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.

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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

*Top 25 Recipients of Remittances, 2008 (in percent of GDP)*

*Top 15 SSA Countries, 2008 (in Percent of ODA)*

*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:

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

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

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 1 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

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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

<table>
<thead>
<tr>
<th>Variables (all in logs)</th>
<th>M2/GDP</th>
<th>DC/GDP</th>
<th>[1]</th>
<th>[2]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Home income</td>
<td>-3.236***</td>
<td>-2.952***</td>
<td>-3.158***</td>
<td>-3.258***</td>
</tr>
<tr>
<td></td>
<td>(-6.08)</td>
<td>(-4.48)</td>
<td>(-5.14)</td>
<td>(-3.02)</td>
</tr>
<tr>
<td>M2/GDP</td>
<td>0.698***</td>
<td>1.232***</td>
<td>(3.37)</td>
<td>(3.06)</td>
</tr>
<tr>
<td>Domestic credit/GDP</td>
<td>0.160</td>
<td>0.890***</td>
<td>(1.15)</td>
<td>(3.86)</td>
</tr>
<tr>
<td>Host income</td>
<td>4.255***</td>
<td>4.555***</td>
<td>(3.64)</td>
<td>(3.60)</td>
</tr>
<tr>
<td></td>
<td>(2.09)</td>
<td>(2.09)</td>
<td>(1.59)</td>
<td>(1.59)</td>
</tr>
<tr>
<td>Expatriates/Population</td>
<td>0.024***</td>
<td>0.021***</td>
<td>(3.59)</td>
<td>(2.85)</td>
</tr>
<tr>
<td></td>
<td>(3.29)</td>
<td>(3.29)</td>
<td>(1.97)</td>
<td>(1.97)</td>
</tr>
<tr>
<td>Institutions</td>
<td>0.400***</td>
<td>0.378***</td>
<td>(2.72)</td>
<td>(2.43)</td>
</tr>
<tr>
<td></td>
<td>(3.21)</td>
<td>(3.21)</td>
<td>(1.60)</td>
<td>(1.60)</td>
</tr>
<tr>
<td>Real exchange rate</td>
<td>-0.765***</td>
<td>-0.581***</td>
<td>(-3.06)</td>
<td>(-2.14)</td>
</tr>
<tr>
<td></td>
<td>(-2.39)</td>
<td>(-2.39)</td>
<td>(-1.99)</td>
<td>(-1.99)</td>
</tr>
<tr>
<td>Interest rate differential</td>
<td>-0.039***</td>
<td>-0.039***</td>
<td>(-3.56)</td>
<td>(-4.30)</td>
</tr>
<tr>
<td></td>
<td>(-3.52)</td>
<td>(-3.52)</td>
<td>(-2.64)</td>
<td>(-2.64)</td>
</tr>
<tr>
<td>Dual exchange rate</td>
<td>-0.131</td>
<td>-0.029</td>
<td>(-0.83)</td>
<td>(-2.16)</td>
</tr>
<tr>
<td></td>
<td>(-0.83)</td>
<td>(-0.83)</td>
<td>(0.61)</td>
<td>(0.61)</td>
</tr>
<tr>
<td>Observations</td>
<td>352</td>
<td>334</td>
<td>318</td>
<td>296</td>
</tr>
<tr>
<td>R squared</td>
<td>0.8171</td>
<td>0.8122</td>
<td>0.8251</td>
<td>0.8129</td>
</tr>
<tr>
<td>For weak instruments</td>
<td>N.A.</td>
<td>N.A.</td>
<td>31.289</td>
<td>52.756</td>
</tr>
<tr>
<td>p-value for overidentifi</td>
<td>N.A.</td>
<td>N.A.</td>
<td>0.3162</td>
<td>0.2796</td>
</tr>
</tbody>
</table>

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.

Instrumented: Home income, M2/GDP
Instruments: 1st lag of real GDP per capita and institutions; 1st and 2nd lags of M2/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 mi-
grants 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

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

* Countries in our Sample (in alphabetical order)

© migration letters
**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:

\begin{align}
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)
\end{align}

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:

\[ DH_i^* = d_i H_{i-1}^* , \]
\[ DF_i = d_i^* F_i . \] (B5)

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

\[ H_i^* = H_{i-1}^* (1 - d_i) + F_i - F_{i-1} (1 - d_i^*) - M_i . \] (B6)

One remaining issue in constructing the data as described so far is that data on migration stock within a country, \( F_i \) 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**

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**References**


REMITTANCES IN SUBSAHARIAN AFRICA


