

THE IMPACT OF WORKERS' REMITTANCES ON ECONOMIC GROWTH¹

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I. INTRODUCTION

Recently there has been growing interest in workers' remittances as a tool for development and economic growth. *Global Development Finance 2003*, issued by the World Bank, notes that workers' remittances are one of the least volatile external financings and have become an important resource for many developing countries². Other international agencies, donors, as well as governments of developing countries share the same view. On the front line of development, the US Agency for International Development (USAID) has launched a remittance-based community development project in order to utilize remittance inflows to developing countries in a more efficient manner.³

What explains this sudden change in the perception of remittances from just a means of supporting migrants' families back home to a tool for development? The fact is that the absolute and relative volumes of workers' remittances are increasing. They have shown a steady increase over the last ten years. The amount of remittance flows to developing countries already surpassed that of official resource inflows. Since 1999, workers' remittances have been the second largest resource flowing into developing countries after foreign direct investment (FDI). In addition, workers' remittances are not liabilities but cash transfers from overseas, which in principle, they do not cost any to recipient countries. As there has been much debate about external debt and its negative effect on growth, this feature is a very attractive force.

Despite the growing interest in workers' remittances, the role of remittances in development and economic growth in general is not clearly understood. For example, studies based on a country's time-series data tend to find positive impacts of remittances on growth, but a cross-country/panel data study by Chami et al (2003) shows the opposite outcome. This is still one of the least studied areas of research in migration literature.

In order to fill the gap that exists in labor migration literature, this paper aims to examine the effect of remittances on economic growth (growth in terms of per capita real GDP) by using a panel of aggregate remittances data on developing countries, and analyze the general relationship that may exist between them. The chapter proceeds as follows. Section 2 describes the trends and characteristics of workers' remittances from a macro point of view. Section 3 presents a simple theoretical model that link

¹ I am grateful to Ranajit Dastidar and Sujoy Dutta for their helpful comments.

² In Chapter 7, "Workers' Remittances: An Important and Stable Source of External Development Finance," by Dilip Ratha.

³ See <http://www.usaid.gov/press/releases/2003/pr030425.html> for the details. Also visit www.usaid.gov/regions/lac/rural/conference_documents/Remittance_Options_Revised.pdf for related documents.

remittances with economic growth. Section 4 examines the empirical relationship between remittances and economic growth, and Section 5 presents concluding remarks.

II. TRENDS AND CHARACTERISTICS OF REMITTANCE FLOWS

A. Trends in Resource Inflows to Developing Countries⁴

Figure 1 depicts the trend in resource inflows to developing countries. Up to the 1990s, official assistance was the largest flow, followed by workers' remittances. In the early 1990s, in the wake of global financial liberalization, private capital flows emerged as the main external source of finance to developing countries. Among them, FDI is the largest source, retaining the top spot since 1993. Private capital inflows continued increasing until the Asian currency crisis of 1997-98 broke out.

With the onset of the crisis, private inflows suddenly shifted into reverse gear. The crisis led to a sharp decline in private borrowings and portfolio investment flows to developing countries (see Figure 1 and Table 1). FDI flows, which were thought to be relatively stable, were also affected and have shown a negative trend since then. In 2002, the volume of net FDI was US\$143 billion, down by US\$36 billion from its peak in 1999. Net portfolio investment stood at US\$9.4 billion, down by US\$40 billion from the 1996 peak. Net private borrowings fell to US\$2.9 billion, down by almost US\$100 billion from its highest level.

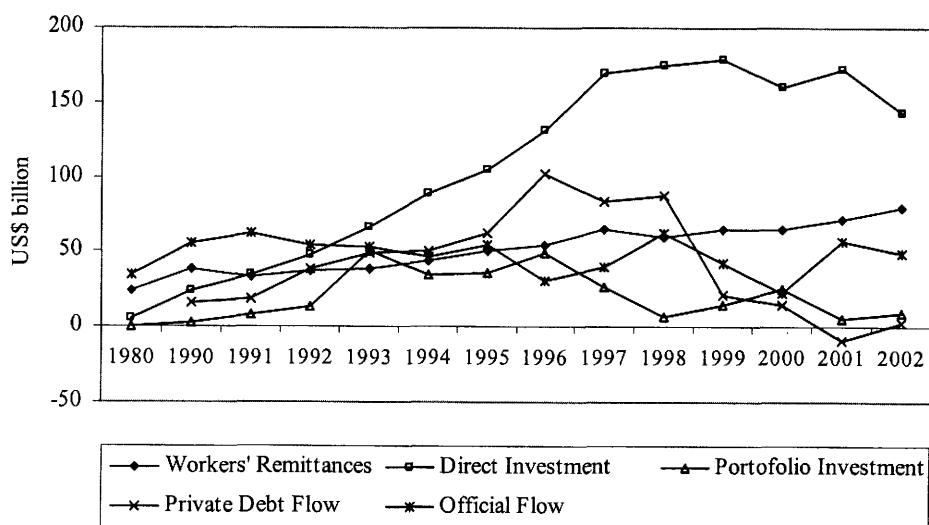
The relative importance of official assistance has been diminishing. It is no longer the most reliable source of capital for developing countries as a result of changes in the nature and quality of public funds. There is a tendency for international agencies to sanction grants and loans on a performance basis, which means that developing countries need to show continued efforts and improvements in order to receive funds. The terms of loan contracts have also become more stringent. Shorter maturities and higher interest rates have made accessing this once readily available money for developing countries a costly exercise. In addition, the recent Afghanistan and Iraq post-conflict reconstructions have put substantial pressures on the allocation of official resources.

While private equity and debt inflows have exhibited declining trends, workers' remittances have been steadily increasing although the speed of increment is slow. They have emerged as the second largest flow after FDI. In 2002, the volume was US\$80 billion, which was roughly half the volume of FDI flows and twice that of official resource flows.

⁴ Low-income and middle-income economies defined by the World Bank are referred to as developing countries. Economies are classified according to gross national income (GNI) per capita, calculated using the World Bank Atlas method (low income: \$745 or less; lower middle income: \$746-2,975; upper middle income: \$2,976-9,205; and high income: \$9,206 or more).

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FIGURE 1. Resource Inflows to Developing Countries



Source: IMF, *Balance of Payments Statistics Yearbook (BOP)*, various issues; World Bank, *Global Development Finance (GDF)*, 2000, and 2003.

TABLE 1. Trends in Resource Flows as % of Developing Countries' Total GDP

	1980	1990	1995	1996	1997	1998	1999	2000	2001	2002
Workers' Remittances	0.81	0.91	0.89	0.88	1.01	0.99	1.05	0.99	1.08	1.16
Direct Investment	0.17	0.56	1.84	2.10	2.62	2.90	2.91	2.47	2.56	2.07
Portfolio Investment	0.00	0.07	0.63	0.79	0.41	0.12	0.24	0.40	0.09	0.14
Private Debt Flow	0.00	0.37	1.09	1.64	1.30	1.45	0.36	0.22	-0.13	0.04
Official Flow	1.16	1.31	0.95	0.50	0.61	1.04	0.70	0.36	0.86	0.71

Source: World Bank, *GDF* 2000 and 2003.

Before proceeding further, we shall discuss the definition and the accuracy of remittance data. Remittances figures quoted in this section follow the World Bank's definition of remittances; that is the sum of "workers' remittances", "compensation of employees", and "migrants transfer" from the International Monetary Fund's *Balance of Payments Statistics Yearbook*. This practice was suggested by Swamy (1981). He argues that these three items should be totaled as "workers' remittances" under the heading "current transfer" in the current account only measures the value of remittances from workers abroad for more than one year and excludes the earnings and transfers of temporary workers who work abroad for less than one year: "compensation of employees", and the net flow of wealth resulting from migration: "migrants transfer".

Taylor (1999) quotes examples to stress that "workers' remittances", the narrow definition of remittances, are inadequate. He refers to the fact that the Philippines recorded the bulk of "workers' remittances" under the category of "compensation of employees" even though many migrants from the Philippines were abroad more than

one year, while Mexico recorded the larger part of “compensation of employees” as “workers’ remittances” even though many Mexican migrants were abroad less than one year. In light of these disparities and the inability of the authorities to gather information on the length of migrant stays, he proposes that it is best to combine “workers’ remittances” and “compensation of employees” to measure the volume of all workers’ remittance flows.

A more serious issue in the calculation of remittance flows arises from workers’ use of informal channels such as *hundi* and *hawala* – traditional methods of remitting money. IMF’s statistics captures only remittance flows made through formal channels such as banks and post offices. It is, however, quite evident that many workers’ abroad use informal channels of remitting money back to their home country. In addition, there are cash transfers carried in by migrants when they return to their home country. It is believed that the amount of money that makes its way into countries through informal channels and by being brought in by hand is quite substantial. These blind spots in remittance data have caused actual financial inflows to be underestimated and are indeed a sensitive issue for research.

B. Characteristics of Remittance Flows- From a Macro Perspective

Compared to other types of resource flows, remittance flows possess several favorable features. One of the characteristics that are often noted is that they are more stable than private flows, which fluctuate up and down in response to business cycles. This is evident from the movements in capital flows before and after the Asian financial crisis. While private flows went through an erratic boom-and-bust type cycle, remittance flows continued to rise steadily and showed greater stability. Part of this stability may arise from workers’ concern about their families back home, as they are driven by altruistic motivations. This provides a sort of insurance or safety net for residents in developing countries, and is especially important for those who bordering on subsistence living. However, it should be noted that remittance flows are easily affected by the economic situation and immigration policies in labor-importing countries.

Another important characteristic is that, compared to private capital flows, remittance flows are more evenly distributed across developing countries, which might imply that more countries are benefiting from remittances. Table 2 shows that, in 2001, about 35% of total FDI was invested in China, the share of the top five FDI-recipient countries accounted for more than 61%, and that of the top ten for around 72.5% of total FDI investment. A significant portion of FDI goes to China and a few other countries. In contrast to FDI flows, the share of top five remittance-recipient countries was about 45% and that of the top ten roughly 60% of total remittance flows to developing countries.

Table 2 also shows the relationship between FDI, remittances, and per-capita income levels among the top ten recipient countries. As the table shows, FDI tends to be invested more in the countries where the income level is relatively high (upper middle income countries), and remittances tend to flow more into the countries where the income level is relatively low (lower middle income countries).

Area-wise remittance flows also show more equal distribution of remittances across developing countries (Table 3). In 2002, for example, the amount of FDI invested in Latin America and Europe (including Central Asian countries) accounted for 30% and 20% of total FDI investment respectively, while a very limited share of FDI flowed into South Asia (3.5% of total FDI) and the Middle East and North Africa (2.1% of total

FDI). If China was excluded, we would see more concentration of investment in Latin America and European countries – the combined share of which would be close to 80% of all FDI. This tendency also can be observed when we look at FDI flows relative to the size of regional GNI. We see high concentration of investment in certain regions (Table 4).

This type of concentration is less evident in remittance flows. Latin America is still the largest recipient of remittances, attracting a 30% share of the total value in 2002, but the remittance flows to South Asia, and the Middle East and North Africa, regions that receive little FDI, amounted to 20% and 17.5% of the total remittances respectively. Clearly remittance flows help the countries in these regions to supplement resource shortages. Thus, when we examine the situation region-by-region, we once again observe that remittances are more evenly distributed than are private flows.

TABLE 2. Top 10 Shares of FDI and Workers' Remittances, 2001

	Top 10 FDI Destination			Top 10 Remittances Recipient Countries		
	Country	FDI (US\$ bil)	GNI per capita (US\$)	Country	REM (US\$ bil)	GNI per capita (US\$)
1	China	44.2	890	India	10.0	460
2	Mexico	24.7	5,530	Mexico	9.9	5,530
3	Brazil	22.6	3,070	Philippines	6.4	1,030
4	South Africa	7.2	2,820	Morocco	3.3	1,190
5	Poland	5.7	4,230	Egypt	2.9	1,530
6	Czech	4.9	5,310	Turkey	2.8	2,530
7	Chile	4.5	4,590	Lebanon	2.3	4,010
8	Thailand	3.8	1,940	Bangladesh	2.1	360
9	India	3.4	460	Jordan	2.0	1,750
10	Venezuela	3.4	4,760	Dominican Rep.	2.0	2,230
	Top 5 share	60.8%	Top 10 Average	Top 5 share	45.0%	Top 10 Average
	Top 10 share	72.5%	3,360	Top 10 share	60.4%	2,062

Source: World Bank; *WDR2003*, *GDF2003*.

TABLE 3. Distribution of FDI and Workers' Remittances by Region, 2002 (US\$ billion)

	Foreign Direct Investment			Workers' Remittances		
	Volume	%	Volume (excl. China)	%	Volume	%
East Asia and Pacific	57.0	39.9	4.3	4.8	11.0	13.8
Europe and Central Asia	29.0	20.3	29.0	32.1	10.0	12.5
Latin America and the Caribbean	42.0	29.4	42.0	46.5	25.0	31.3
South Asia	5.0	3.5	5.0	5.5	16.0	20.0
Middle East and North Africa	3.0	2.1	3.0	3.3	14.0	17.5
Sub-Saharan Africa	7.0	4.9	7.0	7.8	4.0	5.0
Total	143.0	100.0	90.3	100.0	80.0	100.0

Source: World Bank, *GDF2003*.

TABLE 4. FDI and Workers' Remittances as % of Regional GNI, 2002

	GNI (US\$ billion)	FDI as % of GNI	Remittances as % of GNI
East Asia and Pacific	1,640	3.48	0.67
Europe and Central Asia	935	3.10	1.07
Latin America and the Caribbean	1876	2.24	1.33
South Asia	618	0.81	2.59
Middle East and North Africa	669	0.45	2.09
Sub-Saharan Africa	311	2.25	1.29

Source: World Bank, *GDF2003*, *WDR2003*.

C. Remittance Inflows to South Asia

The oil boom in the 1970s brought economic prosperity to the Middle Eastern oil-exporting countries. A large share of the wealth gained from oil exports was spent on the construction of infrastructure, which increased demand for manpower in the region and attracted South Asian workers. As a result, substantial migration to the Gulf region from South Asia began in the early 1970s. In the 1980s, the number of South Asian workers migrating to the region had slowed, but still today, the Middle Eastern countries remain the primary destination for South Asian migrants.

Table 5 shows external financing in South Asia for 1997 to 2002. Workers' remittances have been the largest resource flow, which amounted to US\$16 billions in 2002. This figure is far greater than the combined figure of net private inflows (US\$4.8 billion) and net official flows (US\$6 billion). Relative to the size of GDP, South Asia was the largest recipient of remittances (Table 4).

Figure 2 traces trends and cycles in remittance inflows to four South Asian countries (Bangladesh, India, Pakistan, and Sri Lanka). The volume of total remittances increased from US\$700 million in 1975 to US\$16 billion in 2002. India has been the largest recipient of remittances in nominal terms since the late 1980s. It recorded US\$8.4 billion in 2002, followed by Pakistan (US\$3.5 billion). In terms of remittances as a share of GDP, Sri Lanka has been the largest recipient. The country registered almost 8% in 2002. Pakistan was once the largest recipient in both nominal and relative terms but it lost momentum in the late 1980s.

Unlike the overall trends observed in Figure 1, we see a mixed picture here. The aggregate remittance flows in Figure 1 exhibited a smooth and upward trend; however, Figure 2 shows that this is not a universal tendency. Remittance flows to Sri Lanka and Bangladesh have been stable, but for Pakistan they are more volatile. If flows are measured as a share of GDP, all four countries exhibit more volatility than when remittances are compared in nominal terms (see Figure 3).

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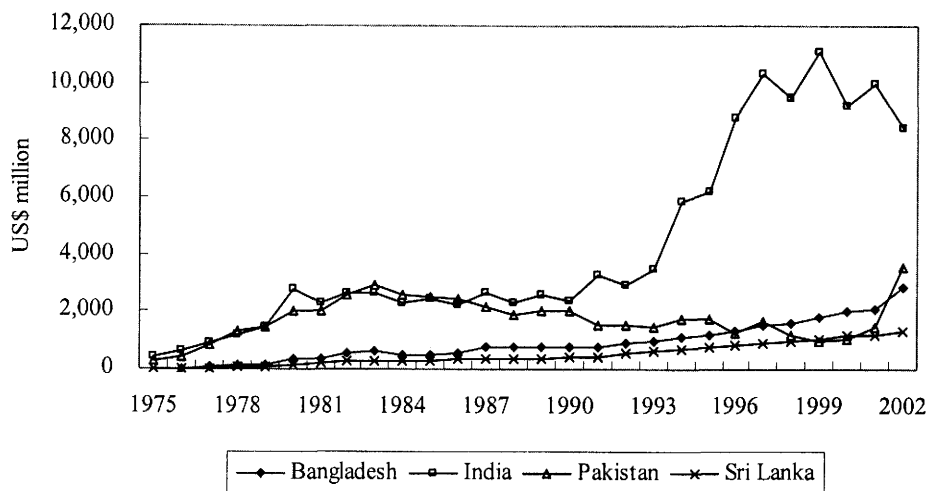
TABLE 5. External Financing in South Asia, 1997-2002 (US\$ billion)

	1997	1998	1999	2000	2001	2002*
Net equity flows	7.8	2.9	5.5	4.7	5.7	5.8
Net FDI inflows	4.9	3.5	3.1	3.1	4.1	5.0
Net portfolio equity inflows	2.9	-0.6	2.4	1.7	1.6	0.8
Net debt flows	0.6	4.7	0.5	3.4	-0.3	0.9
Official creditors	0.3	2.3	2.5	0.5	2.5	1.9
World Bank	1.1	0.8	1.0	0.7	1.5	1.1
IMF	-0.8	-0.4	-0.1	-0.3	0.3	0.1
Others	0.0	2.0	1.6	0.0	0.7	0.7
Private creditors	0.3	2.4	-2.0	2.9	-2.7	-1.0
Net medium-long term debt flows	2.4	3.7	-2.1	3.9	-1.9	-1.6
Bonds	2.3	4.2	-1.2	5.4	0.0	-0.4
Banks	1.3	0.7	-0.5	-2.0	-1.7	-1.1
Others	-1.2	-1.2	-0.4	0.5	-0.1	-0.1
Net short term debt flows	-2.1	-1.3	0.1	-1.0	-0.9	0.6
Bilateral aid grants	2.4	2.3	2.4	2.3	3.6	4.2
Net private flows (debt+equity)	8.2	5.3	3.5	7.7	2.9	4.8
Net official flows (aid+debt)	2.7	4.6	4.9	2.8	6.0	6.0
Workers' remittances	14.6	13.3	15.1	13.5	14.9	16.0

Note: * estimate.

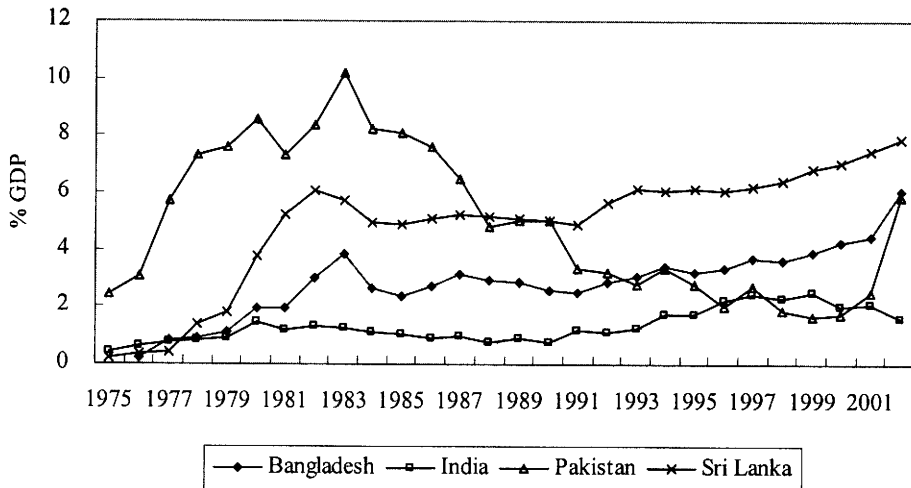
Source: World Bank, *GDF*2003.

FIGURE 2. Trends in Workers' Remittance flows to South Asia



Source: IMF, *BOP*, various issues.

FIGURE 3. Workers' Remittances Inflow to South Asia as a Share of GDP



Source: IMF, *BOP*, various issues; World Bank, *GDP* and *World Development Review* (WDR), various issues.

Remittance flows to Pakistan are the most volatile out of the four countries. As the number of migrants to Middle Eastern countries increased in the 1970s, so too did the amount of remittances sent back to Pakistan. At its peak, the amount came up to US\$2.3 billion, which was larger than export earnings of the same year. However, due to the falling price of oil in the 1980s and subsequent economic downturn in the Middle East, and the shift in demand from unskilled manual labor to skilled labor, the number of Pakistani migrants as well as the volume of remittances fell. In addition, competition from new migrants from Thailand, Korea, and the Philippines accelerated the decline in the number of Pakistani workers abroad.

This declining trend was reversed after September 11, 2001 due to the international crackdown on informal routes of money transfer. One of the most affected is Pakistani workers. This exercise led them to channel money through formal routes such as banks and post offices, resulting in a significant boost to official remittance statistics. The remittance flows through official channels were US\$0.92 billion in 2000-01, but they recorded a sharp increase to \$2.3 billion in 2001-02, then to \$ 4.1 billion in 2002-03. These surges of remittance have contributed to ease Pakistan's balance of payments, which now records current account surplus.

Thus, as pointed out earlier, remittances flows are easily swayed by a number of factors and can rise or fall by a significant margin.

III. THEORETICAL FRAMEWORK

There are a number of theoretical studies that explore the impact of international labor migration on economic growth and development. Most of these have focused on the effects of labor migration through 1) labor markets, 2) factor mobility and allocation, and 3) human capital accumulation (for example, see Haque and Kim 1995; Razin and

Sadka 1995; Faini 1996; Wong 1996; Fischer 1999; Bretschger 2001). Despite the fact that remittance is a clear consequence of international labor migration, there are surprisingly a few theoretical attempts that model the direct economic effects through remittances. The main exceptions to this are studies by Kirwan (1985), Lundahal (1998), and Chami et al (2003). While Kirwan (1985) and Lundahal (1998) are based on international trade theory, Chami et al (2003) have built the model on a solid microeconomic foundation, and analyze the effects of remittances on the recipients' labor market behavior under imperfect information. They argue that remittances create incentives for recipients to reduce their work efforts that may, in turn, lead to lower economic activities in labor exporting countries.

As theoretical exploration into this topic is still in the early stages of development, this section presents a standard utility maximization model to analyze the impact of remittances on output growth in a simple setting. Though the model is not dynamic, but is rather static, it provides theoretical implications for the empirical study that follows and aims to give readers some basic understandings of the effects that might be brought by remittances on economic growth.

A. A Model Setup

Let us suppose that the economy is populated by a constant number of N homogeneous workers who have preferences over combinations of consumption goods and leisure, and seek to maximize a utility function U given by:

$$U(c, l) = \ln c + a \ln l \quad (1)$$

where c is consumption per worker; l is hours of leisure per worker; thus $24-l$ represents hours of work, given the ultimate time constraint of 24 hours per day; a indicates the worker's relative weight on leisure (how much the worker values leisure relative to work).

Each worker in the economy is engaged in the production of an identical physical good that is consumable. A production function for per capita is given by the following simple equation:

$$y = 24 - l \quad (2)$$

where y stands for output per worker. The production per capita is just a function of hours worked. Since there are N workers in the economy, the aggregate output Y is expressed as $Y = (24 - l)N$. In this model, all the income (output) earned is consumed. As the worker consumes his own output for living, the level of his consumption depends on how many hours he works. The budget constraint of a representative worker, therefore, is given by $c = 24 - l$.

The worker's optimization problem is simply to maximize his utility, subject to the budget constraint:

$$\begin{aligned} \text{Max } U(c, l) &= \ln c + a \ln l \\ \text{s.t.} & \\ c &= 24 - l \end{aligned} \quad (3)$$

Solving this gives that the optimal level of leisure is $l^* = \frac{24a}{1+a}$, and the optimal level of consumption is $c^* = \frac{24}{1+a}$, which is equal to the optimal level of hours of work in this setting. The optimal output per worker and the optimal aggregate output are now $y^* = \frac{24}{1+a}$ and $Y^* = \frac{24}{1+a}N$ respectively.

B. Migration, Remittances, and Output

We now introduce labor migration and remittances in the model. They enter into the model as exogenous factors. We do not consider their endogenous process here for simplicity. Since all the workers are identical in this model by assumption, we assume that a certain portion of the workers is randomly chosen and has been shipped out to another country for work⁵.

Suppose p % of N workers have migrated to another country, leaving $(1-p)N$ workers in their home country. The aggregate output now is $Y = (24-l)(1-p)N$, but the level of per capita output remains the same since the number of workers that stay in the home country is $(1-p)N$. The optimization problem for the remaining workers, in this case, is identical to the problem that we have just solved. Thus, the migration of p % of N workers does not have any impact on the level of output per worker. It simply reduces the aggregate output level by p % due to the loss of labor force in the home country by migration. At its optimal level, the aggregate output is given by $Y^* = \frac{24}{1+a}(1-p)N$.

Suppose that, now, migrant workers remit part of their earned income to their home country. Let us also consider remittances here in the form of a consumable good that is identical to the good produced in the home country. We assume that the volume of remittances is held constant⁶ and they are equally distributed among $(1-p)N$ workers.

The amount of remittances received by each worker at home is $\frac{rm}{(1-p)N}$, where rm indicates the total volume of workers' remittances. The new budget constraint for the worker in the home country is:

$$c = (24-l) + \frac{rm}{(1-p)N} \quad (4)$$

The worker at home maximizes his utility given by (1), subject to the new budget constraint (4) above. Solving this optimization problem gives:

⁵ This assumption might be problematic as migrants are rarely drawn randomly from the population pool. Several micro surveys reveal that personal characteristics, such as education, age, marital status etc, are important for the international migration decision of individuals. See Bauer and Zimmermann (1999).

⁶ The basic implications do not change if we assume that the amount of remittances is proportional to the number of migrant workers.

$$c^{**} = \frac{24}{1+a} + \left(\frac{1}{1+a} \right) \frac{rm}{(1-p)N} \quad (5)$$

$$l^{**} = \frac{24a}{1+a} + \left(\frac{a}{1+a} \right) \frac{rm}{(1-p)N} \quad (6)$$

It is quite clear that the optimal hours of leisure, l^{**} , is greater than l^* by $\left(\frac{a}{1+a} \right) \frac{rm}{(1-p)N}$ and the optimal level of consumption, c^{**} , is greater than c^* by $\left(\frac{1}{1+a} \right) \frac{rm}{(1-p)N}$. These differences arise due to the introduction of non-labor income; that is, the remittances, in the budget constraint. Remittances relax the worker's budget constraint in the home country. The shift in the budget line results in an increase in both consumption goods and leisure, and hence a decline in hours worked. Thus, the introduction of remittances in the model acts just like income effects in the standard utility maximization problem.

Since the output per worker in this model is simply expressed by hours worked, the optimal output per worker declines to $y^{**} = \frac{24}{1+a} - \left(\frac{a}{1+a} \right) \frac{rm}{(1-p)N}$. As both the optimal level of consumption and the optimal level of hours worked are increasing functions of remittances, an increase in remittances leads to higher consumption and less hours of work as long as the solutions satisfy the time constraint.⁷ The aggregate domestic production further declines as a result of remittance effects and it now comes to:

$$Y^{**} = \frac{24}{1+a} (1-p)N - \left(\frac{a}{1+a} \right) rm \quad (7)$$

The aggregate output here is the value of a physical good that is produced in the domestic economy, which corresponds to gross domestic product (GDP) in the national accounts. If we add workers' remittances to GDP, the sum can be considered as gross national income (GNI) in this simple setting⁸. Adding workers' remittances to the optimal Y^{**} (GDP) leads to:

$$GNI^{**} = \frac{24}{1+a} (1-p)N + \frac{rm}{1+a} \quad (8)$$

Whether this figure is greater than GNI without migration depends on the size of migration, p , and the volume of remittances, rm . If the size of remittances is greater than the maximum output loss as a result of migration, that is, $24pN$, then GNI would be

⁷ The ultimate time constraint is 24 hours. Workers can't either enjoy leisure for more than 24 hours or work for more than 24 hours a day.

⁸ In this simple setting, the other aspects of the external sector, such as export-import, are ignored.

higher, and it would be lower otherwise. Thus, at the aggregate level, the impact of migration can either be positive or negative.

Dividing (8) by the remaining workers, then, the optimal level of per capita GNI (per capita income) in the home country is equal to $\frac{24}{1+a} + \left(\frac{1}{1+a}\right) \frac{rm}{(1-p)N}$, which is already presented in (5) as the optimal level of consumption. This value is greater than y^* , the income level achieved before the remittances flowed in.

C. Implications and Model Extensions

This simple presentation shows that remittances reduce domestic output per capita by affecting workers' labor/leisure choices. Because of remittances, workers in the home country enjoy more leisure and work less. Per capita income, however, increases. Table 6 summarizes the results obtained from the model.

TABLE 6. The Effect of Remittances on Output

	Per capita GDI	Per capita GDP
No Migration	$\frac{24}{1+a}$	$\frac{24}{1+a}$
Migration but No Remittances	$\frac{24}{1+a}$	$\frac{24}{1+a}$
Migration with Remittances	$\frac{24}{1+a} + \left(\frac{1}{1+a}\right) \frac{rm}{(1-p)N}$	$\frac{24}{1+a} - \left(\frac{a}{1+a}\right) \frac{rm}{(1-p)N}$

Do these results reflect the reality in developing countries? The model assumes that all workers are employed; but we observe the widespread prevalence of unemployment, underemployment and disguised unemployment in developing countries. If the migrants in this model are only constituted of the surplus labor force⁹, migration does not cause any reduction in the aggregate output in the home country and is rather beneficial to workers at home as they now can enjoy higher income per capita on average.

What about the workers and their families who live at subsistence levels? Do remittances change their life style? Not likely so¹⁰. Remittances might give them some breathing space, but workers would enjoy little leisure. They still have to work as much as they can do to make their living a little bit better. In this model, if workers do not value leisure at all, the weight attached to leisure becomes $a=0$. In this case remittances do not provide any incentives for workers living at subsistence levels to work less and enjoy more leisure. This might be too extreme but as long as a is close to zero, then a negative effect stemming from remittances on labor participation is negligible.

Another strand is to bring in a more realistic production function and consumer behaviors. The model assumes that workers in the home country spend remittances just for consumption. But it is also possible to incorporate savings and a production function that uses capital inputs into the model in an intertemporal framework. For example,

⁹ Khan (1991) finds a favorable impact of labor emigration on the domestic labor market in Pakistan.

¹⁰ This seems very complicated as a study by Kozel and Alderman (1990) finds that high levels of non-labor income, particularly remittances, result in low labor participation rates in Pakistan.

savings are invested in physical goods as well as in education¹¹. The accumulation of physical and human capital makes labor productivity higher. Then we can see whether it can outweigh the output loss as a result of both migration and negative remittance effects on labor participation. This line of research would be quite interesting and is expected to provide a deeper understanding of the impact of remittances on growth.

IV. EMPIRICAL STUDIES

This section examines the empirical relationship between remittances and long-run economic growth. We would like to test the implication derived in the previous section; "remittances have negative effects on domestic economic activities. Is this true in developing countries?" To be precise, we would analyze whether the level and growth of (official) remittances are associated with higher economic growth. Although the official remittance data has certain limitations, we believe that it serves as the best indicator of actual remittance flows. By using the official data as a proxy for actual flows, we should be able to obtain meaningful results.

Several attempts have been made to estimate the impact of remittances on the overall economy. Typically these studies focus on one country at a time and use a simple macroeconomic model to calculate a remittance multiplier. The results tend to show a positive impact on GNP (Nishat and Bilgrami 1991; Adelman and Taylor 1990). It is not surprising to see these positive outcomes since the impact of remittances on the aggregate GNP is analyzed when remittances itself constitute part of GNP. In addition, the data used for these studies is time-series, which often suffers from the problem of spurious relationships among variables when proper treatments are not performed.

Chami et al (2003) is the breakthrough in the study of macro impacts of remittances on growth. By constructing a comprehensive remittance data from the official statistics of (up to) 113 countries over a period of 29 years, the study investigates the link between remittances and per capita real GDP using cross-country as well as panel estimation. It finds a robust and significant negative impact of remittances on growth performance, and argues that remittances induce moral hazard problems among the recipients that cause poor economic performance. Our empirical study in this chapter aims to supplement the referred study and challenge its findings.

A. Data and Model Specification

The empirical analysis uses a panel of aggregate remittance data on, as many as, 91 developing countries from 1976 to 1999 (see Appendix for the list of countries). The choice of countries depends on the availability of data. Countries with more than 4 years of non-zero remittance-data are included. Since our interest is on developing countries, we exclude the data on developed countries from the panel.¹² Following Taylor (1999), the definition of remittance data employed here is the sum of "workers' remittances" and "compensation of employees". The analysis is also made by using the narrow definition

¹¹ Earlier studies find that remittances are rarely used for investment in productive activities; they are rather used for consumption and purchasing land (Islam 1991). Recent studies, however, indicate that remittances are increasingly used for investment purposes (Adams 1991; 1998).

¹² The only exception is South Korea.

of remittances, which just considers “workers’ remittances” to examine the probable differences that may arise. We name the former Panel I and the latter Panel II.

The source of data on remittances is the *Balance of Payments Statistics Yearbook* of the International Monetary Fund. The compiled data is conveniently downloadable from <http://migration.ucdavis.edu/mn/data/remittances/remittances.html>.

Unless specified, the data are averaged over five non-overlapping five-year periods from 1976-1995 and one four-year period from 1996-1999¹³. Such a procedure is necessary to avoid the influence of short-run fluctuations induced by business cycles on estimation.

In the following equation, the subscript t therefore refers to one of these five-year periods ($t=1, \dots, 5$) and i represent country ($i=1, \dots, 91$). The estimated regression is given by:

$$GRWPC_{i,t} = \beta_0 + \beta_1 RM_{i,t} + \beta'X_{i,t} + \varepsilon_{i,t}$$

where the dependent variable is $GRWPC_{i,t}$; the average annual rate of growth of per capita real GDP, RM , is the logarithm of the average ratio of remittances to GDP; X is a set of conditioning information that controls for other factors associated with economic growth, and ε is the error term. The definition of economic growth here is the growth of real per capita GDP, not the growth of aggregate GDP.

The conditioning information set includes the initial real per capita GDP at the first year of each sub-period (INT) to control for convergence, and the average years of schooling at the start of each sub-period (EDU) as an indicator of human capital stock. The set also includes policy-related variables that are defined as the ratio of domestic investment to GDP (INV) to capture the effect of investment, the rate of inflation (INF) as an indicator of macroeconomic stability, and the sum of exports and imports as a share of GDP (TRA) as an indicator of openness of an economy and to capture the effect of trade-oriented policies. The variables included in the conditioning information set enter in logarithmic form (except EDU) and have been identified by the empirical growth literature as being correlated with growth performance across countries (Barro 1991; Mankiw, Romer, and Weil 1992). Further details on the definition and sources of all the variables used in the model can be found in the Appendix.

B. Econometric Issues

Besides gaining more degrees of freedom, one key reason for estimating a panel is to avoid the risk of obtaining biased results induced by any unobservable country-specific effects that may be correlated with other explanatory variables. Another important reason is to account for dynamic effects, which are simply not detectable in pure cross-country data.

We apply the fixed-effects method which takes into account of the country-specific characteristics, and models them as fixed effects within the country. This method treats the error term as follows.

¹³ Whether the five-year average is long enough to capture the long-term economic growth is an issue of contention.

$$\varepsilon_{i,t} = \alpha_i + \mu_{i,t}$$

The basic assumption is that the error structure for the disturbance is composed of two components: unobservable individual country effect, α_i , and well-behaved disturbance, $\mu_{i,t}$: $E[\mu_{i,t}] = 0$ and $\text{var}[\mu_{i,t}] = \sigma_\mu^2$. The fixed model assumes that α_i varies according to the cross-country units but time-invariant, and the remainder disturbance $\mu_{i,t}$ can be thought of as the usual disturbance in the regression and varies with countries and time.

One of econometric issues in estimation is an endogeneity problem. As seen in Section 2, lower income countries tend to attract more remittances. This hints that lower levels of income or lower rates of growth cause workers to migrate and consequently the volume of remittances increases. This reserve causality implies that a contemporaneous relationship may exist between remittances and economic growth. A similar argument is also presented in Chami et al (2003), which points out a negative association between growth rates and the level of remittances. The same problem also arises when the ratio of domestic investment to GDP (*INV*) is included as an explanatory variable. It has been widely discussed that causality between investment and economic growth runs in both directions: investment shares cause growth rates and growth rates cause investment shares (Arellano and Bond 1991). In this exercise, we take account of the likely endogeneity of these variables by using the lagged values to mitigate this problem¹⁴.

C. Empirical Results

1. Results from Panel I Data

Table 7 presents the results of the regressions when remittances are defined as the sum of “workers’ remittances” and “compensation of employees.” The logarithm of workers’ remittances to GDP is used as an indicator of remittance flows (*RM*). The first row of the table shows the estimated coefficients on the remittance variable. EQ. (1.1) and EQ. (1.2) use simple explanatory variables and show a positive and statistically significant relationship between the five-year average of per capita GDP growth and the ratio of remittances to GDP. A unit increase in the remittance variable leads close to 1% increase in real per capita GDP growth rates¹⁵. When policy-related explanatory variables are included, however, we have mixed results. While the coefficient on the remittance variable in EQ. (1.3) is positive and significant at the 10% level, it enters positively but insignificantly in EQ. (1.4) when all explanatory variables are included. In addition, the coefficients on the remittance variable in EQ. (1.3) and EQ. (1.4) are far smaller than those in EQ. (1.1) and EQ. (1.2). It may be suspected that the difference might be due to a linear relationship among explanatory variables; probably there is a link between *EDU* and *RM*. When the indicator of human capital stock (*EDU*) comes in EQ. (1.4), the ratio

¹⁴ Chami et al (2003) applies a two stage least square estimator to control the bias that may arise from simultaneity.

¹⁵ It should be reminded that all the variables except *EDU* enter in the regressions in logarithmic form. A unit increase is not a 1% increase, but a unit increase in the log of the ratio of remittances to GDP here.

of remittances to GDP turns insignificant. This may suggest that the level of remittances is associated with the level of human capital. As a result, it causes inconsistency in estimation (though the link is not evident in EQ. (1.2)).

TABLE 7. Dependent Variable: GRWPC (Per capita real GDP growth rates)
[Values of standard errors in parentheses]

	EQ(1.1)	EQ(1.2)	EQ(1.3)	EQ(1.4)
<i>RM</i>	0.0098*** (0.003)	0.0097** (0.004)	0.0043* (0.003)	0.0021 (0.003)
<i>INI</i>	-0.04** (0.019)	-0.04 (0.025)	-0.072*** (0.014)	-0.103*** (0.017)
<i>EDU</i>		0.011** (0.005)		0.0136*** (0.0047)
<i>INV</i>			-0.0027 (0.01)	0.0106 (0.011)
<i>INF</i>			-0.014*** (0.004)	-0.011*** (0.003)
<i>TRA</i>			0.0550*** (0.009)	0.0451*** (0.01)
Adj. Rsqr	0.34	0.34	0.55	0.56
Obs.	279	206	256	198

Notes: ***, **, * denote statistical significance at the 1%, 5%, 10% levels respectively.

Standard errors are heteroskedasticity-robust standard errors.

Source: Author's estimates.

Other explanatory variables have significant coefficients with the expected signs (except *INV*). The logarithm of the initial GDP per capita (*INI*) has a positive and significant sign, which confirms the findings of Barro (1991), and Mankiw et al (1992). The average years of schooling (*EDU*) as an indicator of human capital stock have a significant and robust impact on growth. This result highlights the important role of human capital in economic growth that has been suggested in the endogenous growth literature, such as by Lucas (1988). The rate of inflation as an indicator of macroeconomic stability (*INF*) inserts a negative and significant impact on growth. The openness indicator in terms of trade volumes to GDP (*TRA*) has a significant positive influence on growth performance.

The estimated coefficient on the rate of investment to GDP (*INV*) exhibits ambiguous and statistically insignificant results. Although this is in line with Barro (1995) and Blomstrom et al (1996), the result seems to be against a common belief that investment is the engine of growth. The result also provides a sharp contrast with the earlier findings of Delong and Summers (1991) and Levine and Renelt (1992). However, recently, the view that investment can fuel economic growth has been challenged (Easterly 2001). Also from a statistical point of view, the positive association found in earlier studies might simply originate in reverse causation from growth to investment¹⁶.

¹⁶ When instead contemporaneous investment rates enter into the regressions, the estimated coefficients on investment show significant and positive signs. Another possible explanation for this insignificant result is that the concept of investment in the data is inappropriate as suggested by

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A study by Attanasio et al (2000), that considers the simultaneous determination of investment and growth, shows even negative impacts of investment on growth.

We have also estimated the impact of remittances on growth by using the first difference of the log of workers' remittances to GDP (*DRM*) as suggested by Chami et al (2003). They claim that this specification is better as it can capture the dynamic nature of remittances.

The results are presented in Table 8. Similar to the results in Table 7, EQ. (2.1) and EQ. (2.2) show a positive and significant impact of remittances on growth performance. For example, a unit increase in the growth rates of remittances to GDP ratio raises per capita GDP growth by 0.52 percentage points in EQ. (2.2). When additional explanatory variables are employed in the regressions, however, the coefficients on remittances become statistically insignificant though the signs remain positive. The coefficients on other explanatory variables show robust and expected signs, which are consistent with those in Table 7.

TABLE 8. Dependent Variable: GRWPC (Per capita real GDP growth rates)
[Values of standard errors in parentheses]

	EQ(2.1)	EQ(2.2)	EQ(2.3)	EQ(2.4)
<i>DRM</i>	0.0039*** (0.001)	0.0052*** (0.002)	0.0008 (0.001)	0.0011 (0.001)
<i>INI</i>	-0.0236 (0.017)	-0.0243 (0.021)	-0.061*** (0.014)	-0.089*** (0.015)
<i>EDU</i>		0.0123*** (0.004)		0.012*** (0.004)
<i>INV</i>			-0.01 (0.01)	0.004 (0.11)
<i>INF</i>			-0.012*** (0.004)	-0.009*** (0.003)
<i>TRA</i>			0.0457*** (0.007)	0.033*** (0.008)
Adj. Rsqr	0.32	0.39	0.54	0.58
Obs.	256	183	216	175

Notes: ***, ** denote statistical significance at the 1%, 5% levels respectively.

Standard errors are heteroskedasticity-robust standard errors.

Source: Author's estimates.

2. Results from Panel II Data

To supplement the results obtained above, we now turn to replicate the exercises by using the remittance data defined by "workers' remittances" only. This is the same definition employed by Chami et al (2003).

Table 9 presents the results when the logarithm of workers' remittances to GDP is used as an indicator for remittance flows. Table 10 shows the results when the first difference of the log of workers' remittances to GDP is used. In both tables, the coefficients on the remittances variables are positive but statistically insignificant except

Barro (1995). The investment we used here combines both private and public investment. If these entered in the regression separately, the result might have been different.

EQ. (3.1). *INI*, *EDU*, *TRA* show expected signs and are significant, but *INF* becomes insignificant and shows a positive sign. *INV* is now negative and significant. When we work on the data that use “workers remittances” only as an indicator of remittance flows, some robust positive impacts on growth which were observed in Table 7 and Table 8 have now been disappeared.

TABLE 9. Dependent Variable: GRWPC (Per capita real GDP growth rates)
[Values of standard errors in parentheses]

	EQ(3.1)	EQ(3.2)	EQ(3.3)	EQ(3.4)
<i>RM</i>	0.0056** (0.003)	0.0027 (0.003)	0.0039 (0.026)	0.0038 (0.003)
<i>INI</i>	-0.057*** (0.014)	-0.077*** (0.015)	-0.047*** (0.015)	-0.07*** (0.017)
<i>EDU</i>		0.017*** (0.005)		0.009** (0.005)
<i>INV</i>			-0.025*** (0.008)	-0.018** (0.009)
<i>INF</i>			0.0016 (0.005)	0.0019 (0.005)
<i>TRA</i>			0.057*** (0.008)	0.054*** (0.01)
Adj. Rsqr	0.48	0.57	0.64	0.69
Obs.	200	141	181	135

Notes: ***, ** denote statistical significance at the 1%, 5% levels respectively.

Standard errors are heteroskedasticity-robust standard errors.

Source: Author's estimates.

TABLE 10. Dependent Variable: GRWPC (Per capita real GDP growth rates)
[Values of standard errors in parentheses]

	EQ(4.1)	EQ(4.2)	EQ(4.3)	EQ(4.4)
<i>DRM</i>	0.0014 (0.002)	0.0015 (0.002)	0.002 (0.002)	0.0011 (0.002)
<i>INI</i>	-0.063*** (0.019)	-0.081*** (0.018)	-0.052** (0.02)	-0.078*** (0.018)
<i>EDU</i>		0.016*** (0.005)		0.007 (0.005)
<i>INV</i>			-0.029*** (0.011)	-0.019* (0.01)
<i>INF</i>			-0.0049 (0.007)	-0.0024 (0.005)
<i>TRA</i>			0.056*** (0.01)	0.053*** (0.011)
Adj. Rsqr	0.36	0.51	0.65	0.63
Obs.	159	118	143	113

Notes: ***, **, * denote statistical significance at the 1%, 5%, 10% levels respectively.

Standard errors are heteroskedasticity-robust standard errors.

Source: Author's estimates.

D. Interpreting the Results

The regression analysis in this section has shown some positive effects of remittances on per capita real GDP growth. Unfortunately the results are not robust and are sensitive to the selection of explanatory variables and the definition of remittances. When the analysis is made using the sum of “workers’ remittances” and “compensation of employees” as an indicator of remittance flows, the estimated coefficients on remittances tend to exhibit positive and significant impacts on growth. But these positive effects disappear when we work on “workers’ remittances” only. However, overall the analysis has at least shown “non-negative” impacts of remittances on growth performance.

What does this positive, or at least non-negative, impact of remittances explain? Here are a couple of possibilities. First, remittances do not provide any incentives for remaining workers and families to work less as they live at near subsistence levels as discussed in the previous section; therefore, output per capita is not affected. Second, remittances can be invested in education: the formation of human capital. It raises the level of labor productivity; hence it increases per capita output. This may explain why the estimated coefficient on the remittance variable becomes insignificant when an indicator of human capital (*EDU*) is included in estimation in EQ. (1.4). Third, remittances relax foreign exchange constraints facing developing countries. This enables developing countries to purchase essential capital goods for productive activities from abroad, hence generate higher output growth¹⁷.

The empirical evidence obtained in this study provides a sharp contrast with the findings of Chami et al (2003), in which the negative and robust impact of remittances on economic growth has been found. This is because the two studies differ in several aspects. First, the dataset and the definition of remittances differ. While our study uses data that includes only developing countries, the study of Chami et al (2003) uses data that includes both developed and developing countries, where labor behaviors seems different. In addition, the definition of remittances employed for their study is “workers’ remittances”, which are not adequate to measure the volume of remittances as discussed in Section 2. The two studies also differ in how the variables used in the regressions are processed. While the variables are averaged over five-year in our study, the annual time-series data of both remittances and macro variables is used in their study. As annual data tends to suffer from the influence of short-term fluctuations induced by business cycles, there is a considerable possibility that their results simply reflect the counter-cyclical nature of remittances. Probably most of the differences in the estimated results can be explained by this factor.

V. SUMMARY

Remittance flows have shown a steady increase over the last 10 years and have become the second largest resource inflow to the developing countries. The speed of increment seems increasing especially after the September 11, 2001 U.S. terrorist attack. As private

¹⁷ This is one of the basic ideas which gives rise to the “two-gap models” of growth.

equity and debt flows, as well as official assistance, to the developing countries have been declining, the importance of remittances as a tool of development has risen. Despite the growing interest in remittances, however, little attention has been paid to the investigation of their role in development in the existing literature. Because of lack of theoretical and empirical analyses in conjunction with data limitations, the relationship between remittances and growth is not well understood.

In this paper, we have discussed the effect of remittances on economic growth. The first part of this chapter examines trends in remittances and their characteristics from a macroeconomic perspective. It highlights the fact that remittances are less volatile and more equitably distributed than other types of inflows. A simple theoretical model being presented in the section that follows, suggests the possibility that remittances can be detrimental to per capita output growth as they influence recipients' labor/leisure choices. Possible extensions of the model, however, point out that remittances might have favorable effects on growth, depending on how remittances are spent.

The empirical study has examined the relationship between remittances and economic growth. Based on official remittance data, it has demonstrated positive or at least non-negative effect of remittances on growth performance, indicating that negative impacts on recipients' labor choices are either not severe or can be compensated for by the positive benefits that remittances bring.

The issue of remittances and development is complicated because of the unique characteristics of remittances. Workers' remittances are trans-border transactions between workers abroad and their families left behind; that is, transactions between the smallest units in the economy. Unlike FDI and official development aid (ODA), which are intended for financing business or development projects, the way in which remittances are used is determined by the individual's preferences and family strategies. This will differ from one household to another, depending on recipient family's economic and social situation. As the maximization of an individual's utility does not necessarily lead to the maximization of the nation's utility (this may be represented by GDP), it is not a simple task for governments and donors to make workers' remittances conducive to development and economic growth.

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Appendix A- Definitions and Sources of Variables

Data Sources:

World Bank, *Global Development Finance* (GDF)

World Bank, *World Development Indicators* (WDI)

International Monetary Fund, *Balance of Payments Statistics Yearbook* (BOP)

Summers, R., Heston, A., and Aten, B., *the Penn World Table Mark 6.1* (PENN)

*downloadable from <http://pwt.econ.upenn.edu/>

Barro-Lee Data Set: Educational Attainment Data, 1960-1985 (BARLEE)

*downloadable from <http://www.worldbank.org/research/growth/ddbarlee.htm>

Date Definitions:

Variables	Definitions	Sources
<i>GRWPC</i>	The average annual growth rate of per capita real GDP (in 1985 constant prices) of each sub-period.	PENN, WDI, GDF
<i>INI</i>	The initial real per capita GDP (in 1985 constant prices) at the first year of each sub-period.	PENN, WDI, GDF
<i>EDU</i>	The average schooling years for the population that is aged 25 years or older at the first year of each sub-period. *Figures for 1996 have been extrapolated from past values.	BARLEE
<i>INV</i>	The average annual value of each sub-period's total investment as a ratio to GDP	WDI, GDF
<i>INF</i>	The average annual rate of inflation (measured in CPI) of each sub-period.	WDI, GDF
<i>TRA</i>	The average annual value of each sub-period's total trade (exports plus imports) as a ratio to GDP	WDI, GDF
<i>RM</i>	The log of the average annual value of each sub-period's remittances as a share of GDP.	BOP
<i>DRM</i>	The first difference of the log of the average annual value of each sub-period's remittances as a share of GDP. *Remittance data is downloadable from http://migration.ucdavis.edu/mn/data/remittances/remittances.html	BOP

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Appendix B- Country List by Region and Level of Income

Income group	Sub-Sahara African	Asia	Europe and Central Asia	Latin Americas	Middle East and North Africa
Low income	Benin	Bangladesh		Haiti	Yemen
	Burkina Faso	India		Nicaragua	
	Cameroon	Indonesia			
	Chad, Comoros	Lao PDR			
	Congo Rep.	Nepal			
	Cote d'Ivoire	Pakistan			
	Ethiopia				
	Ghana, Guinea				
	Guinea-Bissau				
	Kenya, Lesotho				
	Madagascar				
	Mali				
	Mauritania				
	Mozambique				
	Niger, Nigeria				
	Rwanda				
	Senegal				
	Sudan				
	Tanzania, Togo				
	Zimbabwe				
Lower middle income	Cape Verde	China	Bulgaria	Belize	Egypt
	Namibia	Fiji	Romania	Bolivia	Jordan
	South Africa	Kiribati	Turkey	Colombia	Morocco
	Swaziland	Maldives		Dominican R.	Syria
		Philippines		Ecuador	Djibouti
		Samoa		El Salvador	Tunisia
		Sri Lanka		Honduras	
		Thailand		Jamaica	
		Vanuatu		Paraguay	
				Peru	
				St. Vincent & Grenadines	
				Suriname	
Upper middle income	Botswana	Malaysia	Czech	Argentina	Oman
	Seychelles		Hungary	Barbados	Malta
			Latvia	Brazil	
			Poland	Chile	
			Slovak	Costa Rica	
				Dominica	
				Mexico	
				Panama	
				St. Kitts and Nevis	
				St. Lucia	
				Trinidad & Tobago	
				Venezuela	
High income		South Korea			
Total	31	17	8	26	9