

CASE STUDY

From shock absorber to shock transmitter: Determinants of remittances in Sub-Saharan Africa

RAJU JAN SINGH *

Abstract

Workers' remittances to developing countries have substantially increased over the past decade, both globally and in sub-Saharan Africa. They have been argued to be shock absorbers, increasing when home economies face economic difficulties and have been shown to alleviate poverty. During economic downturns, however, migrant workers are often the most vulnerable. As migrants lose their incomes or even their jobs, the global scope of the current crisis may turn remittances into a shock transmitter. Faced by this perspective, what can home countries do to shelter themselves? This paper investigates the determinants of remittances in sub-Saharan Africa and suggests some possible policy responses.

Keywords: remittances, migration, global crisis, Africa

Remittances in Sub-Saharan Africa

Reported remittances have substantially increased throughout the developing world (Figure 1), rising from about US\$20 billion in 1980 to an estimated US\$336 billion in 2008. In sub-Saharan Africa (SSA), an estimated US\$20 billion in remittances in 2007 corresponded to about 2½ percent of regional GDP, an amount similar to the official development assistance the region received. However, on a global scale remittance flows to SSA are quite small; they account for only 5 percent of total remittances to developing countries, and in terms of GDP are dwarfed by the amounts received in the Middle East and South Asia.

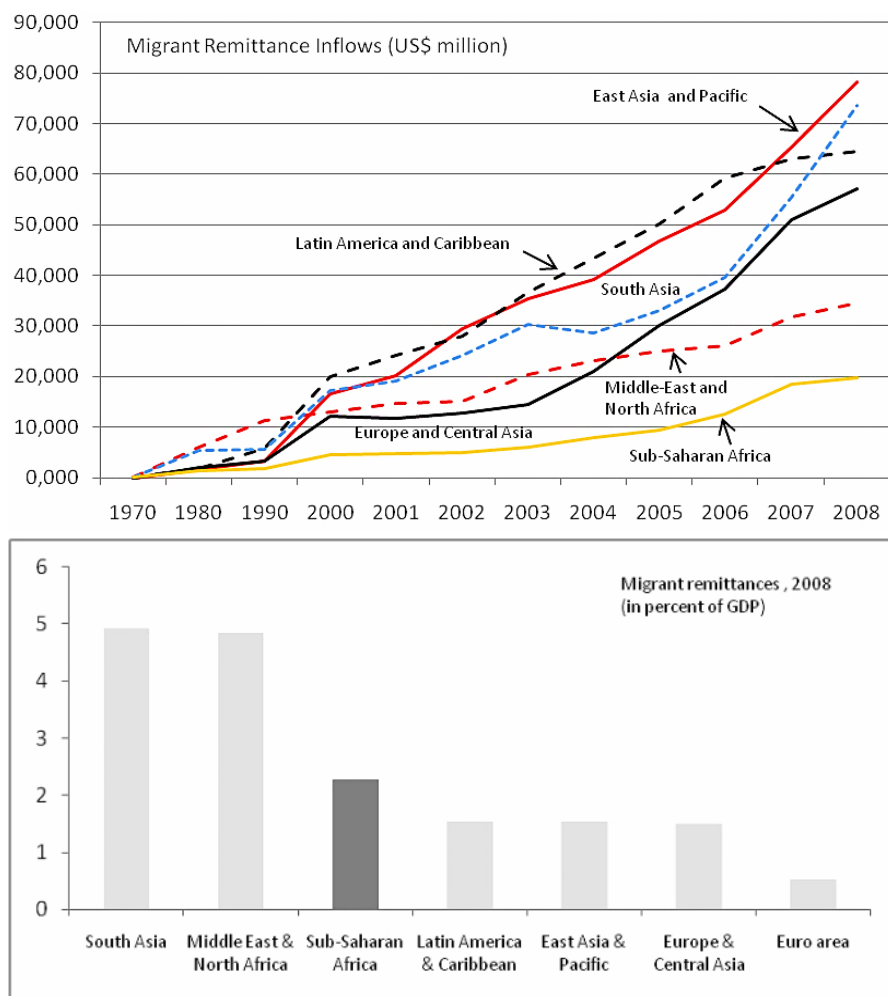
The general picture hides striking variations by country (Figure 2). Of the 25 largest recipients of remittances in 2008 in terms of GDP, four were in Africa (Lesotho, Togo, Cape Verde, and Senegal). As a source of foreign exchange, in Benin, Cape Verde, Gambia, Lesotho, Senegal, Sierra Leone and Uganda, remittances in 2008 represented more than 25 percent of each country's export earnings. Furthermore, while for the region as a whole the amounts of aid and recorded remittances are similar, in numerous countries remittances were a multiple of official assistance.

With about 80 percent of their remittances coming from advanced economies, SSA countries are particularly vulnerable to an economic slowdown in these countries. The expected increase in unemployment would be concentrated in countries and sectors where migrant workers are heavily represented (e.g. advanced economies, and the construction and transport sectors). This would imply reduced job opportunities for migrants and lower remittance flows. According to Ratha et al. (2009), remittances are expected to have declined by about 7-10 percent in 2009, putting poverty reduction and employment in home countries at risk.

* Raju Jan Singh is affiliated with the World Bank. Email: rsingh9@worldbank.org.



Figure 1. Remittances by major region



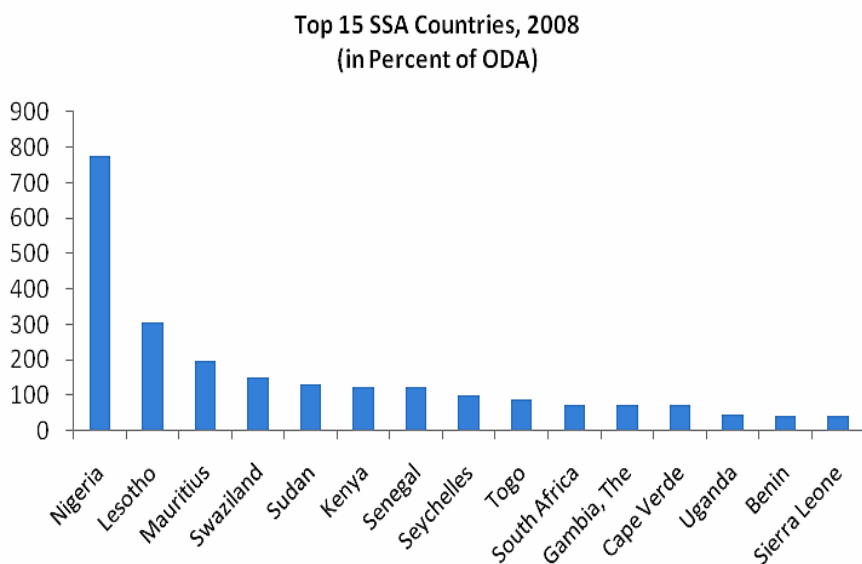
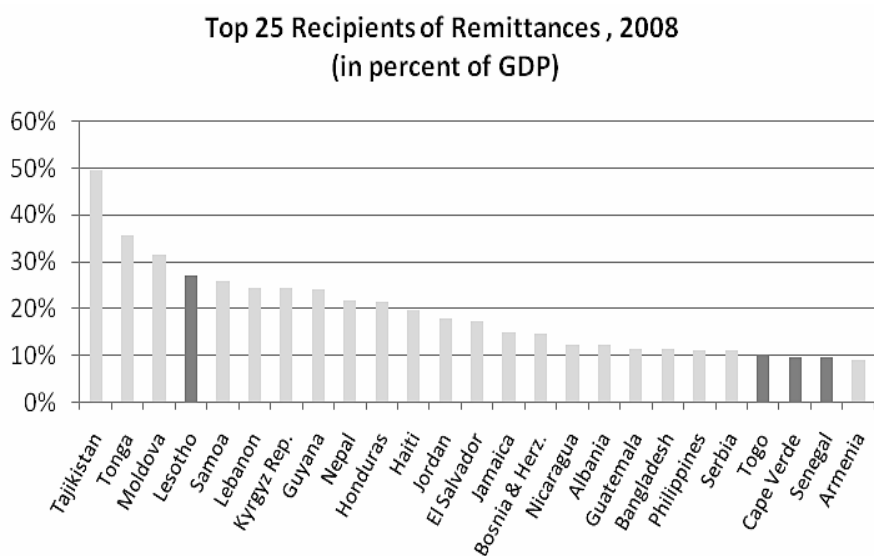
Sources: IMF, World Bank, and authors' calculations.

Going forward, there are concerns about a possible rise in discrimination and xenophobia, migrant workers being perceived as taking jobs away from local workers or competing for welfare benefits. A number of host countries have stopped or imposed restrictions on new admissions of migrants for employment. Home countries are already experiencing inflows of returning migrants, which may result in economic and social instability in poorer countries.¹ Understanding what

¹ Many governments have already adopted more restrictive policies (e.g. Australia, Korea, Russia, U.S.) and some have even introduced financial incentives to encourage migrant workers to return home (e.g. Japan, Spain, U.K.).

drives remittances is therefore crucial. Yet, little research has been done on the determinants of remittances to Africa.

Figure 2. Main recipients of remittances



Sources: IMF, World Bank, and authors' calculations.

Empirical Analysis

Empirical Approach

We estimate the following equation describing the determinants of remittances and including explanatory and control variables that have been shown significant in previous studies ²:

Equation (1):

$$\ln(\text{REM}/\text{GDP})_{it} = \alpha_i + \gamma_t + \beta_1 \ln y_{it} + \beta_2 \ln \text{FinDev}_{it} + \beta_3 \ln y_{it}^* + \beta_4 \ln(\text{Mig}/\text{Pop})_{it} \\ + \beta_5 \ln \text{Ins}_{it} + \beta_6 \ln \text{REX}_{it} + \beta_7 \text{ID}_{it} + \beta_8 \text{Dual}_{it} + \varepsilon_{it},$$

where *REM/GDP* denotes the ratio of remittances to GDP, *y* is home income, *FinDev* stands for an index for the financial development, *y** is host income, *Mig/Pop* is the ratio of expatriates to population, *Ins* denotes institutional quality, *REX* is the real exchange rate, *ID* is the interest rate differential, *Dual* is the dual exchange rate dummy variable, and α_i and γ_t are country- and time-specific dummies. Panel fixed effect (FE) and fixed-effect two-stage least square (FE 2SLS) estimation methods were used.³

The sample comprises 36 countries in SSA for 1990 through 2005. Data on remittances are drawn from the IMF's *Balance of Payments Statistics Yearbook* (BOPSY). To estimate the annual stock of expatriates, we started with the data compiled by Parsons et al. (2007) on international bilateral migration. This database provides the number of migrants from each of 226 origin countries to each of 226 destination countries in 2000. From this we inferred data on the stock of expatriates for our 36 SSA countries during 1990–2005 using World Development Indicators (see Appendix B for a more detailed discussion). Measures of the differentials in interest rates and income between the home and host countries were constructed as an average of bilateral differentials, weighted by the shares of migrants (from Parsons et al., 2007).

Results

Table I reports the estimation results. Remittances to SSA do seem to play a shock-absorbing role. The coefficient of real per capita GDP in the home country is negative regardless of the choice of estimation methods. This suggests that when adverse economic shocks decrease incomes in their home country, migrants would remit more to protect their family from those shocks.

The coefficients of host country income and stock of expatriates are, however, positive and robust. Countries with a large diaspora attract more remittances and the location of expatriate communities matters: the wealthier the country where expatriates are located, the higher the remittances they send back home. This

² See Rapoport and Docquier (2006) for a survey of various theories and empirical evidence on motivations to remit.

³ The dependent variable used here is the ratio of remittances to GDP. We also tried different measures, such as remittances to population or just the volume of remittances, but the results were robust to the choice of measure for remittances.

result would suggest that, as the global crisis erodes the incomes and the number of migrants, remittances should be expected to decline, spreading the crisis to home countries rather than sheltering them.

Table 1. Determinants of remittances

Variables (all in logs)				
	M2/GDP	DC/GDP	[1]	[2]
Home income	-3.236*** (-6.08)	-2.952*** (-4.48)	-3.158*** (-5.14)	-3.258*** (-3.02)
M2/GDP	0.698*** (3.37)		1.232*** (3.06)	
Domestic credit/GDP		0.160 (1.15)		0.890*** (3.86)
Host income	4.255*** (3.64)	4.555*** (3.60)	2.567*** (2.09)	3.690*** (2.66)
Expatriates/Population	0.024*** (3.59)	0.021*** (2.85)	0.027*** (3.29)	0.016 (1.59)
Institutions	0.400*** (2.72)	0.378*** (2.43)	0.491*** (3.21)	0.274 (1.60)
Real exchange rate	-0.765*** (-3.06)	-0.581** (-2.14)	-0.760** (-2.39)	-0.699** (-1.99)
Interest rate differential	-0.039*** (-3.56)	-0.039*** (-4.30)	-0.030*** (-3.52)	-0.025** (-2.64)
Dual exchange rate	-0.131 (-0.83)	-0.029 (-2.16)	-0.126 (-0.83)	0.113 (0.61)
Observations	352	334	318	296
R squared	0.8171	0.8122	0.8251	0.8129
For weak instruments	N.A.	N.A.	31.289	52.756
p-value for overidentification test of all instruments	N.A.	N.A.	0.3162	0.2796

Note: 1) Standard errors are robust to autocorrelation in errors.
 2) t-values are in parentheses.
 3) ***, **, and * indicate 1%, 5% and 10% significance.
 4) Time-specific dummies are included but estimates are not reported here.

[1] Financial depth: M2/GDP
 Instrumented: Home income, M2/GDP
 Instruments: 1st lag of real GDP per capita and institutions; 1st and 2nd lags of M2/GDP

[2] Financial depth: DC/GDP
 Instrumented: Home income, DC/GDP
 Instruments: 1st lag of real GDP per capita and institutions; 1st and 2nd lags of DC/GDP

Remittances also reflect a portfolio choice about investment opportunities in the home country. The coefficient on institutional quality is significantly positive and robust. This result suggests that countries with better institutions or a more stable political system would receive more remittances relative to GDP. Institutional quality can be viewed as reflecting the business environment, which in turn should influence the amount of remittances driven by the investment motive.

Once migrants have decided how much to remit, they must then decide how to send it. Remittances are estimated to be positively correlated with financial deepening. Countries with more developed financial markets would attract more

remittances relative to GDP. Financial development should ease the process of money transfers and may reduce the fee associated with sending remittances through competition, so that it can raise the amount or share of remittances transferred through official channels, which our data on remittances captures.

Conclusions: What can be done?

The findings suggest that remittances vary countercyclically with variations in GDP per capita in the home country, consistent with the hypothesis that remittances can help mitigate economic shocks. However, the size, the location, and the income of the diaspora are also important determinants of remittances. These results would suggest that this time around remittances should not be expected to shelter their home economies from adverse economic shocks, but on the contrary could contribute propagating them. The global scope of the current crisis could turn remittances into shock transmitters.

Against this backdrop, what could home countries do? The results presented in this paper would suggest several policy options:

- Just as protectionism in trade needs to be avoided, rising protectionism in human mobility in host countries should be resisted, keeping the number of migrants in host countries.
- Efforts should be stepped up in home countries to improve the quality of their institutional environment, particularly their business climate, to encourage migrants to send more remittances.
- In particular, measures should be taken to deepen financial intermediation and facilitate remittance flows through formal channels by lowering transaction costs associated with sending remittances.

Appendix A. List of variables and countries used for the analysis

Variables	Description	Source
Remittances	Sum of workers' remittances, compensation of employees, and migrants' transfers (expressed in US\$)	BOPSY (IMF), WDI (World Bank), and African Department at the IMF
Real GDP per capita	Real GDP per capita in 2000 constant US\$	WDI
Nominal GDP	Nominal GDP in US\$	World Economic Outlook (WEO; IMF)
Population	Population	WDI
Nominal exchange Rate	Nominal exchange rate measured as the amount of USD for one unit of local currency unit (US\$/local currency unit)	WEO
CPI	Consumer Price Index (100 in 2000)	WEO
Inflation	CPI inflation	Authors' computation
Investment	Gross investment in US\$	WEO
Dual exchange rate regime	Dual exchange dummy, 1 for dual or multiple exchange rate regime	Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER; IMF)
M2	Money and quasi-money (M2) in US\$	WDI
Terms of trade	Export price index/ Import price index (100 in 2000)	WEO
Trade openness	(Imports + Exports)/GDP	WEO
Stock of expatriates	Number of expatriates by origin (see Appendix B for details.)	WDI and Parsons et al. (2007)
Private investment	Private investment in US\$	WEO
Public investment	Public investment in US\$	WEO
Institutional quality	ICRG political risk index (0: highest risk, 100: lowest risk)	International Country Risk Guide (ICRG; Political Risk Service Group)
Deposit rate	Deposit rate	IFS
Real exchange rate	Real exchange rate against US\$ $\left(\frac{\text{USD}}{\text{LCU}} \frac{\text{CPI}_{\text{US}}}{\text{CPI}_{\text{US}}} \right)$	Authors' computation
Government expenditure	General government total expenditure and net lending in US\$	WEO
Host income	Weighted average of real per capita GDP in top 4 expatriates-receiving countries (in 2000 constant US\$)	WDI and Parsons et al. (2007)
Nominal interest rate differential	Deposit rate of home country – Deposit rate of country with largest migrants share from that country	IFS and Parsons et al. (2007)
Domestic credit	Domestic credit provided by banks (% of GDP)	WDI

* Countries in our Sample (in alphabetical order)

Benin, Botswana, Burkina Faso, Cameroon, Cape Verde, Comoros, Republic of Congo, Côte d'Ivoire, Eritrea, Ethiopia, Gabon, The Gambia, Ghana, Guinea, Guinea-Bissau, Kenya, Lesotho, Madagascar, Malawi, Mali, Mauritania, Mauritius, Mozambique, Namibia, Niger, Nigeria, Rwanda, São Tomé & Príncipe, Senegal, Seychelles, Sierra Leone, South Africa, Sudan, Swaziland, Tanzania, and Togo. (36 countries)

Appendix B. Construction of the stock of expatriates data

This appendix describes in detail how we construct data on the stock of expatriates from available sources of migration data. The data we use to compute the stock of expatriates include net migration into each country and the stock of migrants within each country (both from the WDI but recorded only every five years as well as the international bilateral migration database compiled by Parsons et al. (2007).

Suppose there is a country, which we call **home**. We call the rest of the world **foreign**. Assume for simplicity that place of birth determines citizenship. Assume further that all available stock data are measured at the end of a given period.

Let us define the following variables (see the diagram below):

1. Stocks

H_t : number of people born in home and living there

H_t^* : number of people born in home but living in foreign

F_t : number of people born in foreign but living in home

F_t^* : number of people born in foreign and living there

P_t : population of home ($= H_t + F_t$)

2. Flows

EH_t : number of home-born people who migrate from home to foreign

IH_t : number of home-born people who migrate back to home from foreign

EF_t : number of foreign-born people who migrate from home to foreign

IF_t : number of foreign-born people who migrate from foreign to home

E_t : number of out-migration from home ($= EH_t + EF_t$)

I_t : number of in-migration to home ($= IH_t + IF_t$)

M_t : net migration ($= I_t - E_t$)

DH_t^* : number of home-born people who die in foreign

DF_t : number of foreign-born people who die in home

What we know is: P_t , F_t (migration stock from the WDI), hence H_t , and M_t (net migration from the WDI). But what we want to know is: H_t^* (stock of expatriates). The flow of migration is characterized by the following equations:

$$H_t^* = H_{t-1}^* - DH_t^* + EH_t - IH_t \quad (B1)$$

$$F_t = F_{t-1} - DF_t + IF_t - EF_t \quad (B2)$$

Note that births to migrants are counted as increases in the natives for the country where they live on the assumption we made earlier. Turning to net migration we know by definition,

$$M_t = I_t - E_t = (IH_t - EH_t) + (IF_t - EF_t),$$

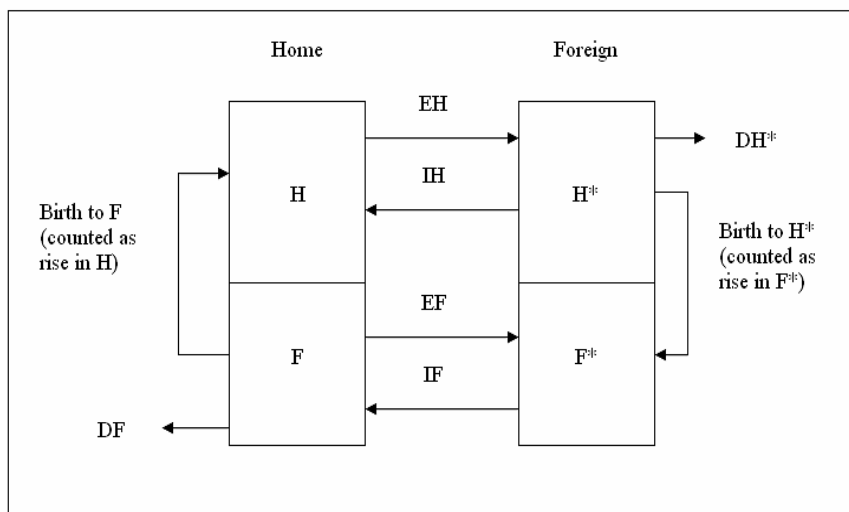
which implies

$$(EH_t - IH_t) = (IF_t - EF_t) - M_t. \quad (B3)$$

Combining (1), (2), and (3), we have

$$H_t^* = H_{t-1}^* - DH_t^* + F_t - F_{t-1} + DF_t - M_t. \quad (B4)$$

To construct the stock of expatriates from home, we need a value of H_t^* for some period t as well as the number of deaths of migrants, i.e., DH_t^* and DF_t . We address these issues as follows: First, to obtain the stock of expatriates from home at some period, we make use of the international bilateral migration database of Parsons et al. (2007). Then, to estimate the number of deaths of migrants, we first assume the death rate depends only on place of birth.



On this assumption, we can compute the death of migrants as follows:

$$\begin{aligned} DH_t^* &= d_t^* H_{t-1}^*, \\ DF_t &= d_t^* F_t, \end{aligned} \quad (B5)$$

where d_t is the death rate of home-born people and d_t^* the death rate of foreign-born people.

We use the crude death rate of home, available from the WDI, to measure d_t and a simple average of crude death rates for our sample countries to measure d_t^* . Combining (B4) and (B5) yields the equation for computing the stock of expatriates:

$$H_t^* = H_{t-1}^*(1 - d_t^*) + F_t - F_{t-1}(1 - d_t^*) - M_t. \quad (B6)$$

One remaining issue in constructing the data as described so far is that data on migration stock within a country, F_t in our term, are available only every five years. Thus we interpolate between two recorded observations linearly to obtain annual data on the stock of expatriates.

Acknowledgement

The paper draws on a wider research project including Markus Haacker (London School of Hygiene and Tropical Medicine), Kyung-woo Lee (Columbia University), and Maëlan Le Goff (CERDI-University of Auvergne). This work was carried out when Markus Haacker, Kyung-woo Lee, and the author were at the African Department of the International Monetary Fund. The views expressed in this paper are those of the authors and do not necessarily represent those of the IMF or IMF policy.

References

- Aggarwal, R. and Spatafora, N. (2005). *Remittances: Determinants and Impact*, mimeo, International Monetary Fund, Washington DC.
- Amuedo-Dorantes, C. and Pozo, S. (2004). "Worker's Remittances and the Real Exchange Rate: A Paradox of Gifts," *World Development*, 32 (8): 1407-1417.

- Bouhga-Hagbe, J. (2006). *Altruism and Workers' Remittances: Evidence from Selected Countries in the Middle East and Central Asia*, IMF Working Paper 06/130, International Monetary Fund Washington DC.
- Cragg, J. G. and Donald, S. G. (1993). "Testing Identifiability and Specification in Instrumental Variable Models," *Econometric Theory*, 9: 220–40.
- Elbadawi, I. and Rocha, R. D. (1992). *Determinants of Expatriate Workers' Remittances in North Africa and Europe*, World Bank Policy Research Working Paper 1038, World Bank Washington DC.
- El-Sakka, M. I. T. and McNabb, R. (1999). "The Macroeconomic Determinants of Emigrant Remittances," *World Development*, 27 (8): 1493–1502.
- Freund, C. and Spatafora, N. (2005). *Remittances: Transaction Costs, Determinants, and Informal Flows*, World Bank Policy Research Working Paper 3704, World Bank Washington DC.
- Guiliano, P. and Ruiz-Arranz, M. (2005). *Remittances, Financial Development, and Growth*, IMF Working Paper 05/234, International Monetary Fund Washington DC.
- Gupta, S., Pattillo, C. A. and Wagh, S. (2007). *Impact of Remittances on Poverty and Financial Development in Sub-Saharan Africa*, IMF Working Paper No. 07/38, International Monetary Fund Washington DC.
- Kleibergen, F. and Paap, R. (2006). "Generalized Reduced Rank Tests Using the Singular Value Decomposition," *Journal of Econometrics*, 133: 97–126.
- Lucas, R.E.B. and Stark, O. (1985). "Motivations to Remit: Evidence from Botswana," *Journal of Political Economy*, 93 (5): 901–18.
- Parsons, C.R., Skeldon, R. Walmsey, T.L. and Winters, L.A. (2007). "Quantifying International Migration: A Database of Bilateral Migration Stocks," in Çağlar Özden and Maurice Schiff (eds) *International Migration, Economic Development and Policy*, Palgrave Macmillan and World Bank.
- Rapoport, H. and Docquier, F. (2006). "The Economics of Migrants' Remittances," in S. Kolm and J. M. Ythier (eds) *Handbook of the Economics of Giving, Altruism, and Reciprocity*, Elsevier.
- Ratha D., Mohapatra, S. and Silwal, A. (2009). *Migration and Development Brief 10*, World Bank, Washington DC.
- Sayan, S. (2006). *Business Cycles and Workers' Remittances: How Do Migrant Workers Respond to Cyclical Movements of GDP at Home ?*, IMF Working Paper, WP/06/52, International Monetary Fund, Washington DC.
- Stock, J. H., and Yogo, M. (2005). "Testing for Weak Instruments in Linear IV Regression," in D.W.K. Andrews and J.H. Stock (eds) *Identification and Inference for Econometric Models: Essays in Honor of Thomas Rothenberg*, Cambridge: Cambridge University Press.
- Straubhaar, T. (1986). "The Determinants of Remittances: The Case of Turkey," *Weltwirtschaftliches Archiv*, 122 (4): 728–40.
- World Bank (2007). *World Development Indicators*, Washington DC: World Bank.
- World Bank (2006). *Global Economic Prospects 2006: Economic Implications of Remittances and Migration*, Washington DC: World Bank.
- Yang, D. (2008). "International Migration, Remittances, and Household Investment: Evidence from Philippine Migrants' Exchange Rate Shocks," *The Economic Journal*, 118 (528): 591–630.
- Yang, D. and Choi, H. (2007). "Are Remittances Insurance? Evidence from Rainfall Shocks in the Philippines," *World Bank Economic Review*, 21 (2): 219–48.