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Push or Pull? The Determinants of Remittances to Egypt

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Push or Pull? The Determinants of Remittances to Egypt

Rania Al-Mashat and Andreas Billmeier

Abstract

Egypt is the recipient of sizeable remittance flows sent by the large number of Egyptians working outside their home country. In this paper, we analyze the relationship between these remittances and other macroeconomic variables, taking into account the nonstationary character of these time series. We find that both pull and push factors familiar from the capital flow literature are cointegrated with remittances, but our data do not allow us to clearly distinguish between altruism and other competing motives among the pull factors.

KEYWORDS: Egypt, remittances, capital flows, cointegration

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Introduction

Over the past couple of decades, workers' remittances have played an increasingly important role as a financial flow worldwide. For example, in its latest report on migration and remittances, the World Bank (2010) estimates that in 2009, remittances to developing countries amounted to just over US$300 billion, or 1.9 percent of global GDP. The report also projects that worldwide remittance flows in 2010 have exceeded $440 billion with developing countries receiving $325 billion, an increase of 8 percent from the 2009 level.[1]

The economic relevance of these flows is particularly accentuated in the economies of the Middle East and North Africa (MENA) region, where source and destination countries of remittance flows—and the corresponding labor—are geographically close. Unsurprisingly, the expansion of hydrocarbon-rich economies in the region, especially those that form the Gulf Cooperation Council (GCC), has attracted a large amount of labor. Given its geographic location, the linguistic predisposition, and—as the most populous Arabic-speaking country—the depth of its labor pool at all skill levels, Egypt has played a key role in providing migrant workers for this expansion while harvesting the benefits from large remittance flows over the past two decades or so.

Remittances have been a key foreign exchange earner in many MENA countries. Prior to the global financial crisis, remittances inflows to MENA economies had ranged between 6 percent of GDP in Egypt and Yemen to more than 23 percent in Lebanon. GCC countries contribute about 10 percent of worldwide remittances and MENA countries generally depend on remittances from the GCC area. For example, in Egypt, Jordan, and Lebanon more than half of remittance inflows originate from the GCC. On the other hand, North African MENA countries are more dependent on Europe than on the GCC for remittances with more than half of remittance flows to Morocco and Tunisia originating in the European Union.

Over the past four years, the Middle East has been hit by a couple of crises: first the ramifications of the global financial crisis, then the political and government changes termed collectively as the "Arab Spring". According to the IMF (2010 and 2011), the global slowdown following the global financial crisis led to a reduction in receipts from abroad with merchandize exports and foreign direct investments being the hardest hit. While remittances receipts have varied considerably across MENA countries, most have witnessed a decline 2008 and

[1] In its most recent Migration and Development Brief, the World Bank (2011) estimates remittance flows to developing countries to have reached $351 billion in 2011, up 8 percent over 2010. The brief continues to predict similar growth rates until at least 2014.

2009, rebounding in 2010 (in nominal terms) but without fully recovering to the pre-crisis levels in terms of GDP (Table 1). Focusing on net remittances in MENA recipient countries *relative to GDP* (as highlighted in the table), we can distinguish between three broad groups according to the developments during and after the financial crisis: (i) in Algeria, Egypt, and Yemen, net remittances seem to be on a secular downtrend including during the crisis, partly due to relatively strong GDP growth (e.g., Egypt; see below); (ii) in Jordan and Lebanon, the largest beneficiaries of remittances, these flows have experienced a major setback, underlining the fact that outsized remittance flows can contribute to a country's vulnerabilities; (iii) in Morocco, Sudan, Syria, and Tunisia, the share of remittances in GDP is broadly at pre-crisis levels.

Table 1. Workers' Remittances
(in percent of GDP)

	2005	2006	2007	2008	2009	2010
Algeria	2.0	1.4	1.6	1.3	1.5	1.3
Egypt, Arab Rep.	5.6	5.0	5.9	5.3	3.8	3.5
Iraq	2.3	0.9	0.0	0.1	0.1	0.1
Jordan	19.9	18.4	19.3	16.7	14.3	13.2
Lebanon	22.5	23.2	23.0	23.9	21.6	13.1
Morocco	7.7	8.3	8.9	7.8	6.9	7.1
Sudan	3.7	3.2	3.8	5.3	3.9	3.2
Syrian Arab Republic	2.9	2.4	2.8	2.7	2.9	2.8
Tunisia	4.3	4.4	4.4	4.4	4.5	4.4
Yemen, Rep.	7.7	6.7	6.1	5.2	4.4	4.0

Source: World Bank, *World Development Indicators* and authors' calculations

In *absolute terms*, however, Egypt portrays a somewhat different picture as the nominal level of remittances already in 2010 exceeded the pre-crisis levels. Moreover, following the January 2011 events, net remittances into Egypt registered an all-time high: US$14.3 bn during CY 2011, compared to US$12.5 bn in CY 2010.[2] Remittances have played an important role in Egypt for more than two decades: together with India, Mexico, the Philippines, and Turkey, Egypt was one of the top 5 remittances recipient countries in the world between 1990 and 2003.[3]

At the same time, Egypt weathered the global financial crisis quite well compared to many countries in the region and remittance inflows might have contributed to this favorable outturn: 4-quarter real GDP growth bottomed out at

[2] Data for other countries are not yet available from comparable data sources—World Bank, WDI—but we suspect similar dynamics. In what follows, we abstain from commenting on the post Arab Spring situation, chiefly due to lack of data.
[3] See IMF (2005), Figure 2.3.

+4.1 percent in 2008Q4, compared to -1 percent growth in 2008 and -3 percent growth in 2009 for the MENA region according to the IMF's *World Economic Outlook* database.[4] According to the World Bank (2010), the stock of Egyptian emigrants currently stands at 3.7 million, i.e., 4.4 percent of Egypt's total population (of about 83 million) or almost 15 percent of the domestic labor force live and work abroad.[5,6] These emigrants sent about US$ 8.7bn p.a. on average over the last 3 years back home to Egypt (Figure 1)—about ten times the flow of official development assistance (ODA), which averaged US$843 million during the same period. The remittance flow also compares quite favorably to other important sources of capital flows into Egypt: Suez Canal receipts averaged US$4.8bn over the same period, and FDI inflows on average amounted to US$9.3bn (but with the bulk accounted for by investments in the hydrocarbon sector), while tourism brought about US$10.1bn p.a. on average. In other words, remittances currently represent around 4–5 percent of GDP, which is similar to the share of tourism, slightly below that of non-petroleum exports and almost double the share of Suez Canal receipts. Contrary to remittances, however, FDI and tourism inflows have suffered from the Arab Spring events. Table 2 provides details on longer-run statistics on key sources of foreign financing as well as the very fast ascent (or rebound) of remittances during the 2 most recent fiscal years compared to the average before the global financial crisis.

Figure 1 indicates a couple of interesting facts: First, after remaining stable in nominal U.S. dollar terms for about a decade, remittance flows into Egypt picked up markedly around 2004/05; second, even during the global financial crisis, remittances have held up quite well. At first glance, the changing pattern of remittances around 2005 broadly coincides with reinvigorated reform

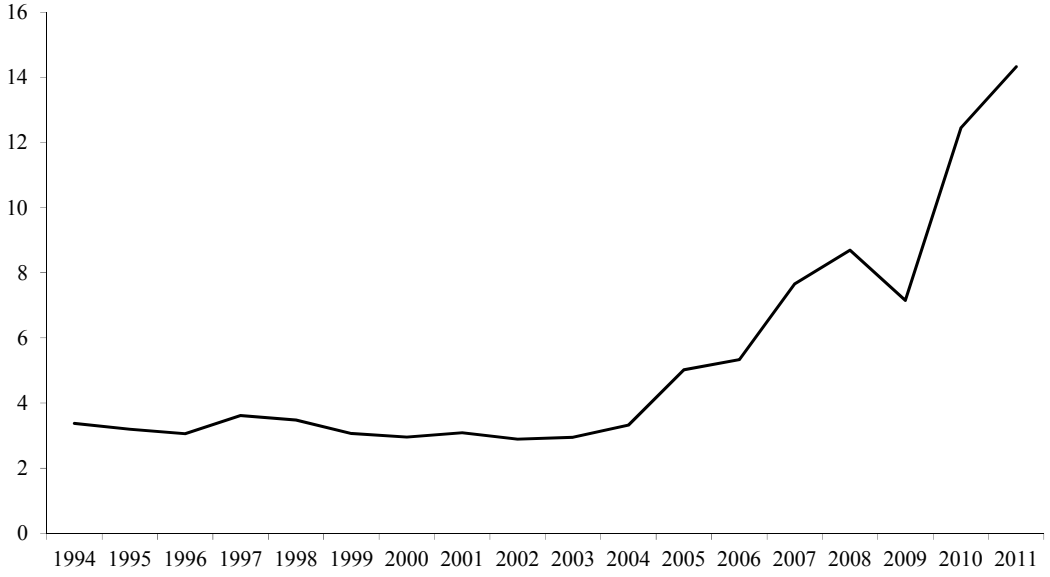
[4] Annual real GDP growth rates in Egypt recorded 7.2 percent in FY2007/08 and 4.7 percent in FY 2008/09; Egypt's fiscal year starts in July and ends in June of the following year.

[5] See World Bank (2010). In percentage terms, this is substantially lower than some other countries, especially in Latin and Central America/the Caribbean or other island economies or enclaves, where often more than ten percent of the population live and work outside the country. In absolute terms, however, Egypt has one of the largest emigrant populations in the world.

[6] There are several attempts in the literature to quantify the distribution of Egyptian emigrants across destinations: In a survey of 200 Egyptian emigrants, IOM (2010) finds that 47 percent work in Saudi Arabia (KSA), 12 percent in the United Arab Emirates (UAE), 11 percent in Kuwait, 7 percent in Qatar, 3 in percent Oman, and 1 percent in Bahrain, for a total of about 80 percent in the GCC, and 90 percent in the Arab world more broadly (additional destinations include Libya, Yemen, Algeria, and Jordan). This compares with the Global Migrant Origin Database (2007) which is based on national census data from the year 2000 approximately: the main destinations include KSA 47 percent, Jordan 6 percent, United States 6 percent, Palestine 5 percent, Libya 3 percent, UAE, Lebanon, Oman, Germany, Italy, Canada, Syria, Australia, and Greece 2 percent each. While the former is certainly less reliable than the latter due to the small sample, it seems intuitive that the share of GCC destinations has increased over the past 10 years as the rising oil price was instrumental in the very strong growth episodes in hydrocarbon exporters.

efforts led by a newly appointed administration at the time. These efforts might have been viewed as an attempt to make Egypt more attractive to capital inflows—including remittances—resulting in GDP growth at around 7 percent for 3 years in a row.[7] On the other hand, this was also the time when the oil price—benefitting many of the countries that receive Egyptian labor—started to climb from about US$33 per barrel at end-2004 to above US$140 in July 2008. So a priori, it is not clear whether international events have pushed the amount of remittances or local events have pulled more remittances into the country.

Figure 1: Remittance Inflows to Egypt
(In billion US dollars, fiscal year)



Source: Central Bank of Egypt (CBE).

Just as important as the relative size, however, is the fact that remittances are a stable source of foreign exchange (FX) inflows and less volatile compared to most other components in the balance of payments. During the period between 2004 and the outbreak of the global financial crisis, the standard deviation of quarterly remittances amounted to 19 percent of the mean, compared to 21 percent for merchandise exports, 30 percent for ODA, and 52 percent for FDI. On the other hand, Suez Canal and tourism receipts have been less volatile than remittances, deviating by only 12 percent from the mean. This is also true for a longer time span: between 1990/91 and 2009/10, the annual standard deviation of

[7] The efforts focused on tax reform, monetary and banking reform, trade policy reform, and investment policy reform.

remittances was 48 percent of the mean, compared to 75 percent for merchandise exports, 80 percent for ODA, and 125 percent for FDI.

Table 2. Sources of Foreign Financing
(In million USD)

	Annual average					
	1991-2011	1991-2008	2005-2008	2009	2010	2011
Total Exports	11,362.8	9,032.4	20,915.5	25,168.9	23,873.1	26,992.5
Non-Petroleum Exports	6,330.3	5,016.8	10,890.0	14,164.4	13,614.5	14,856.8
Suez Canal	2,756.8	2,422.3	4,047.6	4,720.6	4,516.8	5,052.9
Travel	5,244.1	4,303.2	8,168.5	10,487.6	11,591.3	10,588.7
Remittances	4,311.4	3,814.9	6,061.0	7,805.7	9,753.4	12,383.9
Official Development Aid	1,120.8	1,178.6	847.2	614.3	954.0	752.9
Foreign Direct Investment	3,037.9	2,596.4	8,575.7	8,113.4	6,758.2	2,188.6

Source: CBE and authors' calculations.

Note: The year refers to the fiscal year, which ends in June.

A simple empirical assessment reveals that between 2004 and 2007, remittances appear to be procyclical as the quarterly correlation with real GDP growth in Egypt reached 0.9. Conversely, the contemporaneous correlation with oil prices reached 0.7 over the same period. The exchange rate (EGP/USD) also correlates positively with a coefficient of about 0.3 over that time period, possibly indicating that remitters took advantage of depreciating currencies by transferring more assets. On the other hand, the interest rate differential between Egyptian and US$ short term rates also displays a positive correlation of 0.3 with remittances, indicating that the latter could be somewhat related to the (financial) investment theme.

This simple evidence raises a number of important questions concerning the flow of remittances into Egypt. In what follows, we will abstract from the microeconomic aspect of the analysis of remittances. Instead, we intend to describe in this paper the causal relationship between remittances and other key macroeconomic variables, with a view to explaining the behavior of remittances in Egypt as a dependent variable. In addition, we link the stylized facts mentioned above to the pull and push factors discussed in the capital flows literature. Finally, we pay particular attention to empirical issues in the literature on remittances based on some recent contributions that stress the non-stationary nature of many of the time series involved in the assessment.

We find that both push (host country economic activity) and pull factors (home country economic activity) cointegrate positively with the level of remittances over time. Our results are less clear as to whether remittances are the outcome of altruism or other motives or the remitter, such as investing in his/her home country.

The remainder of this paper is structured as follows. In the next section, we briefly relate our paper to the growing literature on remittances, both from a broader macro perspective and from a (mostly micro) Egypt-specific angle. Section 3 offers some background on the data and the empirical strategy, while Section 4 provides the empirical results. Section 5 explores a couple of extensions to our baseline set-up: we substitute real activity with a proxy, which enables us to obtain a longer estimation sample and explore the impact of the recent global financial crisis. The last section recaps the main conclusions.

Literature Review

The literature on—as well as the policy interest in—remittance flows and their economic consequences has been growing rapidly with the increasing availability and reliability of data. Policymakers' interest has been triggered in particular by the apparent resilience of remittance flows in the face of economic uncertainties. In this section, we will briefly summarize four key topics in the literature: (i) the debate about the altruism versus the portfolio model of remittances; (ii) the parallels with the discussion about pull versus push factors in the capital flow literature; (iii) some Egypt-specific research; and (iv) some empirical issues that are relevant in the present context.

Altruism vs. Portfolio Approach

Generally speaking, there are two major questions related to remittances: (i) what are the determinants of the size of remittance flows and (ii) what are the effects of these remittances on the receiving or (migrant's) home country. Regarding the former, the question essentially circles around the altruism vs. portfolio diversification discussion.[8] Under the altruism motive, a migrant worker sends remittances home because he is concerned with the welfare of parts of his family left behind; in other words, remittances should behave countercyclical to economic conditions in the home country. The second motive—the portfolio approach—isolates the decision to migrate from the decision to remit. In this view, the migrant earns income and decides how to allocate savings between host country assets and home country assets in response to investment opportunities. In this case, remittances should display more of a procyclical pattern. Empirical evidence has been found bolstering both theories.

[8]See Docquier and Rapoport (2006), Gupta (2004), Chami, Fullenkamp, and Jahjah (2005), Jadhav (2003), El-Sakka and McNabb (1999), Taylor (1999), Poirine (1997), Elbadawi and Rocha (1992), Russell (1986), and Lucas and Stark (1985) for fuller surveys and analyses of the determinants of remittances.

Supporting the former, Chami, Fullenkamp, and Jahjah (2005) construct a simple model to test whether remittances function as capital flows or whether they serve another economic purpose. In applying their model to a panel of 113 countries over 29 years, they are able to show that remittances are compensatory transfers, which fluctuate countercyclically, consistent with the altruism motive of remittances. Using a panel regression framework, the IMF (2005) shows that in many developing countries, remittances are a very large source of foreign exchange that have proven far more stable and less procyclical than other such sources, consistent with the altruism motive.

The portfolio motive, on the other hand, would imply that remittances could be sensitive and hence respond to interest rate differentials and, in general, be more associated with the business cycle in the home country. In a cross-country study, Lueth and Ruiz-Arranz (2006) estimate a gravity model of bilateral remittance flows for a number of developing countries and find that remittances (i) are, in fact, aligned with the business cycle in the home country; (ii) decline when the investment and political climate worsen; and (iii) do not seem to respond to adverse shocks at home.

Focusing on the role of the exchange rate during the global financial crisis, Barajas et al. (2010) claim that the exchange rate may have played an important role in some countries as a devaluation of their currencies could have had an impact on remittance flows. They argue that the literature has shown that the impact is bound to be negative—that is, remitters are likely to reduce their foreign currency transfers when the home country's currency weakens. Bouhga-Hagbe (2006) argues that the overall effect of exchange rate movements is not always clear a priori because it is the sum of two opposite effects. If goods in the home country become less expensive with the depreciation of the currency, remitters need to transfer less to help buy a given amount of goods at home. On the other hand, a depreciation of the home country's currency can also make its citizens living abroad "wealthier," as it increases their purchasing power in the home country. Therefore, this wealth effect could give them incentives to engage in larger one-off purchases in the home country, such as residential real estate.

Pull vs. Push factors in the literature

While some studies have examined remittances from a capital flows angle, there have been no studies to test whether remittances behave like other capital flows. However, in examining the macro determinants of remittances, the empirical literature has relied on numerous variables, which according to IMF (2005) can be categorized in five broad groups: (i) economic activity in the migrant workers' host country; (ii) economic activity in the migrant workers' home country; (iii) economic policies and institutions in the home country; (iv) general risks in the

home country; and (v) investment opportunities. These groups closely resemble the variables motivating capital flows.

It has been widely documented that the factors that affect international capital flows can be characterized as internal or domestically driven pull factors, or external determinants known as push factors. Internal factors include increases in creditworthiness as a result of macroeconomic stabilization, widespread liberalization of financial markets, domestic interest rates, exchange rate regime, inflation, and economic activity. The significance of pull factors is consistent with the (optimistic) view that the sustainability of these flows is, to a large extent, a function of economic policies in the home country. On the other hand, external factors include an increased availability of financial capital as a consequence of a sustained decline in world interest rates and recession in industrial economies. Contrary to pull factors, the potential dominance of push factors limits the ability of policymakers to attract consistently inflows and limit their volatility (Fernandez-Arias, 1996).

The empirical literature shows that there is no clear message regarding the competition between push vs. pull factors, and that the conclusions often are specific to the period, region, and type of financial instrument. Calvo, Leiderman, and Reinhart (1993, 1996), and Fernandez-Arias (1996) argue that push factors, particularly low US interest rates play a dominant role in driving capital flows into developing countries. Likewise, Kim (2000) finds that push factors such as decreases in world interest rates and/or recessions in industrial countries have a dominant role in driving capital flows. Similarly, Ying and Kim (2001) find that push factors such as US business cycles and foreign interest rates account for more than 50 percent of capital flows into Korea and Mexico. Conversely, Mody, Taylor and Kim (2001), and Dasgupta and Ratha (2000) find that, in general, pull factors are more important in determining capital flows. Hernandez, Mellado, and Valdes (2001) also show that private capital flows into developing countries during the 1970s and 1990s were determined mainly by pull factors. Taylor and Sarno (1997) argue that push and pull factors are equally important in determining the long-run movements in equity flows, while push factors are more important than pull factors in explaining the dynamics of bond flows. Chuhan, Claessens, and Mamingi (1993) similarly argue that about half of the explained increase in flows to Latin American countries can be attributed to push factors, whereas pull factors are estimated to be three to four times more important than push factors in motivating the capital flows to Asian economies.

Egypt in the Literature

While there is a growing body of literature on various aspects of Egyptian migration, both on a micro and a macro level, the identification of factors that determine remittances and the use thereof remain relatively little explored.

From a microeconomic perspective, remittances essentially relax the budget constraint of their recipients, enabling these to engage in a combination of higher consumption, human capital accumulation and/or physical and financial investments. Adams (1991) shows in one of the earliest noteworthy contributions that for a sample of households in rural Egypt, remittances have a small but positive effect on poverty but a negative effect on income distribution (as mainly the lowest and the two top quintiles of households produce migrant workers) and that, contrary to expectations, migrant households do not spend their remittance receipts on consumption but on land, housing, and other investments. Using data from a more recent (1996/1997) round of household surveys sponsored by Eurostat and the Netherlands Interdisciplinary Demographic Institute (NIDI), van Dalen, Groenewold, and Fokkema (2005) show that for Egypt the survey data do not provide a clear picture as to whether remittance flows are driven by altruism or by self-interest—a variant of the portfolio motive. McCormick and Wahba (2001) present evidence on entrepreneurial activities of returning Egyptian emigrants obtained in a 1988 survey of about 1500 Egyptian migrants. They find that the likelihood of becoming entrepreneurs after returning increases with the time emigrants spent abroad and the amount of money they saved while abroad, but that these two effects differ between literate and illiterate migrants. The duration of the stay abroad only matters for literate migrants as they accumulate skills and ideas that they will use in their entrepreneurial activities once they returned to Egypt. In a recent study by the IOM (2010), micro-level data is presented on remittances and investment opportunities for Egyptian migrants, albeit only for 200 households. The authors find, for example, that about 22 percent of remittances are received via informal channels and that the trend toward formal channels of sending remittances increases with the amount sent and the educational attainment of the sender. Only about 20 percent of households were channeling remittances toward various forms of investment, mainly land and real estate, but also some stock market investments.[9] The main reason mentioned by interviewed households for not investing in more productive enterprises is limited or no access to formal credit.

There are very few noteworthy Egypt-specific studies that take a macro perspective. The already-mentioned study by IOM (2010) bridges the gap

[9] Billmeier and Massa (2009) find that remittances are significant in explaining stock market capitalization in the Middle East and Central Asia, especially in countries without significant hydrocarbon resources.

between its primarily microeconomic gist and macro analysis. The authors point out that spending remittances on everyday consumption as well as on real estate in Egypt potentially leads to higher inflation rates of consumer goods and real estate prices. They refer to earlier work by Adam (1991), who argued that during the 1980s, the price of agricultural land in Egypt might have risen by 600 percent due to remittance inflows.[10] Two cross-country studies also include Egypt in the sample: Barajas et al. (2010) investigate the economic impact of the change in remittances during the global financial crisis on a sample of African economies. For Egypt, the authors expect the impact on GDP to be rather small—on the order of 0.1 percent of GDP (in 2009). Bouhga-Hagbe (2006) includes Egypt in his sample of five economies in the Middle East and Central Asia used to analyze the role of remittances in the home country. He finds that altruism plays an important role as a motive to send money home, limiting the external vulnerabilities of the home economies (i.e., remittances act as a hedge).

Finally, in an Egypt-specific macro contribution, El-Sakka and McNabb (1999) use as explanatory variables the workers' host country wage, home country income and price level, the interest rate differential between home and recipient country and the gap between official and black market exchange rate. They show that both the exchange rate differential and the interest rate differential are important explanatory variables for cash remittances, while host country GDP only matters with a lag. The authors obtain their estimates using a log-linear OLS specification. Except for the empirical approach, this paper is the closest in spirit to the present study. Given our attempt to formally characterize determinants of remittances flows as push and pull factors, we view our work as an update and extension of El-Sakka and McNabb (1999), paying particular attention to the time series properties of the macro variables.

From a policy perspective, Egyptian remittances have also received some attention as strengthening the formal intermediation channels becomes extremely important to reap the macroeconomic benefits of these inflows. According to a World Bank report (Nasr, 2009), various financial indicators put the Egyptian financial sector at an intermediate level in financial intermediation compared to other developing and emerging economies. The poor aspects of financial intermediation are reflected in high transaction costs, large non-performing loans, and limited access for small firms and households to financial services. Although the saving ratio in Egypt is high by international standards and the bulk of savings is channeled through the financial system as bank deposits, the banking sector is not fulfilling its intermediary role efficiently. This is partly due to the fact that Egypt is underbanked, especially in rural areas, which is the key source for

[10] While there are no reliable (official or private) data on real estate prices in Egypt, it is highly likely that the pronounced increase in oil prices has had a marked impact, both directly via foreign (direct) investment, and via remittance channels.

workers living abroad. Regarding remittances, there is currently no regulatory framework to ensure transparency or efficiency of remittances-related financial services. These factors combined could encourage remittances inflows through informal channels. The report's key recommendations include to (i) improve financial system efficiency to promote effective intermediation; e.g., by lowering the costs of sending remittances and improve the relationship with corresponding banks abroad; (ii) enable efficient use of remittances by increasing investment opportunities for households that do not have easy access to financial services, e.g. by increasing the degree of bank coverage especially in rural Egypt; and (iii) provide incentives for remittances to travel via official channels as opposed to informal ones.

Empirical Issues

From an empirical perspective, most of the contributions mentioned above employ standard OLS-type techniques. Only very few studies in the literature pay particular attention to the nonstationary character of most explanatory variables in typical macro models of remittances; notable among these are Bouhga-Hagbe (2004, 2006) and Lueth and Ruiz-Arranz (2007).

This literature argues that in traditional empirical models of remittances (such as simple OLS), nonstationary behavior of macroeconomic times series cannot be accounted for (i.e., the models are misspecified), while data transformation—differencing the series—could lead to a loss of information. Hence, Bouhga-Hagbe (2004) proposes the use of vector error correction models (VECMs) and cointegration techniques. The estimation is based on (the logarithm of) the original variables, thus leading directly to the estimation of the long run relation among the variables. Moreover, endogeneity issues can be assessed explicitly when estimating the VAR because the cointegration technique allows for endogenous regressors and produces adjustment coefficients that indicate to what extent specific time series are (weakly) exogenous. Building on these methodological points, Lueth and Ruiz-Arranz (2007) investigate Sri Lanka using a cointegration framework and show that remittance receipts are procyclical and decline when the island's currency weakens, therefore undermining the argument that remittances are largely motivated by altruism.

Data and Empirical Strategy

Data Issues and Sources

There are a couple of data issues related to the concept of remittances. First, as pointed out repeatedly in the literature—see, e.g., EIB (2005), Table 1.3 or Adams (2006)—the coverage of this series differs from country to country. What is casually referred to as remittances and corresponds, strictly speaking, to 'workers remittances' is often hard to separate from—and therefore often encompasses—'migrant/employee compensation' and 'migrant/current transfers' in national statistical data.[11] From our perspective, there is not clear 'solution' to this question of coverage. While some support stripping out employees' compensation and migrants' transfers to the extent possible, we are not convinced as the distinction between the first two—has the migrant remained in the host country for more or less than 12 months—seems somewhat arbitrary and of minor importance in the current context.[12] For example, there is evidence of Egyptian workers migrating to Saudi Arabia on a seasonal basis (i.e., for less than one year at a time).[13] Officially, this would go under employee compensation. For the question at hand, however, we would like to capture it in our remittance flow as long as this employee is transferring money during his stay abroad. On the other hand, we would argue that migrant transfers have a somewhat different character as they are related to physical relocation and we do not consider them conceptually part of remittances.

Second, there is also another dimension to the question of coverage. Official BoP statistics on remittances cover flows that are recorded in the financial system, because they cross borders either via banks or traditional money transfer systems. For obvious reasons, money (or goods) carried across borders in person or via informal transfer mechanisms (e.g., Hawala systems) cannot be captured in official statistics. This fact by itself would imply that the true amount of remittance flows is underestimated by a certain percentage and that the

[11] According to the Balance of Payments Manual (IMF, 1993), *worker remittances* are the value of monetary transfers sent home from workers abroad who stay for more than 1 year in their host country and are therefore considered to be residents abroad. These flows are recorded under private current transfers in the current account. *Compensation of employees* (previously labor income) represents the gross earnings of foreigners residing abroad for less than 12 months, and they are recorded in the income section of the current account. *Migrant transfers* correspond to the BoP treatment of the spatial reallocation of their net worth when migrants move from one country to another; this is a bookkeeping entry in the capital account.

[12] Chami, Fullenkamp, and Gapen (2008) show that the empirical characteristics of remittances change depending on what series are covered. They advise against including employee compensation and migrants' transfers.

[13] See Schoorl et al. (2000).

empirical results are biased accordingly. In an attempt to deal with this issue, the UN International Fund for Agricultural Development (IFAD, 2007) has collected data on remittance flows worldwide during 2006 using various home and host country sources to estimate the 'true' size of remittances, including those via informal channels. Whereas the divergence between officially measured and estimated remittances is often significant—on average, official records capture about 75 percent of the estimated true remittances worldwide—Egypt is somewhat of an outlier as the officially recorded flows exceed by far the estimate derived in the IFAD study. On the other hand, IOM (2010) finds in its survey of 200 Egyptian households that around 22 percent of the remittances were received using informal channels. This is broadly consistent with Adams (1991), who suggests that about 25 percent of total remittance flows to Egypt come through informal channels. Both estimates are consistent with Puri and Ritzema (1999), who collect cross-country data indicating that the informal share ranges between about 8 and 40 percent. While we acknowledge the issue, we stick to official data for the purpose of this study for a couple of reasons. For one, we have no prior as to the direction of adjustment of the official data, neither the degree of adjustment. The real problem, though, lies in the possibility that the share of recorded flows in total flows is not constant over time. The empirical results would therefore capture an effect averaged over time, and any forward-looking policy conclusions deducted from the analysis would not necessarily be appropriate.[14]

Our data, sourced from the Central Bank of Egypt (CBE), officially cover workers' remittances only; however, these data are based on submissions by banks, and the published BoP data do not specify separate line items for the other two components, presumably because they are either very small (likely in the case of migrants' transfers) or undistinguishable. In terms of the first point discussed above, we assume that the series contains mainly workers' remittances and possibly employees' compensation, so the proper series for our purposes.[15] In

[14] There are a couple of ways to model this variable gap between observed and true remittance level: One could either assume that the remittance sender's choice between official and unofficial transmission channel is driven by the cost difference between the official and the unofficial channel. In this context, the World Bank has engaged in a very promising effort to collect data on the cost of sending remittances through official channels; see http://remittanceprices.worldbank.org/ . Unfortunately, the effort only started in 2008 and cannot help in our context. Alternatively, one could get a handle on the difference between officially sent and total received remittances via household spending survey data from the recipients. This strategy is limited by the frequency of household surveys and by concerns about the data quality in the recipient country. Both modeling strategies are beyond the purpose of this paper.

[15] This is also the gist of discussions with the CBE's BoP department. It appears that the empirical evidence for 'migrant transfers' in Egypt is rather limited, and would therefore not distort the results in one direction or the other.

terms of the second point, the series is not adjusted for unofficial transfers, and we will need to keep in mind the potential for underestimation of the actual remittance flow in what follows.

Aside from remittances, the other series employed in the baseline estimation include the consumer price index (CPI) based on the 2008/09 weights, which is obtained from the statistical agency (CAPMAS) and the bilateral nominal exchange rate (EGP/USD) as published by the CBE. While both variables can be considered pull factors, it is not clear a priori what impact they would have on the level of remittances: lower inflation and an appreciating exchange rate are customarily associated with improving economic conditions and hence increasing remittances following the investment motive; the opposite could be true, however, if the altruism motive were to dominate. Similarly, we include the 3-month deposit interest rate differential between domestic-currency deposits in Egypt (obtained from the CBE) and the rate for 3-month commercial paper in the US (published by the US Federal Reserve) as a proxy for a financial pull factor to invest in the host country. Greater potential returns on home country assets as opposed to host country assets may encourage migrants to send their savings as remittances rather than investing in the home country. As many of the host countries for Egyptian migrants maintain a peg with the U.S. dollar, we proxy deposit returns in the host by yields on 3-month commercial paper. As a final pull factor, we used Egypt's real GDP as compiled and published by the Ministry of Economic Development. Negative shocks to output, employment, and wages in the home country reduce the income of any family members left behind by the migrants.[16] This may encourage existing migrants to send more remittances, as well as lead more people to emigrate.

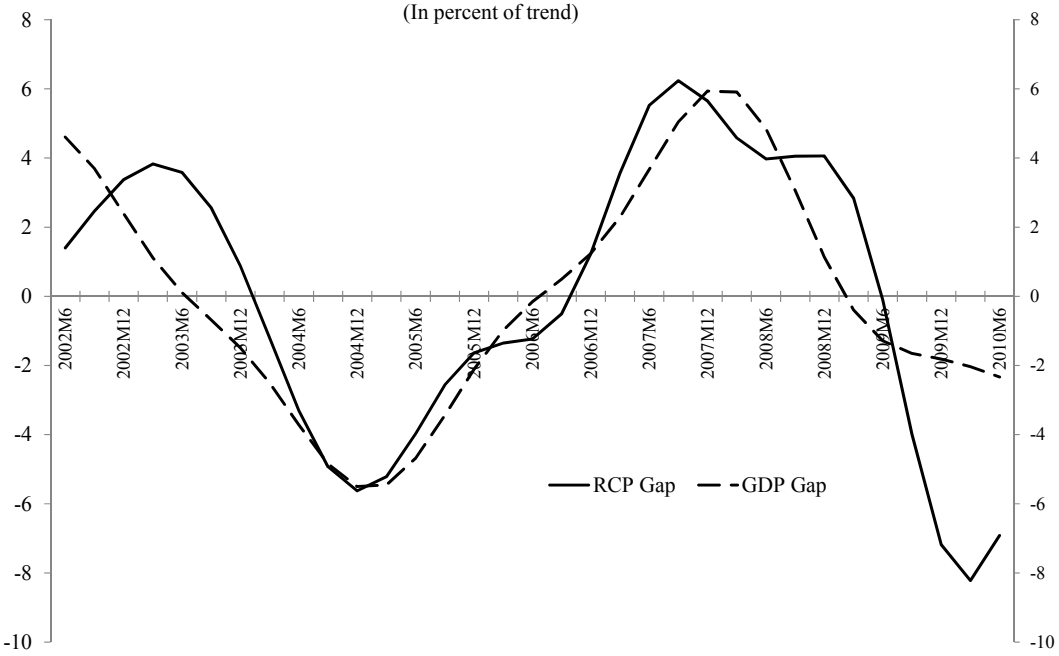
The only push factor in our set-up (except for the yield on US dollar deposits) is the GDP in host economies of Egyptian workers. Due to data availability and aggregation constraints, and given the geographical distribution of Egyptian migrants, we proxy the activity indicator with the price of Dubai crude oil as published in the International Monetary Fund's *International Financial Statistics* database. Stronger economic activity in migrants' host countries (especially in the GCC and other hydrocarbon exporters) is expected to increase the remittances sent to their home country, both directly on a per remitter basis and via additional migration. All data are quarterly frequency.

Another empirical issue not directly linked to remittances is the limited time span of quarterly real GDP data, which only starts in 2001Q3, while most other time series are also available for the preceding decade. In Section 4, we first estimate the baseline model based on real GDP over the period 2001Q3 to 2010Q2. In an attempt to explore the 1990s, we then proxy real GDP with real

[16] Egypt does not dispose of reliable quarterly data on wages and unemployment over a sufficient time period.

credit to the private sector. In separate work, Al-Mashat (2010) found that the real credit to private sector gap, calculated as the difference between the actual and smoothed series, is a good proxy for excess demand, akin to an output gap. To make this point, we use an asymmetric band-pass filter (Christiano and Fitzgerald, 2003) to de-trend both series. With a correlation coefficient of 0.824, the quarterly real credit gap moves in line with the GDP gap (Figure 2). Hence, we extend the analysis in Section 5 by substituting the GDP level series with real credit (in levels), which allows us to significantly increase the amount of observations.

Figure 2. Real Credit Gap vs. Output/GDP Gap
(In percent of trend)



Sources: CBE; and authors' calculations.

Empirical Strategy

Our empirical model is a 6-variable vector autoregression (VAR), where we allow for possible cointegration of non-stationary time series, see Johansen (1991, 1995) and Juselius (2006) for theory and applications. Given the strong focus on nonstationarity, the closest papers in the literature are Lueth and Ruiz-Arranz (2007) and Bouhga-Hagbe (2004, 2006), see above. In a second step, we estimate a cointegrated vector error correction (VEC) model for Egypt to determine whether there is a long-run relationship between remittance receipts and the standard macro variables introduced above.

Estimation Results

As a first step, we test the data for its stationarity characteristics. The basic cointegration approach we use is based on variables being integrated of order 1, short I(1). Table 3 shows the results of a standard test for unit roots (see Dickey and Fuller, 1979). Most series appear to be nonstationary in levels but stationary in first differences. There are two exceptions, however—the price level and real GDP. While the finding that the price level appears to be I(2) is not uncommon in the literature, the fact that real GDP would be nonstationary in first differences is somewhat puzzling. We attribute this to the rather short sample and the weak test power to reject the Null (of a unit root).[17] In the end, we employ the first difference of the price level (i.e., inflation) in the vector error correction model (VECM) below while we chose to ignore the contrarian statistical evidence in the case of real GDP and include it, together with all other variables, in (log) levels.

Table 3. Augmented Dickey-Fuller Test for Nonstationarity

		Level		First Difference		Second Difference	
	Sample	t-statistic	lags	t-statistic	lags	t-statistic	lags
Remittances (REM)	1993Q3-2010Q2	-0.89	0	-9.83***	0		
Oil price (OIL)	1993Q3-2010Q3	-2.65	2	-7.80***	1		
Real GDP Egypt (GDP)	2001Q3-2010Q2	-2.83	4	-1.24	3	-19.77***	2
USD Exchange rate (ER)	1993Q3-2010Q3	-1.67	1	-6.01***	0		
Yield differential (CARRY)	1996Q1-2010Q1	-2.14	1	-3.71**	0		
Price level (CPI)	1995Q1-2010Q3	1.74	4	-2.59	3	-10.25***	2

Note: The test statistics above give the augmented Dickey-Fuller test statistic, together with the number of lags in the model. The test critcal values are -4.10 (significant at the 1 percent level, ***), -3.48 (significant at the 5 percent level, **), and -3.17 (significant at the 10 percent level, *). The lag length is determined automatically based on minimizing the Schwarz information criterion; max lag length is 5. The maximum estimation period covers 1993Q3-2010Q3 if available but varies from series to series as indicated. The model includes a linear trend and an intercept. Results for other specifications are qualitatively similar with the exception of the interest rate differential where nonstationarity in first differences is rejected at the 1-percent level if either a model with intercept only or without either intercept or linear trend is used.

When estimated with two lags, the residuals of the VAR are not particularly well-behaved (that is, not normally distributed), which is exclusively due to the erratic behavior of the exchange rate around the end of the peg to the US dollar in 2003; none of the residuals is trending.[18] Augmenting the number of lags would improve the fit slightly, but it comes at the cost of precision of the

[17] Technically speaking, the two results could be related: the expectation that real GDP is I(1) rests on the assumption that either nominal GDP and a suitable deflator are both I(1) and do not cointegrate to I(0), or that both are I(2) and do cointegrate to I(1). In a case where the price level displays I(2) characteristics and nominal GDP is I(1), the fraction of the two remains I(2).
[18] See Figure A1 in the Appendix.

estimates—an important concern given the very limited amount of observations. Information criteria point to either one (Schwarz) or two (Hannan-Quinn) lags.

In the second step, we test for the cointegration rank of the VECM following Johansen (1991). Given the rather short sample (33 observations, starting in 2002Q1), we estimate the VECM with only one lag. Lag exclusion tests indicate some remaining seasonality at 4 quarters notwithstanding the seasonal filtering of the data series but point otherwise to 1 lag. Eigenvalue and trace statistics in Table 4 indicate that there is one cointegrating vector in the system.

Table 4. Johansen Test for Cointegration Rank

	Eigenvalue	Trace Test			Maximum Eigenvalue Test		
H_0: Rank λ		Statistic	5 % crit. value	p-value	Statistic	5 % crit. value	p-value
$\lambda = 0$	0.82	124.48 ***	103.85	0.00	56.01 ***	40.96	0.00
$\lambda \leq 1$	0.50	68.47	76.97	0.19	22.57	34.81	0.63
$\lambda \leq 2$	0.46	45.90	54.08	0.22	20.28	28.59	0.39
$\lambda \leq 3$	0.32	25.63	35.19	0.36	12.52	22.30	0.60
$\lambda \leq 4$	0.22	13.11	20.26	0.36	8.37	15.89	0.50
$\lambda \leq 5$	0.13	4.73	9.16	0.31	4.73	9.16	0.31

Note: *** denotes rejection of the Null hypothesis at the 1-percent level. This specification (and the critical value statistics) incorporates a constant restricted to the cointegrating space.

The cointegrating relationship can be normalized as follows (standard errors in parenthesis, all variables except for the interest rate differential are in logs):

$$REM = \underset{(0.22)}{2.15GDP} - \underset{(1.15)}{12.58\Delta CPI} + \underset{(0.14)}{0.48ER} - \underset{(0.01)}{0.02CARRY} + \underset{(0.09)}{0.32OIL} + C \quad (1)$$

where *REM* is the quarterly flow of remittances, *GDP* is the economic activity variable in Egypt, ΔCPI is Egyptian inflation, *ER* is the nominal bilateral exchange rate against the US dollar (EGP per 1 USD), *CARRY* is the yield differential in favor of local Egyptian yields, *OIL* is the price of Dubai crude as a proxy for economic activity in key host countries, and *C* is a constant. Over time, remittances (in US$ terms) increase with Egyptian GDP, and a rising exchange rate, i.e., a weakening of the Egyptian pound, and with economic activity in the host country. Remittances decrease with inflation in Egypt, and with the interest rate carry on 3-month deposits. Most of these results are intuitive, with the possible exception of the coefficient on the carry variable, where we would have expected a positive relationship.

However, the standard errors on the interest rate differential are rather large (and the coefficient only borderline significant), and we suspect that we can restrict the coefficient to zero. Moreover, the estimation output indicates also that several variables do not adjust significantly to imbalances in the cointegrating relationship, and could, hence, be considered weakly exogenous if the corresponding adjustment coefficient (α-coefficient) is not significantly different from zero. This is in fact the case for all variables other than remittances and inflation, and the restricted VECM can be expressed as follows (now t-values in parentheses):

$$REM = \underset{(9.62)}{1.66GDP} - \underset{(-12.92)}{11.24\Delta CPI} + \underset{(2.32)}{0.26ER} + \underset{(11.28)}{0.55OIL} + C \qquad (2)$$

Using a likelihood ratio test, these restrictions are accepted with a p-value of 0.08 for a $\chi^2(5)$ distribution, where the additional degrees of freedom stem from zero-restrictions in the α-coefficients of *GDP, OIL, ER,* and *CARRY*.[19]
We interpret the results as follows: In the baseline specification, both push and pull factors play an important role. The former are reflected in the highly significant coefficient for oil. This gives us comfort in the estimates as an insignificant coefficient (or even negative relationship) would be improbable given the anecdotal evidence on Egyptian migration. Regarding the pull factors, we note that remittances increase with economic performance in Egypt, which, in principle, contradicts the altruism motive. However, the positive exchange rate coefficient indicates that remittance flows are shielding home country recipients somewhat from a depreciation-related loss of purchasing power. The investment motive, on the other hand, does not seem to be very strong in current remittance flows, as the coefficient on *CARRY* is slightly negative (or zero). Finally, the negative relationship between remittance flows and inflation indicates that transfers occur primarily under macroeconomic stability, again contradicting somewhat the altruism motive. Overall, we conclude that the evidence is mixed regarding the altruism vs. portfolio/investment discussion. This is broadly consistent with the literature, which tends to combine various motives instead of pointing to a single one.[20]

In terms of push vs. pull factors, we caution that measurement is somewhat imprecise; this holds especially for the latter, as pull variables are hard

[19] Without the zero restriction on the carry coefficient, the model is accepted with a p-value of 0.11; the coefficients change little compared to the restricted case. If the VECM is estimated with two lags, the significance of the CARRY variable is marginally higher.

[20] See the summary by Docquier and Rapoport (2006); they point to Cox, Eser, and Jimenez (1998) and Feinerman and Seiler (2002), who juxtapose altruism and exchange/reciprocity; Foster and Rosenzweig (2001), who analyze altruism and mutual insurance; and Docquier and Rapoport (2000), who combine altruism and the strategic motive.

to distinguish. In theory, inflows are endogenous with respect to a wide range of domestic policies, and no single indicator is likely to represent the broad thrust of such policies with the same degree of accuracy as external interest rates do for foreign financial conditions.

From an empirical perspective, these results are somewhat unsatisfactory as the sample size is quite limited (33 observations) due to the short time span of available quarterly GDP data, and the coefficient estimates are therefore relatively imprecise. In the following section, we seek to ameliorate this constraint.

Extensions

Extending the sample by using a proxy for real GDP

In this section, we intend to relax the data constraint by introducing a proxy for GDP data, see the discussion in Section 3. If we re-estimate the baseline model with data for the real credit measure (which starts in 1995Q1), leaving aside coefficient restrictions for the moment, our results change somewhat (standard errors in parentheses):

$$REM = \underset{(1.13)}{5.51RCP} + \underset{(18.39)}{112.98\Delta CPI} - \underset{(1.41)}{8.79ER} + \underset{(0.11)}{0.39CARRY} + \underset{(0.60)}{2.50OIL} + C \quad (3)$$

Here, *RCP* is real credit to the private sector. From equation (3), we note that remittances continue to increase with host and home country economic activity and that the yield differential now has the correct sign according to the investment motive. However, the coefficients for inflation and the exchange rate flip signs. This would imply that remitters care about the purchasing power of their relatives in Egypt from a pure inflation perspective, while a depreciation of the Egyptian pound is consistent with lower remittances in US dollar terms. While this by itself is a plausible result—lower hard currency transfers needed to sustain a constant level of EGP receipts—it is somewhat harder to explain why the change in real activity measure causes the coefficients to flip compared to the baseline model from the previous section. A potential explanation for this empirical result is that *RCP* is a better proxy for financial system development rather than economic activity. Real credit is often positively correlated with inflation and could explain the change in signs (that correlation in our sample is indeed positive but weak, 0.1-0.2 depending on the sample). Furthermore, we speculate that the extended periods of exchange rate peg between the EGP and the USD which are better captured in this extended sample might have to do with it and caution that the coefficient might be biased by limited variation in the

exchange rate data in the early part of the sample. Moreover, the adjustment coefficients to a disequilibrium in the cointegrating relationship are no longer as clearly defined as above. Of particular concern is the fact that the coefficient for remittances is no longer significant; in other words, remittances respond only weakly to the other variables. While this result is somewhat disappointing from a modeling perspective, it does not come as a complete surprise: as noted in the introduction, the nominal level of remittances has been quite stable during the first decade of the data covered in this lengthened sample.

Testing for the effect of the financial crisis

Extending the sample by using the real credit measure enables us to also perform a sensitivity test of a different kind: we eliminate the final observations during the period of the financial crisis. Specifications (4) and (5) contain, respectively, the estimated model parameters without and with restrictions for a sample ending in 2008Q2 (standard errors in parentheses). Together with various adjustment coefficients (not shown), the exchange rate coefficient in (4) is now insignificant. Moreover, the adjustment coefficient of remittances is only borderline (t-statistic of 1.9 in (4) and 1.8 in (5)) significant, consistent with the full sample estimates described above.

$$REM = \underset{(0.27)}{1.36RCP} + \underset{(5.55)}{20.48\Delta CPI} + \underset{(0.36)}{0.53ER} + \underset{(0.03)}{0.06CARRY} + \underset{(0.17)}{0.62OIL} + C \quad (4)$$

$$REM = \underset{(0.30)}{1.91RCP} + \underset{(6.22)}{28.84\Delta CPI} + \underset{(0.03)}{0.10CARRY} + \underset{(0.16)}{0.78OIL} + C \quad (5)$$

The restrictions in equation (5) are accepted with a p-value of 0.84 for a $\chi^2(5)$ distribution. Comparing equation (4) to equation (3), we note that the long-run elasticities of remittances seem to be higher in the longer sample, which is consistent with the strong performance of remittances toward the end of the sample. Moreover, the exchange rate becomes insignificant in the shorter sample, consistent with the exchange rate peg in place until 2003. Summing up this section, the main result from our perspective is the significant relationship across specifications between remittances and proxies for economic activity in home and host countries, consistent with the results of the previous section.

Conclusions

In this paper, we have investigated the cointegration properties of remittance flows into Egypt. Egypt is a large exporter of labor to the neighboring region and beyond, and remittances toward Egypt have grown substantially over the past few years. The pick-up coincided with the implementation of a number of policy reforms in Egypt—but also the rise in oil prices.

In our empirical models, we are able to link the size of remittances both to push and pull factors. Consistent across time and specifications, economic activity in (the majority of) host countries for Egyptian migrants, as proxied by oil prices, 'pushes' remittances into Egypt, while economic growth in Egypt also provides a 'pull' effect in the same direction. The other variables that have been used in the literature to investigate the motives behind remittances are somewhat weaker in their significance. Overall, we cannot derive a clear conclusion whether the altruism or the investment motive is more important in terms of pull factors.

That said one should not expect remittances to be driven by a single motive. In fact, it is likely that a combination of different motives applies, with the exact mix varying over time and across countries. In our case, an additional constraint is the limited amount of data points, especially with regard to economic activity in Egypt. Finally, we suspect that the quality of statistics for to hard-to-quantify items such as remittances (as oppose to workers' compensation, see discussion in Section 3), still lags behind other parts of BoP statistics.

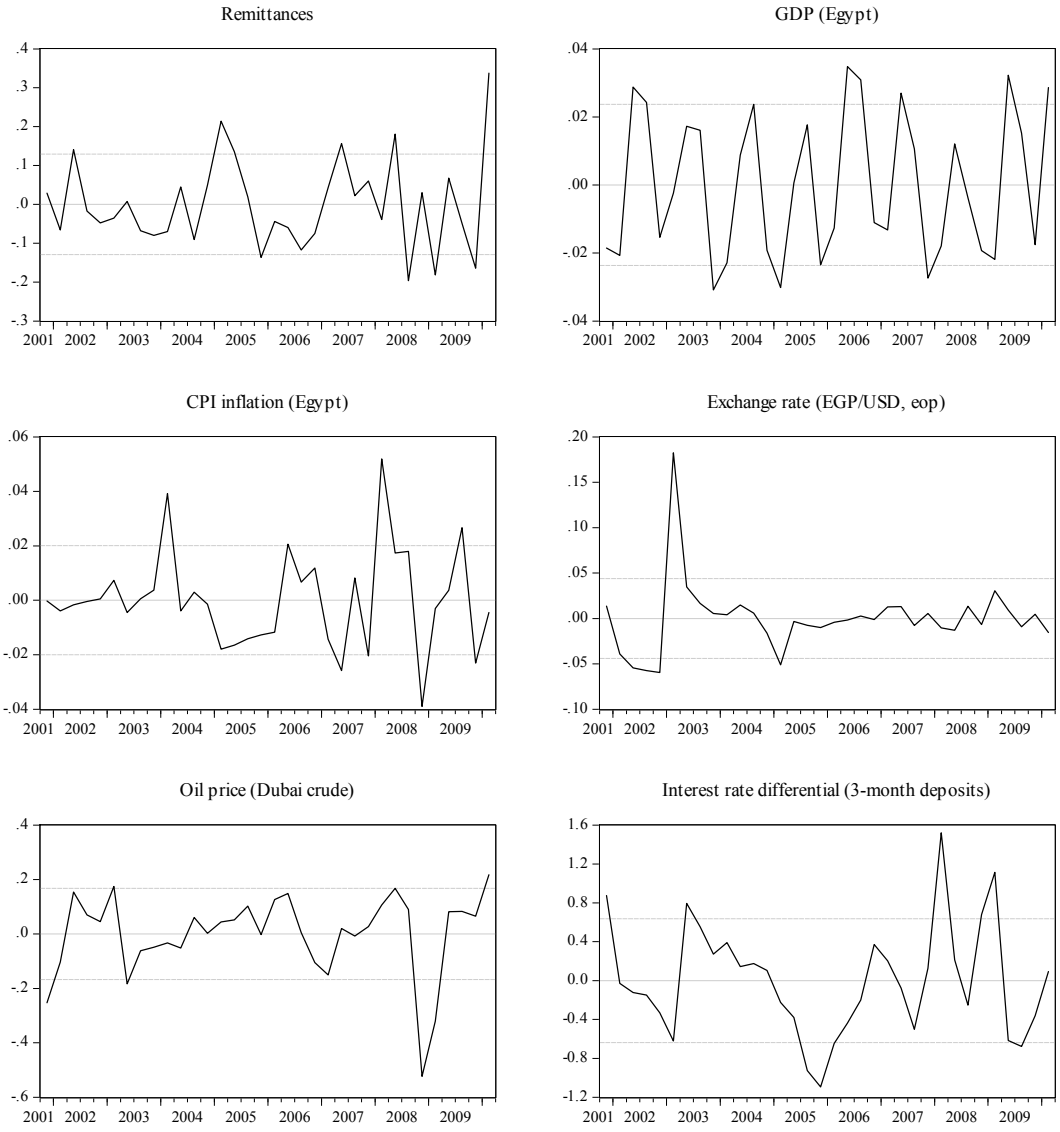
From a policy perspective, it appears that a certain amount of remittances are "a good thing". Hence, Egyptian policymakers should strive to implement reforms that promote and steer the flow of remittances toward Egypt, or, in terms of the results above, strengthen the 'pull' factors. However, similar to the policy recommendations in the capital flows literature, it is important to recognize that the implicit assumption that capital inflows attracted by improved domestic policies do not present a policy problem, but those driven by expansionary monetary policy abroad do, is unwarranted. Even pull factors caused by domestic macroeconomic policies could generate macroeconomic instability, calling for a macroeconomic policy response.[21]

To conclude, generally speaking remittance flows are not very volatile and can help alleviate poverty (via higher consumption) and increase the physical capital stock. The crux in countries that receive significant flows of remittances is, hence, to design policies that promote remittances and increase their benefits while mitigating adverse side effects (along the lines of the aid dependency discussion).

[21] For the microeconomic policy agenda, we refer to the World Bank report described above (Nasr, 2009).

Appendix

Table A1. VAR Residuals



Source: Authors' calculations.

Note: The charts show the VAR residuals with two standard error bands.

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