Volatility of Remittances to Pakistan: What do the Data Tell?

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Abstract

This paper examines the volatility of remittance flows to Pakistan using the ARCH model. We find overall remittances to be stable, whereas those from the Middle East and North America are relatively volatile, owing to fluctuations in the output of the host economies and the migrants' profile. Remittances from Europe are the least volatile and do not vary as a result of shocks to the host or home economy. Remittances to Pakistan, especially those from Europe, can thus be used as a stable source of foreign exchange flows.

1. Introduction

Formal remittances to developing countries have boomed in the recent times, overtaking other financial flows and becoming the economic lifeline of many developing countries. Pakistan is one of them, being among the top ten remittance receiving countries. Remittances, being the highest foreign financial inflows (figure 1), hold great importance for the country, and sharp variations in remittance receipts can be a worry to the country's policymakers.

Figure 1: Financial inflows to Pakistan
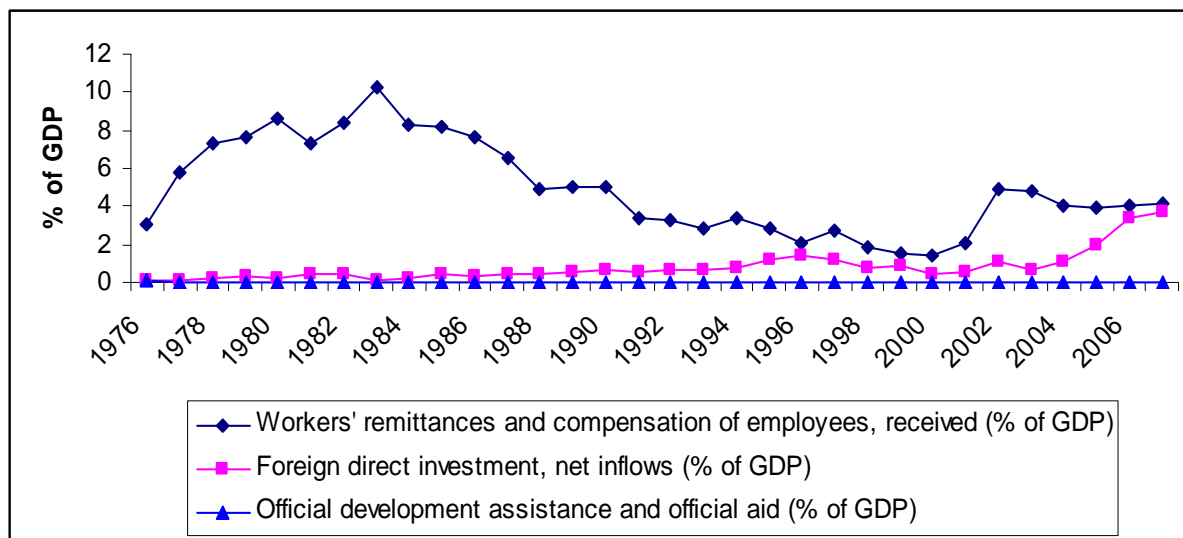
Source: WB Online 'World Development Indicators'

Remittances are generally presented in the literature as a stable source of foreign exchange flows, much less responsive to business cycles and economic shocks than the FDI and foreign portfolios (see for example Chami, Hakura and Montiel, 2009; Ratha and Mohapatra, 2007; Bugamelli and Paterno, 2009; Ratha 2003). This low volatility can help an economy avoid sharp swings and their consequent effects on the monetary and fiscal policies as well as on public welfare (Grabel, 2008).
The volatility of remittances is contingent upon various macroeconomic factors, including the output fluctuations in the home and host countries, the bilateral exchange rate and the over all socioeconomic conditions of the home and host countries (particularly inflation, unemployment and socio-political stability). It can determine the consumption patterns and saving propensity of the remittance receiving households, thereby impacting the national output, both in the immediate and in the long run.

To what extent this is true needs to be empirically determined. The question is of substantial import to Pakistan, as the government is seeking higher remittances under the recently launched Pakistan Remittance Initiative (PRI). This study is an attempt at analyzing this aspect of remittance inflows. We consider remittances from the three major remittance sending regions, namely North America, the Middle East and Europe[1]. Secondly, we look into the possible causes of this volatility, and how different Diasporas might be contributing

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[1] These regions account for over 90% of the over 7 million Pakistanis overseas and a similar proportion of remittance receipts. Moreover, the three regions together account for the bulk of Pakistan's foreign trade.

to it. In the end, we examine the challenges and opportunities this volatility presents. We study the volatility of aggregate and region-wise remittances to Pakistan using the ARCH model, which is presented in section 2 along with the data. Section 3 presents the model's main findings. We discuss some possible explanations of these results. The paper ends with some conclusions and policy recommendations.

2. Methodology and data description

Remittances, whether meant for helping the family members, investment or philanthropic causes, react to the economic and social changes occurring in the home and host economies. These can be in response to shocks which can be natural (earthquakes, floods), economic (foreign exchange, balance of payment or debt crisis), or political (instability, war etc). In the time period under study, Pakistan suffered from the consequence of the deadly earthquake in October 2005. In its wake, remittances to the country rose to contribute in the rehabilitation of the affected households. The flow of formal remittance inflows also jumped in the immediate aftermath of the tragic events of Sep 11 2001.[2]

This behaviour of remittances means that their variations vary with time, and should thus be clustered in small and large groups. Periods of high volatility (shown in red in figure 2 below) are followed by periods of relative calm. We examine this volatility of the variance of remittances using the Autoregressive Conditional Heteroskedastic (ARCH) model, proposed by Engle (1982). ARCH and GARCH models are especially suited for the analysis of volatility of economic variables (Engle, 2001). For that, however, we first need to check for the non-stationarity and non-linearity of the series under examination.
Remittance inflows to Pakistan, just like many other economic time series, show non-stationarity in levels, but are stationary in their first differences. The differenced series expectedly show higher variability, indicating that variance must be changing with time. Moreover, for all the four time series studied, the value of kurtosis is higher than 3, implying that the normality assumption has to be rejected, and therefore, ARCH effects should be present.
Our model can be expressed as:

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\begin{cases}
y_t = \sigma_t \varepsilon_t \\
\varepsilon_t \sim \mathrm{N}(0,1) \\
\sigma_t^2 = \alpha_0 + \alpha_1 y_{t-1}^2
\end{cases}
$$

Where y_t represents the growth rate of remittances, α_0 stands for minimum constant volatility, and
α_1: is the variance related to the squares of the previous values of the process $\{y_t\}$.

Data for remittances are taken from the State Bank of Pakistan and span from July 1996 to June 2010. Therefore our dataset is composed of 168 monthly observations for the aggregate as well as regional remittance series. Regional series are constructed by grouping country-wise remittances with respect to three geographical regions: North America (consisting of Canada and the US), the Middle East (consisting of the six Gulf Cooperation Council (GCC)

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[2] Formal remittances from the US more than doubled in the financial year 2001-02. This sharp rise was probably due to the increased scrutiny of money transfers from the US and curbs on informal remittance channels.

countries: Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and the United Arab Emirates) and Europe (consisting of the UK and Western European countries). The home and host GDP figures are taken from the World Bank World Development Indicators, while international oil prices (used in section 3) have been taken from the website of l'Institut national de la statistique et des études économiques (Insee) France.

Summary statistics (shown in Table 1) show that remittances from Europe have the lowest standard deviation in contrast to those from the Middle East, which exhibit the highest standard deviation. This gives an initial idea of the pattern of variation in the remittance flows.

Table I : Summary statistics

	Mean	Median	Minimum	Maximum	Std. Dev.
World	0.012	0.002	-0.703	0.790	0.188
Europe	0.010	0.010	-0.422	0.537	0.188
North_America	0.014	0.018	-0.821	1.022	0.228
Middle East	0.012	0.005	-0.953	0.947	0.247

Similarly, figure 2 shows a highly fluctuating curve for the Middle East and North America as compared to that of Europe.

Figure 2: Growth in remittances by region
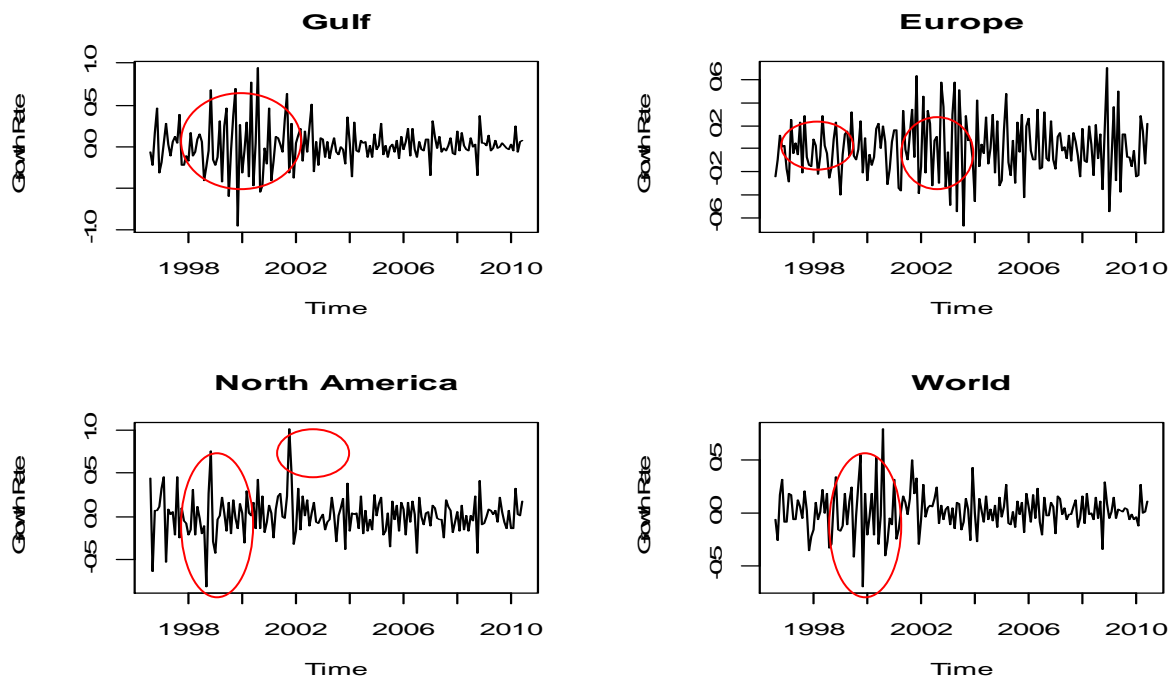
Source: State Bank of Pakistan and authors' calculations

In the next section, we take a closer look at the patterns of volatility.

3. Results and discussion

Results (given in table 2) indicate that remittances to Pakistan exhibit low volatility. In other words, remittances to Pakistan do not vary widely as a result of exogenous shocks. This may partly have to do with the diverse nature of host economies (more on it later).

Table II: ARCH (1) model (Variance equation)

	Gulf	North .America	Europe	World
α_0	0.034 (13.632)***	0.029 (6.925)***	0.050 (6.878)***	0.02 (12.41)***
α_1	0.453 (3.212)**	0.533 (3.911)***	0.169 (1.143)	0.269 (2.43)*
Jarque Bera Test p-value	2.2e-16	8.887e-13	0.6454	1.377e-14
Box-Ljung test p-value	0.9837	0.5808	0.8746	0.8793
T statistic in parentheses ***, ** and * significant at 1%, 5% and 10% respectively				

Among the three regions studied, remittances from the Middle East exhibit the highest volatility. This difference in the behaviour of remittances from the Gulf countries could mainly be attributed to two factors:

The nature of host economies: In contrast to the economies of the other two regions, the economies of Gulf countries are based on the exports of oil and natural gas. Hence, oil prices, which have been highly volatile in the past, are probably related to the boom or bust in these countries. Higher oil prices ultimately lead to higher labour demand, which attracts low-cost labour from abroad, including from the neighbouring Pakistan.

The nature of migration: Migration from Pakistan to the Gulf countries is mostly of temporary nature, as given the volatile nature of growth, the governments of these countries promote only transient labour influx. Much of the Pakistani labour force in the Gulf comprises of semi or unskilled workers who come on short term, often non-renewable work contracts and work in construction, services and other booming sectors (Gilani 2008). They often come from poor, rural backgrounds and save a high proportion of their salaries, sending their savings back home with little delay, as their remittances serve as the mainstay of their families.

As a result, higher oil prices should contribute to higher remittance transfers to Pakistan (their series show a positive and significant correlation of 0.3 and 0.27 at levels and one-month lag respectively).

Remittances from Europe, on the other hand, appear to be the least volatile, even though the coefficient of volatility is statistically insignificant. An explanation for this behaviour may lie

in the nature of migration to the region, particularly to the United Kingdom. Pakistani migrants to the region are mainly permanent immigrants (typically settled in the country for several decades), who often send money home to assist the extended families. Such financial support is usually stable, and rises in the hour of need but falls back to its historic trend once the economic shock has been absorbed. The European Pakistani community is a mix of professional and low-skilled immigrants, which apparently does not have an investor profile. This can not be said for the North American migrant community however. This Diaspora, like the one in Europe, comprises of permanent migrants, but mostly consists of highly educated individuals, including doctors, engineers, programmers etc.[3] The comparatively higher volatility of their remittances may be due to different remitting behaviour associated with the host or home country's economic progress. Table 3 shows the Ordinary Least Squares estimates of logs of region-wise remittances regressed alternatively with the remitting regions and Pakistan's output. Remittances from the US and Canada are highly correlated, both with their national as well as Pakistan's GDP.

Table III: Region-wise remittances and regional and Pakistani GDP

	Remittances dependant variable					
	GULF		North, America		Europe	
	GULF	Pakistan	North, America	Pakistan	Europe	Pakistan
Constant	-8.052 (-2.706)**	-3.78 (-1.941)*	-19.269 (-7.664)***	-10.153 (7.131)***	-2.741 -1.424	-0.051 (-0.045)
GDP	1.21 (5.027)***	1.009 (5.494)***	1.561 (9.657)***	1.431 (10.66)***	0.512 (4.1)***	0.491 (4.609)***
T statistic in parentheses ***, ** and * significant at 1%, 5% and 10% respectively						

This points to the investor profile of the Pakistanis in North America. Being the most qualified and the highest earning group among the country's overseas communities, North American Pakistanis are best place to take advantage of the new investment opportunities in their country of origin. Therefore, they send more money in periods of high growth. Anecdotal evidence suggests high proportions of remittances from North America going into real estate, construction and stock market boom during the high growth period from 2003 to 2006.
The correlation of remittances with official exchange rate also point in the same direction (results not shown), as the North American remittances appear to be the ones most strongly associated with exchange rate fluctuations.

The findings of Table 3 also support our hypothesis regarding the remittances from Europe, as they show low correlation with either the regional or the Pakistani annual output. These remittances appear to be more or less altruist, sent regardless of the level of growth in the host or the home country.

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[3] The 2005 American Community Survey undertaken by the US Census Bureau shows that among the male Pakistani population aged 25 years and over, 60.9% had bachelor's degrees or higher while the American average for the same category was 28.5% (Oda, 2009). In contrast, tertiary enrolment rate in Pakistan is hardly 5 percent.

A related explanation for this divergent behaviour of remittances may be the more volatile nature of economic growth of the US and Canada as compared to the anaemic growth rates prevalent in Europe during the studied period.

En passant, it can be noted that the relatively low volatility of Pakistani remittances is thanks to this diversity of economic conditions in which the overseas Pakistanis find themselves. While the high oil price driven remittances from the Gulf states help the country cope with the deterioration in current balance caused due to rising oil import bill and lower remittances from North America, the remittances from Europe remain steady and keep the over all volatility in check.

4. Concluding remarks

So what message does this study bring ? One good news is that the remittances to Pakistan are relatively stable. This, as the analysis showed, is mainly due to the diverse economic conditions of the sending countries and the varied socioeconomic profile of the Pakistani Diaspora. An across the board increase in remittance flows under the PRI should therefore not worry the country's economic managers on this account. Remittances from the United Kingdom and other Western European countries have shown little volatility so far, and additional receipts from the region should in fact improve the country's economic stability. So the government can indeed rely on remittances as a stable source of foreign exchange inflow. The country can benefit from this stable nature of remittances by securitizing them and thereby improving its sovereign credit rating. Rising remittances may continue their salutary impact on the inequality and poverty in the country (Mughal and Diawara, 2010), but could pose the economic managers additional difficulty on the macroeconomic front by exasperating the Dutch disease from which the country's economy already suffers (Makhlouf and Mughal, 2010). However, more research is needed on the macro and microeconomic determinants of remittances in order to establish the main motivations of the Pakistani migrants behind such different patterns of remittance flows analyzed in this paper. To sum up, given some deft handling, remittances should continue playing a positive role in Pakistan's economic progress.

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