Dynamic Multiplier Effects of Foreign Remittances
A Case Study of India

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India continues to be the largest recipient of remittances across the world, with a tremendous growth in private unrequited transfers from just ₹12 billion in 1990–91 to about ₹1,009 billion in 2015–16. Emphasising this component of remittances that India has witnessed during the post-liberalisation period, the article investigates the demand-side macroeconomic effects of the flow of private transfers on key variables such as consumption, investment, imports, and income in India during the post-reform period of 1996–2014.

Remittances by international migrants to their countries of origin constitute one of the largest sources of external finance for developing countries. As highlighted in the latest Migration and Development Brief by World Bank (2019), India continues to be the largest recipient of remittances (in absolute terms) across the world. According to the statistics published by the Reserve Bank of India (RBI), there has been tremendous growth in private unrequited transfers to India in the post-liberalisation period, from ₹12 billion (1990–91) to about ₹1,009 billion (2015–16). At present, these transfers account for nearly 3.5% of India's gross domestic product (GDP), up from 0.8% in 1991. They have offset India's merchandise trade deficit to a large extent, ensuring that current account deficits remained modest through the 1990s. At the same time, remittances are among the least volatile of inflows, in both the current and capital accounts of India's balance of payments (BoP).

In recent years, remittances have come to be considered a stable source of development finance. They can be used for consumption, asset creation, small savings, and investment in sectors such as education, health, and small enterprises. In addition to providing financial resources to low-income households, remittances also influence macro-level activity, through direct effects on output growth. Additionally, through indirect multiplier effects arising as a result of household consumption and investment activity, they contribute to the GDP growth of the country.

According to the International Migration Report (United Nations 2017), India became the largest country of origin of international migrants during the year 2017 with 16.6 million persons from India living in another country, which has more than doubled from the figure of 8 million international migrants from India in 2000. Consequently, this has resulted in significant developmental effects for both India and the destination countries in terms of economic, political, and social outcomes at both the micro and macro levels.

Private unrequited transfers (in current values) are plotted in Figure 1 (p. 55) for the post-reform period, which indicate a steep rise in the 2000s.

Figure 1 presents annual trends in total transfers and private transfers for the period 1990–91 to 2014–15, where the difference between these two values gives the official transfers for every year. Evidently, official transfers have remained more or less constant with an average figure of around ₹8 billion throughout the post-reform period. It was during the three consecutive years of 2012–13, 2013–14, and 2014–15 that official transfers turned negative for the first time. By contrast, private transfers have only risen dramatically in the post-reform period, especially since the 2000s when they are found to nearly coincide with the trend in total transfers.

Figure 1 illustrates the continuous upsurge in private transfers to India, hinting at their growing role in the post-reform era, and provide an incentive to study their consequences at an aggregate level.

Given their immensity, such unrequited flows should be expected to have significant macroeconomic effects on an emerging economy like India. However, these effects have not been adequately studied so far. This also contrasts sharply with the extensive research on the relationship between growth and other sources of foreign capital.

A growing number of studies have analysed the effects of remittances on various aspects of development, including poverty, inequality, growth, education, and financial development. However, little attention has been paid to the question of how remittances affect major macroeconomic variables like consumption,
This article attempts to fill the gap in the existing literature by contributing to the study of the impact of remittances on growth. The article emphasizes one major aspect of remittances that India has witnessed in recent decades: private transfers. The study focuses on the demand-side macroeconomic effects of the flow of private transfers on key variables, such as consumption, investment, imports, and income in India during the post-reform period. In this regard, the study uses a Keynesian simultaneous, dynamic macro-econometric model to investigate the impact of these flows on various macroeconomic variables in India in the given period. The effect of these remittances on output and employment generation would also depend on the end use of the transfers. These effects would be larger if the transfers are directed towards investment expenditure. If they are used for consumption, production would be stimulated through the multiplier effect, especially if the economy is operating below capacity. This could be enabled by calculating the values of the impact and dynamic multipliers for the given period. Given the data available, the study uses quarterly figures for all variables for the period between 1996 and 2014.

The article unfolds as follows: the subsequent section provides a brief literature review of the studies that have been carried out so far, which is then followed by the econometric specification, data sources, and the methodology applied. The succeeding section tabulates the empirical findings and provides a detailed analysis, while the last section concludes the article.

**Literature Review**

Many studies on remittances have looked at their developmental effects on poverty, inequality, and the financial sector in developing countries. These studies highlight the importance of remittances and their capacity to provide an alternative for overcoming the constraints that these countries face.

In an extensive study of 71 developing economies, Richard H Adams Jr and John Page (2005) considered the impact of international migration and remittances on poverty in these economies. They constructed and analysed a new data set on international migration, remittances, inequality, and poverty for these developing countries. Their results show that both international migration and remittances significantly reduce the level, depth, and severity of poverty in the developing world. The same data set is also used by Paola Giuliano and Marta Ruiz-Arranz (2009) to determine the relationship between remittances and growth, given their increasing importance in total international capital flows. Their paper studies a link between remittances and growth, particularly the development of the local financial sector and its influence on a country's capacity to take advantage of remittances. Using this newly constructed data set that covers about 100 developing countries, they found that remittances boosted growth in countries with less developed financial systems, by providing an alternative to financing investments and helping overcome liquidity constraints.

In a detailed study of countries that receive a significant flow of remittances, an International Monetary Fund (IMF) occasional paper (Barajas et al 2008) looks at two main issues with regard to remittances: how to manage their macroeconomic effects and how to harness their development potential. The paper addresses these two questions by reporting the results of the first global study of the comprehensive macroeconomic effects of remittances on the economies that receive them.

Regarding the study of remittances to the Indian economy, Devesh Kapur (2005) highlights the severe limitations in data compared to other sources of external finance. Based on these limited data, he analyses the key trends in remittance flows and examines the many complex economic and political effects of remittances. Kapur shows that while the effects of remittances are greatest on transient poverty, the long-term effects on structural poverty are less clear, principally because the consequences for economic development are, in general, not well understood.

In an analysis of the macroeconomic determinants of remittances, Poonam Gupta (2005) indicates the determinants of remittances to India, and that their growth over time can be explained by an increase in migration and the total earnings of migrants. None of the remaining economic or political variables considered in the paper, including political uncertainty, interest rates, or exchange rate depreciation, are found to affect remittances significantly. Another report by Puja Guha (2010) presents an empirical illustration of the different measures of international remittances to India, as measured by different institutions and surveys, thus highlighting the discrepancies between the measures.

Dilip Ratha and Sanket Mohapatra (2007) review the country’s recent experiences regarding the impact of remittances on poverty, growth, real wages, and external competitiveness. Their study explores the policy options available to developing countries to deal with the consequences of large and persistent remittance inflows. It also discusses how developing countries can leverage...
remittances to improve their access to international capital markets. Along these lines, Singh and Hari (2011) have also studied the impact of remittances on various macroeconomic and developmental aspects of the Indian economy. They have analysed data on remittances and some of the macroeconomic variables like the GDP, PFCE (private financial consumption expenditure), gross domestic capital formation (GDCF), savings, FDI (foreign direct investments), FII (foreign institutional investors), export, import, and balance of trade deficit for the period between 1971 and 2008.

This research article draws motivation from the work of Nicholas P Glytsos. He has investigated the impact of exogenous shocks caused by fluctuations in remittances on consumption, investment, imports, and output in five Mediterranean countries. He constructed a Keynesian-type econometric model with a dynamic perspective and sound theoretical basis, and used it to estimate the short- and long-run multipliers of remittances. He examined the demand-side impact of remittances, which were used as an exogenous variable in the model. The analysis revealed a uniformity in instability and uncertainty across countries, with great temporal and inter-country fluctuations due to the effects of remittances. The findings pointed to the different levels of priority accorded to remittance spending between countries, and an asymmetric impact of remittance changes. Thus, the model consists of three behavioural equations—the consumption function, the investment function, and the import function—and a national income identity. Each equation incorporates dynamic elements. This allows us to trace the short- and long-term impacts of remittances on the concerned macroeconomic variables. Thus, the following set of simultaneous equations is estimated:

\[ C_t = \alpha_0 + \alpha_1 Y_t + \alpha_2 C_{t-1} + \sum \gamma_{1i} \text{Quarterly-Dummy} + u_{1t} \]
\[ I_t = \beta_0 + \beta_1 Y_t + \beta_2 K_{t-1} + \sum \gamma_{2i} \text{Quarterly-Dummy} + u_{2t} \]
\[ M_t = \delta_0 + \delta_1 Y_t + \delta_2 X_{t-1} + \delta_3 M_{t-1} + \sum \gamma_{3i} \text{Quarterly-Dummy} + u_{3t} \]
\[ Y_t = C_t + I_t + G_t + E_t - M_t + R_t \]

The simultaneous equations model is estimated using the two-stage least squares (TSLS) method. In the above system of equations, we chose to estimate the indirect influence of private transfers on consumption, investment, and imports by including R in the income identity equation. Thus, private transfers are an exogenous variable here, whose effects on other endogenous variables are filtered through the income of recipients. It must be pointed out that introducing the variable R directly as an exogenous variable in the behavioural equations of C, I, and M gives economically unjustified and statistically insignificant results.

The data used are quarterly figures for the post-reform period 1996–2014. All figures are obtained from RBI statistics (2014–15). All variables are in current values (billion rupees). The following data are used to derive the values of eight macroeconomic variables:

\( C \): Private final consumption expenditure (PFCE)
\( I \): Gross fixed capital formation (GFCF) + changes in stocks
\( Y \): GDP at market prices
\( K \): Cumulative gross domestic investment \( \sum_{t=1}^{T} I_t \)
\( G \): Government final consumption expenditure (GFCE)
\( X \): Exports of goods and services
\( M \): Imports of goods and services
\( R \): Private transfers

In the above simultaneous equations dynamic model, ordinary least squares (OLS) estimators are biased and inconsistent because of the correlations between explanatory endogenous variables and the stochastic disturbance terms. Thus, the given system of equations is estimated using the TSLS method, where there are four endogenous variables (C, I, M, and Y) and four exogenous variables (K, G, X, and R).

The time series data for the above variables are considered, where each variable assumes 74 observations. Dickey-Fuller tests indicate that the data under consideration are non-stationary, so we convert them into stationary data using the first-difference technique. In addition, since we are dealing with quarterly data, quarterly dummies are introduced for the three behavioural equations of consumption, investments, and imports, in order to control for seasonal variation.

In the subsequent section, econometric evidence of the model is presented along with its analysis.

Empirical Findings and Analysis

TSLS estimates: The Keynesian-type simultaneous macro-econometric equations (as specified in the preceding section) are estimated using a TSLS regression. The results are presented in Table 1 (p 57).

As observed from Table 1, the model performs quite well for the Indian economy, and its dynamic nature is empirically confirmed. All the coefficients of the explanatory variables \( Y_t, C_{t-1}, K_{t-1}, Y_{t-1}, \) and...
The lagged endogenous variables help in establishing the dynamic character of the model. The partial derivatives of the endogenous variable \( V_t \) with respect to any of the predetermined variables on the right-hand side of the equation are actually the impact multipliers of a change in any predetermined variable on current endogenous variables. Thus, the parameters \( \lambda \) in the above equation can be interpreted as the impact multiplier of the given macroeconomic variable with respect to any of the variables on the right-hand side of the equation. Estimates of each \( \lambda \) are obtained directly by running the OLS regression on the above reduced-form equation for each of the four endogenous variables.

In order to calculate the time-distributed dynamic effects of the model, the long-term multipliers for each of the endogenous variables are estimated by extending the lags of these variables in the subsequent time periods until their impact fades away over time. This is done in the following manner in accordance with Glytsos (2005a).

Considering the four-year time distribution effects for, say, the endogenous consumption variable \( C \) (that is, \( n = 4 \)), the discrete variable notations are introduced to get:

\[
\Delta C_t = \lambda_1 \Delta C_{t-1} + \lambda_2 \Delta R_t + \lambda_3 \Delta G_t + \lambda_4 \Delta M_t
\]

By a consecutive substitution of each lagged variable and after some algebraic manipulations, we get:

\[
\Delta C_t = (\lambda_1)^4 \Delta C_{t-4} + (\lambda_2)^4 \Delta R_{t-4} + (\lambda_3)^4 \Delta G_{t-4} + (\lambda_4)^4 \Delta M_{t-4}
\]

Assuming that lagged consumption exhausts its influence after about four years so that \((\lambda_i)^4 = 0\), we estimate the truncated total multipliers in the long run by adding the coefficients of the remaining right-hand side predetermined variables. That is, \( \{\lambda_1, \lambda_1 \lambda_2, (\lambda_1 \lambda_2)^2 \lambda_3, \ldots\} \) and \( \{\lambda_1, \lambda_1 \lambda_2, (\lambda_1 \lambda_2)^2, \ldots\} \) are added to get dynamic long-run multipliers, where \( \lambda_1 \lambda_2 + (\lambda_1 \lambda_2)^2 \lambda_3 + (\lambda_1 \lambda_2)^3 \lambda_4 \) represents the induced effects. These multipliers allow the possibility of estimating short-term effects and tracing the overall long-term contribution of private transfers to growth.

The induced or lagged effects of transfers for the subsequent years are estimated in the following manner:

- Short-run impact multiplier for Year 1 = \( \lambda_1 \)
- Interim dynamic multiplier effect for Year 2 = \( \lambda_1 \lambda_2 \)
- Interim dynamic multiplier effect for Year 3 = \( \lambda_1 \lambda_2 \lambda_3 \)
- Truncated total multiplier effects = \( \lambda_1 \lambda_2 \lambda_3 + \lambda_1 \lambda_2 \lambda_4 \)

Table 2 provides multiplier calculations for all four endogenous variables.

As observed from Table 2, private transfers exert similar positive influences on domestic consumption and imports in the short term, as shown by the impact of multiplier values. However, these multiplier effects dissipate in subsequent years, as interim multiplier values decrease with each passing year. It must be noted here that the rate of decline in the dynamic multiplier values for imports is much higher than in any of the other macroeconomic variables. These effects nearly disappear in the fourth year. For consumption, the dynamic multiplier effects oscillate between positive and negative values. This is because of the negative estimates of the coefficient of lagged consumption (\( \lambda_1 \)) in the reduced-form equation. Thus, there are two opposing forces operating on consumption: the positive effect of private transfers and the negative effect of lagged consumption. But, the overall impact of transfers on consumption is positive as observed from its total multiplier value.
The estimates from the investment equation show that transfers have a negative coefficient, that is, $\lambda_7$ is negative. The coefficient of $K_{t-1}$ used as a proxy for $\lambda_4$, which is positive. Therefore, we find that both the immediate and dynamic impacts of transfers on investment remain negative in the present, and in subsequent years as well.

For the income variable, private transfers have a negative coefficient, while lagged income has a positive coefficient. This implies that the opposing forces operating for income work in exactly the opposite way to those of consumption. That is, there is a negative effect for private transfers and a positive effect for lagged consumption, which results in an overall negative impact. Also, these effects wear out by the fourth year. Moreover, the induced multiplier values for income or consumption may not have the same sign as their impact multipliers simply because of these conflicting influences, as any of the effects may dominate the other.

The negative value of the truncated multiplier for income can be explained by the greater positive impact of private transfers on imports and their greater negative influence on investment. This results in negative demand-side impact, and consequently, leakages from the economy. More importantly, these findings run counter to those of Glytsos (2005a), where the multiplier effects of foreign remittances on five developing countries in the Mediterranean are positive both in the short and long run. This highlights that private transfers need not be growth-enhancing in the long run for the Indian economy despite their strong positive effects on domestic consumption, as the positive multiplier effects of consumption are outweighed by the negative multiplier effects of investments and imports.

Although private transfers have a positive influence on consumption and imports, they negatively affect the investment and income variables. This adverse impact on private investment results in a net negative impact on the output growth of India.

Accordingly, the study suggests that government policy be designed in such a manner that it induces the private sector to allocate private transfers for investments in order to increase the rate of economic growth. Otherwise, a significant proportion of these transfers would be directed towards increasing private consumption without bringing about any contributory impact to income.

Conclusions

The article has examined an important issue concerning private unremitted transfers to the rapidly growing Indian economy during the post-reform period of 1996–2014. It emphasizes their effects on key macroeconomic variables: consumption, investment, imports, and income. These forms of remittances will remain within the economy regardless of events occurring elsewhere. Thus, questions surrounding the flow of this money and its effect on macroeconomic aggregates become even more exciting, particularly when these transfers assume the proportions currently in play in India.

This article draws inspiration from the work of Glytsos (2002, 2005a, 2005b), who developed a sound theoretical framework for looking at the macroeconomic effects of remittances in various Mediterranean economies. The model is a demand-side Keynesian type, consisting of simultaneous equations. A modified form of this model is used in order to apply it to the Indian context.

The set of equations are estimated using the rSLS method. The parameters of these equations are used to find the short- and long-run multiplier values for consumption, income, investment, and imports. Thus, the immediate and induced effects of private transfers on each of the four endogenous variables can be derived.

Considering the final results, it is observed that private transfers play an important role when it comes to the key macroeconomic variables of the Indian economy. However, just as they have positive demand-side effects on consumption and imports, they adversely affect another demand-side component: investment. The effects become more pronounced in the long run, when the multiplier values of private transfers are considered. This results in a net negative effect on income. This is because of a fall in investments with rising transfers, and ever-increasing imports with rising transfers. As a consequence, the leakage effect on income outweighs the injection effect due to consumption. This issue demands great attention as the flow of private transfers would only accentuate the liquidity overhang, resulting in an increase in import demand. Some sound policies would have to be established to channel these private transfers towards various avenues of investment. This would not only enable greater injections into the circular flow of income, but it would also prevent a liquidity overhang in the economy, which could be inflationary. There is a need to shift this cash away from households and towards the private or public sectors, so that imports are reduced and investment increased.

References