formation).</td>
</tr>
<tr>
<td>NGOV</td>
<td>Nominal general government final consumption expenditure in current USD.</td>
<td></td>
</tr>
<tr>
<td>NSAV</td>
<td>Nominal gross domestic savings in current USD.</td>
<td>These are calculated as GDP less final consumption expenditure (total consumption).</td>
</tr>
<tr>
<td>RIMP</td>
<td>Growth in real imports of goods and services using constant 2010 USD.</td>
<td>Imports and exports of goods and services include the value of merchandise, freight, insurance, transport, travel, royalties, license fees, and other services, such as communication, construction, financial, information, business, personal, and government services. They exclude compensation of employees and investment income (formerly called factor services) and transfer payments.</td>
</tr>
<tr>
<td>NIMP</td>
<td>Growth in nominal imports of goods and services using current USD.</td>
<td></td>
</tr>
<tr>
<td>REXP</td>
<td>Growth in real exports of goods and services using constant 2010 USD.</td>
<td></td>
</tr>
<tr>
<td>NEXP</td>
<td>Growth in nominal exports of goods and services using current USD.</td>
<td></td>
</tr>
<tr>
<td>RMS</td>
<td>Real money supply growth (broad money) using constant 2010 USD.</td>
<td>This variable includes currency outside banks, demand deposits (other than those of the central government), the time, savings, and foreign currency deposits of resident sectors (other than the central government), bank and traveler’s checks, and other securities such as certificates of deposit and commercial paper.</td>
</tr>
<tr>
<td>NMS</td>
<td>Nominal money supply growth (broad money) using current USD.</td>
<td></td>
</tr>
<tr>
<td>POP</td>
<td>Population growth rate (for the total population living in the country).</td>
<td></td>
</tr>
<tr>
<td>INF</td>
<td>The inflation rate, computed using the Consumer Price Index (CPI). This is computed using the changes in log (CPI) multiplied by a hundred.</td>
<td></td>
</tr>
<tr>
<td>DEP</td>
<td>This is the rate of depreciation of domestic currency with respect to the USD (nominal exchange rate), used in the inflation model (Study 2) as a control variable, being a major determinant of inflation. Hence this can be seen as the growth rate for E (which is the annual percentage increase in price of 1 USD)</td>
<td></td>
</tr>
</tbody>
</table>

All the above variables were used as growth rates, leaving us with one less observation (resulting in the exclusion of the year 1975 from our study). The primary source of data is the World Bank database, retrieved on March 3, 2017.
4. Empirical Estimations and Results

This section is divided into two parts. The first part examines the effect of real remittance growth on real economic growth, and the second part studies the effect of nominal remittance growth on inflation.

4.1 Empirical Estimations and Results for Real GDP Growth

Model 1 for real GDP growth contains no fixed effects as follows:

\[ g_{it} = \alpha_0 + \beta_1 \text{RREM}_{it} + \beta_2 \text{RCON}_{it} + \beta_3 \text{RGOV}_{it} + \beta_4 \text{RIMP}_{it} + \beta_5 \text{REXP}_{it} + \]
\[ \beta_7 \text{RMS}_{it} + \beta_8 \text{POP}_{it} + \mu_{it} \]  

(1)

The OLS estimates of Model 1 are reported in column 2 of Table 1. We then include time and country fixed effects using dummy variables in the following model:

\[ g_{it} = \beta_1 \text{RREM}_{it} + \beta_2 \text{RCON}_{it} + \beta_3 \text{RGOV}_{it} + \beta_4 \text{RIMP}_{it} + \beta_5 \text{REXP}_{it} + \beta_6 \text{RMS}_{it} + \beta_7 \text{POP}_{it} + \]
\[ \alpha_1 t + \alpha_2 t + \ldots + \alpha_39 t_{15} + \gamma_1 \text{PAK} + \gamma_2 \text{IND} + \gamma_3 \text{BAN} + \gamma_4 \text{SRI} + \mu_{it} \]  

(2)

The OLS estimates of Model 2 are reported in column 3 of Table 1. We again conduct separate Wald tests on the fixed effect dummy variables. We reject the null hypothesis that \( \alpha_1 = \alpha_2 = \ldots = \alpha_{39} \) with a p-value of 0.001, concluding that the intercept term significantly varies across time and therefore, the time dummy variables are collectively considered important in the model. However, when we repeat the test for the country dummy variables, we are unable to reject the null hypothesis that \( \gamma_1 = \gamma_2 = \gamma_3 = \gamma_4 \) with a p-value of 0.466. Therefore, we conclude that the intercept term is not significantly different across countries and therefore, formulate the following model with time fixed effects only:

\[ g_{it} = \beta_1 \text{RREM}_{it} + \beta_2 \text{RCON}_{it} + \beta_3 \text{RGOV}_{it} + \beta_4 \text{RIMP}_{it} + \beta_5 \text{REXP}_{it} + \]
\[ \beta_6 \text{RMS}_{it} + \beta_7 \text{POP}_{it} + \alpha_1 t + \alpha_2 t + \ldots + \alpha_{40} t_{15} + \mu_{it} \]  

(3)

The OLS estimates of Model 3 are reported in column 4 of Table 1. We again conduct the Wald test for the time dummies by testing the null hypothesis that \( \alpha_1 = \alpha_2 = \ldots = \alpha_{40} \) which we reject with a p-value of 0.001, hence concluding that the intercept term varies across the
years. In our final model, we add four interaction variables to observe the effect of growth in real remittance inflows on growth in real GDP for each country separately, as follows:

\[ g_i = \beta_{1,1}RREM_iPAK + \beta_{1,2}RREM_iIND + \beta_{1,3}RREM_iBAN + \beta_{1,4}RREM_iSRI + \beta_{2}RCON_i + \beta_{3}RGOV_i + \beta_{4}RIMP_i + \beta_{5}REXP_i + \beta_{6}RMS_i + \alpha_{1}t + \alpha_{2}t + \ldots + \alpha_{40}t + \mu_i \]  

(4)

The OLS estimates of Model 4 are reported in column 5 of Table 1. Once again, we are able to reject the null hypothesis that \( \alpha_1 = \alpha_2 = \ldots = \alpha_{40} \) with a p-value of 0.001. Additionally, we also test whether the parameters of the interaction variables are significantly different from each other. Based on the Wald test results, we reject the null hypothesis that \( \beta_{1,1} = \beta_{1,2} = \beta_{1,3} = \beta_{1,4} \) with a p-value of 0.001, concluding that remittance inflows affect the countries in the sample differently.

The results in Model 4 illustrate that the parameter estimates of remittance inflows for Bangladesh and Sri Lanka are both negative. The parameter estimate for Sri Lanka is statistically significant while the parameter estimate for Bangladesh is statistically significant using a one-tailed test with an absolute t-value of 1.55. Our results make sense since Sri Lanka is the smallest country in the sample and, therefore, the most vulnerable to a change in remittance inflows. It was found that a one percent point increase in real remittances results in a 0.21 percent point decrease in real GDP of Sri Lanka, while reducing Bangladesh’s real GDP by only 0.05 percent point. One explanation would be that remittances are generally consumed by the households and do not result in an increase in investment that is required for economic expansion. An alternative view explained by Mekawy (2016) is that an increased reliance on these remittances results in a higher reservation wage of the households, which results in a lower willingness to work at the prevailing market wage. This consequently increases unemployment or reduces the labor force participation, resulting in a decline in real economic growth. Finally, we see that increased government spending has worsened real
economic growth due to the crowding out effect, while monetary policy has played a significant role in expanding real output.

Table 1: Dependent Variable: Real GDP growth rate – 1976 to 2015

<table>
<thead>
<tr>
<th></th>
<th>Model (1)</th>
<th>Model (2)</th>
<th>Model (3)</th>
<th>Model (4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RREM</td>
<td>-0.053 (2.13)</td>
<td>-0.038 (1.41)</td>
<td>-0.048 (1.78)</td>
<td>-0.017 (0.56)</td>
</tr>
<tr>
<td>RREM_PAK</td>
<td></td>
<td></td>
<td></td>
<td>0.011 (0.25)</td>
</tr>
<tr>
<td>RREM_IND</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RREM_BAN</td>
<td></td>
<td></td>
<td>-0.052 (1.55)</td>
<td>-0.210 (4.00)</td>
</tr>
<tr>
<td>RREM_SRI</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Control Variables:

<table>
<thead>
<tr>
<th></th>
<th>Model (1)</th>
<th>Model (2)</th>
<th>Model (3)</th>
<th>Model (4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RCON</td>
<td>0.103 (0.69)</td>
<td>-0.062 (0.34)</td>
<td>-0.025 (0.13)</td>
<td>-0.151 (0.92)</td>
</tr>
<tr>
<td>RGOV</td>
<td>-0.210 (1.91)</td>
<td>-0.192 (2.27)</td>
<td>-0.199 (2.20)</td>
<td>-0.225 (2.49)</td>
</tr>
<tr>
<td>RIMP</td>
<td>0.019 (0.38)</td>
<td>0.050 (0.96)</td>
<td>0.042 (0.80)</td>
<td>0.065 (1.35)</td>
</tr>
<tr>
<td>REXP</td>
<td>-0.028 (0.54)</td>
<td>-0.042 (0.89)</td>
<td>-0.044 (0.97)</td>
<td>-0.060 (1.31)</td>
</tr>
<tr>
<td>RMS</td>
<td>0.692 (9.86)</td>
<td>0.708 (7.50)</td>
<td>0.691 (7.28)</td>
<td>0.664 (8.43)</td>
</tr>
<tr>
<td>POP</td>
<td>-0.123 (0.18)</td>
<td>-0.491 (0.20)</td>
<td>0.809 (1.05)</td>
<td>0.143 (0.18)</td>
</tr>
</tbody>
</table>

Year Fixed Effects: No Yes Yes Yes
Country Fixed Effects: No Yes No No

Adjusted R-squared: 0.64 0.64 0.64 0.67
Number of Observations: 160 160 160 160

Note: Countries included in the sample are Pakistan, India, Bangladesh and Sri Lanka. Numbers in parentheses are the absolute (Newey West) t-statistics that have been corrected for hetroskedasticity and serial auto-correlation. Model 2 has country dummy variables that replace the intercept. Depending on the data point that whether it is from Pakistan, India, Bangladesh, or Sri Lanka, the dummy variables (PAK, IND, BAN, or SRI) would take the value of 1, and zero otherwise. Similarly, Models 2, 3 and 4 include time dummy variables which take the value of 1 if the data point corresponds to the specified year and zero otherwise. The coefficients are rounded to the nearest 3rd decimal place, while the t-values in parenthesis are rounded to the nearest 2nd decimal place.
4.2 Empirical Estimations and Results for inflation

Model 1 for inflation, which was estimated without any fixed effects is:

\[
\text{INF}_t = \alpha_0 + \delta_1 \text{NREM}_t + \delta_2 \text{NGOV}_t + \delta_3 \text{NIMP}_t + \delta_4 \text{NEXP}_t + \delta_5 \text{NMS}_t + \delta_6 \text{DEP}_t + \mu_t
\]  

(1)

The OLS estimates of Model 1 are reported in column 2 of Table 2. We then include time and country fixed effects using dummy variables in the following model:

\[
\text{INF}_t = \delta_1 \text{NREM}_t + \delta_2 \text{NGOV}_t + \delta_3 \text{NIMP}_t + \delta_4 \text{NEXP}_t + \delta_5 \text{NMS}_t + \delta_6 \text{DEP}_t + \alpha_1 t^7 + \alpha_2 t^8 + \ldots + \alpha_{39} t^{15} + \Upsilon_1 \text{PAK} + \Upsilon_2 \text{IND} + \Upsilon_3 \text{BAN} + \Upsilon_4 \text{SRI} + \mu_t
\]  

(2)

The OLS estimates of Model 2 are reported in column 3 of Table 2. Next, we conduct Wald tests on fixed effect dummy variables. We reject the null hypothesis that \( \alpha_1 = \alpha_2 = \ldots = \alpha_{39} \) with a p-value of 0.001. Additionally, we also reject the null hypothesis that \( \Upsilon_1 = \Upsilon_2 = \Upsilon_3 = \Upsilon_4 \) with a p-value of 0.019, concluding that time and country fixed effects are both important and should be included. Subsequently, we introduce interaction variables in Model 3, to find out the effect of growth in nominal remittance inflows on inflation of each country separately, as follows:

\[
\text{INF}_t = \delta_{1,1} \text{NREM}_t \text{PAK} + \delta_{1,2} \text{NREM}_t \text{IND} + \delta_{1,3} \text{NREM}_t \text{BAN} + \delta_{1,4} \text{NREM}_t \text{SRI} + \delta_2 \text{NGOV}_t + \delta_3 \text{NIMP}_t + \delta_4 \text{NEXP}_t + \delta_5 \text{NMS}_t + \delta_6 \text{DEP}_t + \alpha_1 t^7 + \alpha_2 t^8 + \ldots + \alpha_{39} t^{15} + \Upsilon_1 \text{PAK} + \Upsilon_2 \text{IND} + \Upsilon_3 \text{BAN} + \Upsilon_4 \text{SRI} + \mu_t
\]  

(3)

The OLS estimates of Model 3 are reported in column 4 of Table 2. We again conduct the Wald tests for fixed effect dummy variables and reject the null hypothesis that \( \alpha_1 = \alpha_2 = \ldots = \alpha_{39} \) with a p-value of 0.001. However, we fail to reject the null hypothesis that \( \Upsilon_1 = \Upsilon_2 = \Upsilon_3 = \Upsilon_4 \) with a p-value of 0.445, concluding that the intercept term is significantly different across time, but the same across countries. Furthermore, in order to determine whether the effect of growth in nominal remittance inflows on inflation is the same across countries or not, we test the null hypothesis that \( \delta_{1,1} = \delta_{1,2} = \delta_{1,3} = \delta_{1,4} \), which we reject with a p-value of 0.001,
concluding that the slope parameters significantly differ across countries. Also, since the country dummy variables are now insignificant, we can exclude them and estimate our final model as follows:

\[
\text{INF}_t = \delta_{1,1}\text{NREM}_{it}\text{PAK} + \delta_{1,2}\text{NREM}_{it}\text{IND} + \delta_{1,3}\text{NREM}_{it}\text{BAN} + \delta_{1,4}\text{NREM}_{it}\text{SRI} + \delta_{2}\text{NGOV}_{it} + \delta_{3}\text{NIMP}_{it} + \delta_{4}\text{NEXP}_{it} + \delta_{5}\text{NMS}_{it} + \alpha_1t_{17} + \alpha_2t_{27} + \ldots + \alpha_40t_{15} + \mu_t \tag{4}
\]

The OLS estimates of Model 4 are reported in column 5 of Table 2. Once again, we see from the Wald test that the time dummies are significantly different from each other as we reject the null hypothesis that \(\alpha_1 = \alpha_2 = \ldots = \alpha_{39}\) with a p-value of 0.001. We also reject the null hypothesis that \(\delta_{1,1} = \delta_{1,2} = \delta_{1,3} = \delta_{1,4}\), which we reject with a p-value of 0.001. The parameters of the interaction variables, which represent the effect of nominal remittance inflows on inflation, greatly vary across countries.

The results in Model 4 illustrate that the parameter estimate of remittance inflows for Sri Lanka is highly significant. Recipient households of remittances increase their demand for goods and services which as a result, raises price levels in the country. Specifically for Sri Lanka, we found that a 1 percent point rise in nominal remittance inflows resulted in an increase in inflation by 8.62 percent points. Our results make sense since Sri Lanka is the smallest country in the sample and, therefore, the most vulnerable to a change in remittance inflows. In 2015, personal remittance inflows alone, were as high as 8.5 percent of Sri Lanka’s GDP (World Bank). This ratio was the highest when compared with other countries in the sample. Additionally, we also find that high government expenditure in the Indian Subcontinent is associated with high inflation. Conversely, we do not find statistically significant results for Bangladesh as found by Khan and Islam (2013). Nevertheless, this paper does not contradict the findings of Khan and Islam (2013), but extends their study to other countries of the Indian Subcontinent (Pakistan, India, and Sri Lanka), with more recently available data.
Table 2: Dependent Variable: Inflation rate – 1976 to 2015

<table>
<thead>
<tr>
<th></th>
<th>Model (1)</th>
<th>Model (2)</th>
<th>Model (3)</th>
<th>Model (4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>NREM</td>
<td>-1.143 (0.75)</td>
<td>1.255 (0.66)</td>
<td>4.595 (1.34)</td>
<td>4.481 (1.31)</td>
</tr>
<tr>
<td>NREM_PAK</td>
<td></td>
<td></td>
<td>-2.737 (0.96)</td>
<td>-1.921 (0.75)</td>
</tr>
<tr>
<td>NREM_IND</td>
<td></td>
<td></td>
<td>-0.710 (0.35)</td>
<td>-1.997 (1.07)</td>
</tr>
<tr>
<td>NREM_BAN</td>
<td></td>
<td></td>
<td>5.456 (1.31)</td>
<td><strong>8.624 (3.18)</strong></td>
</tr>
<tr>
<td>NREM_SRI</td>
<td></td>
<td></td>
<td>4.590 (0.64)</td>
<td>-3.346 (0.50)</td>
</tr>
</tbody>
</table>

Control Variables:

<table>
<thead>
<tr>
<th></th>
<th>Model (1)</th>
<th>Model (2)</th>
<th>Model (3)</th>
<th>Model (4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>NGOV</td>
<td><strong>7.521 (1.87)</strong></td>
<td><strong>7.600 (1.93)</strong></td>
<td><strong>7.385 (1.89)</strong></td>
<td><strong>8.224 (2.33)</strong></td>
</tr>
<tr>
<td>NIMP</td>
<td>5.221 (1.30)</td>
<td>0.516 (0.17)</td>
<td>-1.012 (0.32)</td>
<td>-1.274 (0.41)</td>
</tr>
<tr>
<td>NEXP</td>
<td>3.143 (0.92)</td>
<td>-0.511 (0.16)</td>
<td>-0.053 (0.02)</td>
<td>-0.076 (0.03)</td>
</tr>
<tr>
<td>NMS</td>
<td>4.590 (0.64)</td>
<td>0.891 (0.15)</td>
<td>-3.346 (0.50)</td>
<td>-5.177 (0.86)</td>
</tr>
<tr>
<td>DEP</td>
<td><strong>32.894 (3.74)</strong></td>
<td><strong>19.672 (2.87)</strong></td>
<td>11.889 (1.30)</td>
<td>10.384 (1.18)</td>
</tr>
</tbody>
</table>

Year Fixed Effects | No | Yes | Yes | Yes
Country Fixed Effects | No | Yes | Yes | No

Adjusted R-squared | 0.13 | 0.45 | 0.47 | 0.47
Number of Observations | 160 | 160 | 160 | 160

Note: Countries included in the sample are Pakistan, India, Bangladesh and Sri Lanka. Numbers in parentheses are the absolute (Newey West) t-statistics that have been corrected for heteroskedasticity and serial auto-correlation. Models 2 and 3 have country dummy variables that replace the intercept. Depending on the data point that whether if it is from Pakistan, India, Bangladesh, or Sri Lanka, the dummy variables (PAK, IND, BAN, or SRI) would take the value of 1, and zero otherwise. Similarly, Models 2, 3 and 4 include time dummy variables which take the value of 1 if the data point corresponds to the specified year and zero otherwise. The coefficients are rounded to the nearest 3rd decimal place, while the t-values in parenthesis are rounded to the nearest 2nd decimal place.
5. Conclusion and Policy Recommendations

The findings of this paper show that remittance inflows have adversely affected real economic growth of Bangladesh and Sri Lanka during the period 1976-2015. Additionally, over the same period, faster growth in remittance inflows resulted in higher inflation in Sri Lanka. Both these factors tell us that remittance inflows would serve as a very poor macroeconomic tool for development.

As households in Bangladesh and Sri Lanka get more and more remittances, their reservation wage rises, which means that they would no longer be willing to work at a wage that they would otherwise have happily accepted. Hence, although these remittances may improve their living standards, they may reduce the likelihood that the receivers would participate in the labor force, which would, as a result, hinder economic growth.

Also, what we deduce from the findings of this paper is that macroeconomic policies for developing countries must be carefully devised, considering the potential impact that remittance inflows would have on inflation. In particular, they must consider that remittance inflows would cause inflation as we see in the case of Sri Lanka. It is, therefore, important to understand that depending on a continued source of funds from other countries may not be an optimal solution for the developing world. Sri Lanka in particular, should, therefore, reduce their reliance on remittance inflows and attempt to achieve real economic growth through other competitive means such as trade, commerce, and industry. In general, developing countries must create opportunities for their workforce domestically, by providing the necessary infrastructure, law and order to enable the hardworking population to prosper without having to migrate to a foreign land.
Appendix – Estimating Inflation for Bangladesh for the missing years

The CPI for Bangladesh from 1975 until 1985 was not available; however, we found that the CPI for Bangladesh is strongly correlated with the CPI for the other three countries for 1986-2015. As such, the numbers in the following table have been computed using data from 1986 to 2015:

<table>
<thead>
<tr>
<th></th>
<th>CPI Bangladesh</th>
<th>CPI India</th>
<th>CPI Pakistan</th>
<th>CPI SriLanka</th>
</tr>
</thead>
<tbody>
<tr>
<td>Correlation with CPI</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bangladesh</td>
<td>1.000</td>
<td>0.997</td>
<td>0.996</td>
<td>0.993</td>
</tr>
<tr>
<td>CPI in 1986</td>
<td>24.280</td>
<td>17.081</td>
<td>13.320</td>
<td>8.704</td>
</tr>
</tbody>
</table>

We can see from this table that the CPI of Bangladesh is most strongly correlated with the CPI of its neighboring country India. Therefore, for the purpose of this study, the CPI of India has been used to substitute for the CPI of Bangladesh over the years 1975 to 1985, after adjusting for the proportionate difference in the year 1986 between the CPI for India and the CPI for Bangladesh. The following chart distinguishes between the CPI from 1986 to 2015 and the estimated CPI from 1975 to 1985:

Note: Actual values are in blue, while estimated values are in purple. The point in bold is that of 2010, the base year.
References


