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Cyclical Properties of Migrant's Remittances to Pakistan: What the data tell us

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Abstract

Migrant's remittances are a growing source of foreign funds for several developing countries including Pakistan. Despite a burgeoning body of literature and growing interest in migrants' remittances and its impact on recipient's economies, relatively little work exists on the business cycle characteristics of remittances to Pakistan. This study analyzes whether remittance act pro- or counter-cyclically in the face of external and internal economic shocks by employing annual data from 1973-2010 for Pakistan. The results show that migrant's remittances are counter-cyclical with respect to home output and households consumption. Remittances are found to be acyclical with the output of Pakistan's major remittances sources such as the United States and United Kingdom. Remittances from Saudi Arabia, however, show mixed results. The overall impact of remittance inflows to Pakistan appears to be a stabilizing one.

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1. Introduction

Like with other developing countries, international migration and the resulting remittances to Pakistan have grown in importance during the last decade. Formal remittance flows to Pakistan stood at over $12 billion in the year 2011, equivalent to 6 percent of the country's annual national output (State Bank of Pakistan 2012). These flows cover much of the country's current account deficit, and constitute the second largest source of foreign capital after the receipts from cotton and textile (State Bank of Pakistan 2011). Remittances should therefore have an important influence on Pakistan's macro- and microeconomic factors. Remittances to Pakistan, for instance, have been found to be a relatively stable source of foreign exchange (Mughal and Makhlouf 2011a), and have caused the Dutch disease, leading to loss of export competitiveness and appreciating exchange rate (Mughal and Makhlouf 2011b). Another way in which remittances can influence a country's economic situation is through their association with the home and host countries' business cycle. This association can have potentially important implications for the home economy. Pro-cyclical remittances, the flows moving in line with the country's economic growth, can cause the business cycles to grow sharper, leading to higher growth periods and deeper slumps. Counter-cyclical remittances, on the other hand, can help absorb macroeconomic shocks and smoothen large fluctuations in the national output. Determining the cyclical behaviour of remittances is an empirical question which depends on the economy or group of economies studied, period studied and techniques employed. Chami et al. (2005), for instance, posit that remittances are mostly counter-cyclical, while Giuliano and Ruiz-Aranz (2009) find them to be more pro-cyclical. Remittances' cyclical behaviour also needs to be examined with respect to the sending (also called host) countries. If remittances are pro-cyclical with respect to a host economy, they can serve as a channel through which external macroeconomic shocks impact the home economy.

This study examines the cyclical properties of remittances to Pakistan. The goal of the study is to establish and characterize the cyclicality of migrants' remittances for home and host countries over the period 1973-2010. For this purpose, remittances' association with both host and home output and domestic consumption is studied. We begin by presenting some key features of migration from Pakistan and the resulting remittance flows. Section 3 briefly overviews the literature on business cycle properties of remittances in the context of other developing countries. Section 4 describes the empirical methodology used, followed by our main findings in Section 5. Section 6 concludes.

2. International Migration and Remittances to Pakistan: Some Stylized Facts

An estimated 4 million Pakistanis live abroad, majority of them have migrated to Middle East about half of them (48%), while 28 percent and 21 percent live in Europe and North America respectively (Arif, 2009). Main concentrations of Pakistani migrants are found in Saudi Arabia, United Arab Emirates, United States, Canada and United Kingdom. (Oda, 2009). Migrants in the developed OECD countries are usually better qualified and come from upper income background in Pakistan (Gazdar, 2003). The more numerous migrants to the countries of Persian Gulf, in contrast, are mostly semi- or unskilled, and come from lower income households.

Remittances to Pakistan first took up in the 1970s when the oil exporting economies of Persian Gulf began to import thousands of Pakistani workers to work in the rapidly construction sector. Remittances increased sharply to reach 10% of Pakistan's GDP in 1982-83 (figure 1). The ensuing fall in oil prices and the consequent slowing down of construction projects led to a gradual decline in remittances. The second period of remittance growth began in 2001. Remittances to Pakistan grew from about $1.5 billion in 2001 to $12 billion in 2011, an almost ten-fold rise during the decade (WDI, 2011 and SBP, 2012). Country-wise analysis shows that USA, Saudi Arabia, UAE and UK have been the main sources of rise in

remittances during this period (figure 2). The rise in remittances from the United Arab Emirates was particularly strong in 2009, bringing remittances from that country close to the level of remittances from the United States. The share of remittances sent by migrants from USA peak at 2005 to account about 30 percent of total remittances, and decreased after financial crisis in 2008. Remittances sent by migrant's in Saudi Arabia and UAE have not been adversely affected by the crisis. In 2011 the share of remittances from Saudi Arabia and United Arab Emirates increased to 24 and 23 percent respectively, while the share of remittances from the United State dropped to 18 percent (see figure 3). Overall, the continued increase in remittance inflows during the 2009 and subsequent year shows that the crisis has not affected the flow of remittances to Pakistan.

3. Business Cycle and Remittance Flows: Review of Literature

Empirical studies on various developing countries have shown varying cyclical behaviour of the remittance flows. For example, in his study of 12 developing countries over the period 1976-2003, Sayan (2006) finds that although the aggregate country data exhibits counter-cyclicality with respect to GDP, the results in the case of individual countries are mixed, with different countries showing pro-, counter- or acyclical behaviour. Similarly, Giuliano and Ruiz-Arranz (2009) analyzed the cyclical components of remittances and output series employing the HP filter. They conclude that remittances are pro-cyclical with respect to local business cycle for about two-thirds of the countries included in the sample, while for the remaining countries remittances are counter-cyclical with the domestic economy. Coronado (2009) analyzes the business cycle properties of remittances and output series for United States–Mexico and Salvador, and Germany–Turkey. Using an unobserved components state-space model (via the Beveridge-Nelson decomposition). The results show that remittances are counter-cyclical with all the home countries: Mexico, El Salvador, and Turkey. However with respect to source countries, remittances to Mexico are counter-cyclical with the United States business cycle, while remittances from the United States to El Salvador and remittances sent by Turkish migrants from Germany are strongly pro-cyclical with German output. Akkoyunlu and Kholodilin (2006) use data from 1962-2004 to understand the cyclical behaviour of remittances sent by Turkish migrants in Germany. The authors employ cross-correlations, cointegration tests, and vector auto regression models to establish that German output is a pro-cyclical determinant of remittances, whereas remittances are acyclical to Turkish output. These results are contrary to those of Sayan and Tekin-Koru (2007, 2010), who find that remittances to Turkey are pro-cyclical to Turkish output. Sayan and Tekin-Koru (2010) depict that remittances move pro-cyclically with both real output and consumption at home. They conclude that during the studied period, remittances sent from Germany have shown little poverty and inequality reducing effects. Vargas-Silva (2009) explained the cyclical components of remittances and output series using Baxter and King filter. The author employ different method using cross correlation and SVAR model for the period 1981 to 2006 and show that there is strong and negative correlation between the Mexican output and remittances whereas remittances are weakly positively correlated with United States output.

In the South Asian context, Lueth and Ruiz-Arranz (2007) explore to what extent migrants remittances have helped Sri Lanka against macroeconomic shocks. Employing quarterly data for the period 1996-2004, they find that remittances are pro-cyclical and decline when the island's currency weakens, undermining their usefulness as shock absorbers.

The above brief review of literature shows that the cyclical properties of remittances depend on the countries studied, the periods examined and the techniques employed. Remittances nonetheless show a countercyclical behaviour with respect to most of the home economies. In

what follows, we examine the remittance flows to Pakistan to determine if this is indeed also the case for Pakistan.

4. Data and Methodology

4.1. Data

We employ annual data for the period 1973-2010. The data are denominated in US dollars and come from the World Bank (World Development Indicators) database. All values have been adjusted to base year 2000. The data are transformed in logarithmic form. Drawing on the previous literature, several proxies have been used to denote real economic activity, the most popular being Gross Domestic Product and Gross National Product. We use GDP as home country output and GNP used for host country output. The argument behind this choice is that GNP is defined as GDP plus net factor income from abroad (NFI), which includes net remittances inflows. Therefore, the host country's GNP and the home country's GDP exclude remittances sent to home country (Sayan and Koru, 2010). We consider three major hosts of Pakistani migrants: Saudi Arabia, USA, and the UK. These three also represent the three major remittance-sending regions for Pakistan: Persian Gulf, North America and Europe respectively.

4.2. Empirical Methodology

To investigate how remittances respond to crises and boom and business cycles in home and host nations, first we need to remove the long-run trend within time series data. Once the trend component is removed, the remaining cyclical component composed of fluctuations shows the cyclical upturns and downturns during different periods of time (Hodrick and Prescott, 1997). If cyclical components of the remittance receipts and output (or real consumption spending) series tend to move in the same direction over time, then remittances are said to be pro-cyclical with the output (or real consumption spending). If they move in opposite directions, on the other hand, then remittances are said to be countercyclical with output or (consumption spending). We consider seasonally adjusted series, all in logarithms. Before applying the linear filter to extract cyclical series, it is necessary to examine the stationary properties of time series variables. To check the stationarity we used Augmented Dickey Fuller (ADF) and Phillip Perron (PP) unit root tests. The ADF test constructs a parametric correction for higher-order correlation by assuming that the series follows an AR(p) process, by adding further lagged differences of dependent variable. The ADF test tests the null hypothesis that a time series is *I (1)* against the alternative hypothesis that it is *I (0)*. If the null hypothesis is rejected it means that variable is stationary. Whereas, acceptance of the null hypothesis means the series is non-stationary at level and need to be differenced to make it stationary. The PP test offers an alternative method of controlling for serial correlation and heteroscedasticity (HAC) when testing for unit root**.**

We use two of the more commonly used time series filters to filter our data. The methods are described as follows:

4.2.1. Hodrick and Prescott Filter

Hodrick and Prescott (1997) (H-P) filter is widely used for the decomposition of economic time- series into their trend or potential component and a deviation from trends. As Ravn and Uhlig (2002) state, "...the HP filter has become a standard method for removing trend movements in the business cycle literature." One attraction of the HP filter is that it may be applied to non-stationary time series containing one or more unit roots in their autoregressive representation. For any series y it decomposes the trend component y^T represents the long run movements in the series, and the cyclical component i.e. $y_t^c = y_t - y_t^T$ arising from business cycle fluctuations.

By minimizing the following loss function

$$min \sum_{t=1}^{T} (y_t - y_t^T)^2 + \lambda \sum_{t=2}^{T-1} [(y_{t+1}^T - y_t^T) - (y_t^T - y_{t-1}^T)]^2$$

y_t is the observation of the series at time t. y_{t-1}^T y_t^T y_{t+1}^T is the trend components at time *t-1*, *t* , *t+1*. The residual $(y_t - y_t^T)$ is the deviation from the trend represents the cyclical component, and is the object of our interest. λ is the smoothing parameter. The larger the value of λ, the higher is the smoothness. Where λ is a weight that reflects the relative variance of the two components. We adopt the value of λ =6.25 recommended by Ravn and Uhlig (2002).

4.2.2. Baxter and King Filter

Baxter and King (1999) construct a band-pass filter that attempts to isolate cycles with period lengths of between 1.5 and 8 years which is the typical length of U.S. business cycles. Those whose cycle length is longer than 8 years are identified with the trend, and the remainder is consigned to the irregular component.

4.2.3. Cross Correlation

To measure the cyclical correlation between two economic variables (X) and (Y), we will calculate cross correlations between the cyclical component of the variable (X) and the cyclical components of the second variable (Y) obtained from the two aforementioned filters. The correlation coefficient between X (t) and Y (t + j), ρ (j), where j = 0, ± 1, ± 2, ± 3, measures the degree of their co-movement over the business cycle (Agenor et al. 2000). An economic variable is significantly correlated with the cycle based on $0.32 \leq |\rho(j)| < 1$[1]. If the cross-correlation, ρ (j) is positive, zero or negative, the economic variable (X) is pro-cyclical, acyclical, or countercyclical respectively. Moreover, if | ρ (j) | is the maximum of a positive, zero or negative, j, then the cycle of (X) lags cycle by j periods, synchronous, or leading cycle by j periods, respectively.

5. Results and Discussion

First we conducted ADF and PP test to test the stationarity of both original and cyclical series. Results reported in Table 1 show that both ADF and PP fail to reject the null hypothesis of the presence of a unit root for all variables, except for Saudi GNP which is found stationary at level under PP test. Moreover, we found that all variables are stationary in first difference under both tests. In general, the results of PP test support the results of ADF. These non-stationary series are detrended both with Hodrick-Prescott and Baxter and King Filters. Next, we conduct the stationarity test for the cyclical components under the PP and ADF tests. We find that the null hypothesis of a unit root in each of the detrended series can be rejected at 1% level. The time series are stationary after being detrended by the HP and BK filters. Since we use all series in their logarithmic form, the resulting cyclical components can be interpreted as percentage deviations from the long-run trend.

As shown in figure 4, remittances appear to be countercyclical with respect to home GDP. The trends in cyclical series with respect to Pakistani households' aggregate final consumption expenditures also indicate the counter-cyclicality in the flow of remittances.

[1] This means that correlation coefficients falling outside the $(\pm 2/\sqrt{n+2})$ range will require that the null hypothesis be rejected, i.e., will be considered significant statistically.

As regards the host economies, remittances show no co-movement with the output of United States and United Kingdom. In case of Saudi Arabia however, remittances seem to be counter-cyclical in some periods with the Saudi GNP. This visual inspection gives us an idea about the cyclical nature of remittance inflows. Next, we obtain cross correlation coefficients between the two series to establish whether remittances tend to be counter-cyclical or pro-cyclical with the home and host business cycles. Tables 2 to 4 reports these cross correlation coefficients for real remittances with respect to output and household consumption obtained by using the Hodrick-Prescott and Baxter and King filters.

Table 2 reports the contemporaneous and cross-correlation coefficients between remittances sent to Pakistan and the cyclical components of home real GDP (Household's Consumption). The results indicate that remittances have a contemporaneous negative correlation with home GDP. Moreover, remittances appear to be synchronous and negatively correlated with household consumption regardless of which filter is employed. Therefore, both sets of results support the output smoothening hypothesis. Pakistani migrants increase the amount they remit at the times of lower economic activity back home, and reduce it during boom periods. This interaction with the home output is contemporaneous and takes place in the same year of economic activity. This indicates a high level of reactivity of the remittance flows.

Results shown in Table 3 indicate an insignificant correlation between remittances on the one hand and US and UK output on the other. The relationship is found to be acyclical, affirming the graphic evidence given above. The association with Saudi output is intriguing, as the correlation is found to be significant and negative (even though insignificant in the case of BK filter). This counterintuitive result can be understood in the light of the two country's economic context. Saudi Arabia is host to the largest Pakistani migrant community in the world, and accounts for Pakistan's largest remittance flows. Saudi economy being mainly oil-based suffers from sharp boom and bust cycles in response to world crude petroleum prices. A slowdown in construction and other activities in Saudi Arabia can therefore hardly hit the Pakistani workers who are mostly working on temporary work contracts. As a result, they remit their savings when their job prospects are uncertain during tough economic times, and reduce their remittances once the labour market improves with growing Saudi output. This finding corroborates those of Siddiqui and Kemal (2006) who showed that fall in remittances in the 1990s was an important cause for the rise of poverty in Pakistan. Remittances from Pakistani workers in Saudi Arabia remained depressed during the 1990s, partly due to the financial burden caused by the Gulf war, and partly due to weak oil prices. These remittances however contributed to poverty alleviation in Pakistan during the 1980s and 2000s, the periods of high growth in Saudi Arabia (Arif 2009, Mughal and Anwar 2012). Here, it needs to be noted that the correlation between remittances and Saudi output in our study turns positive after a lag of three years.

In a nutshell, we find that remittances to Pakistan are counter-cyclical with respect to the home economy, significantly and simultaneously responding to the country's output and consumption fluctuations. The correlation with host economies is mixed. Pakistani migrants in USA and UK, being mostly permanently settled (Oda 2009) and usually well off (Mughal 2012), remit considering the economic situation back home, and not the level of economic activity in their countries of residence. Migrants to Saudi Arabia, in contrast, show an opposite behaviour. The nature of remittance cyclicality in the context of host economies can also be seen in the correlation between home and host economy output (Table 4). Neither the US nor the UK annual output shows any cyclical relationship with Pakistan's annual GDP. Similarly, Saudi GNP shows a positive, i.e. pro-cyclical association with Pakistan's output.

6. Conclusion

The objective of this study was to determine the cyclical properties of remittance flows to Pakistan. We found strong evidence of counter-cyclicality with respect to Pakistani output, both for aggregate flows as well as flows from three principal remittance-sending countries. However, remittances are acyclical or countercyclical with respect to host countries, depending on the economy examined. Our results suggest an overall stabilizing effect of remittances. Given fragile macroeconomic conditions of the country, this can be regarded a welcome news for Pakistan. The sharp growth in remittances in the recent years can therefore be considered helpful for country's macroeconomic stability.

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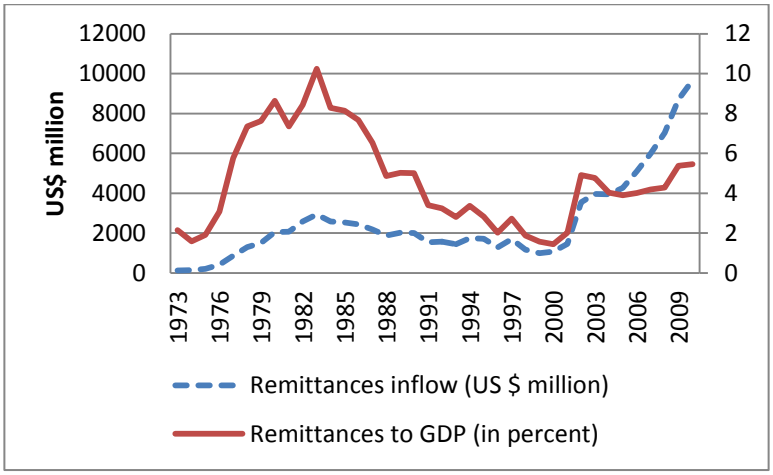
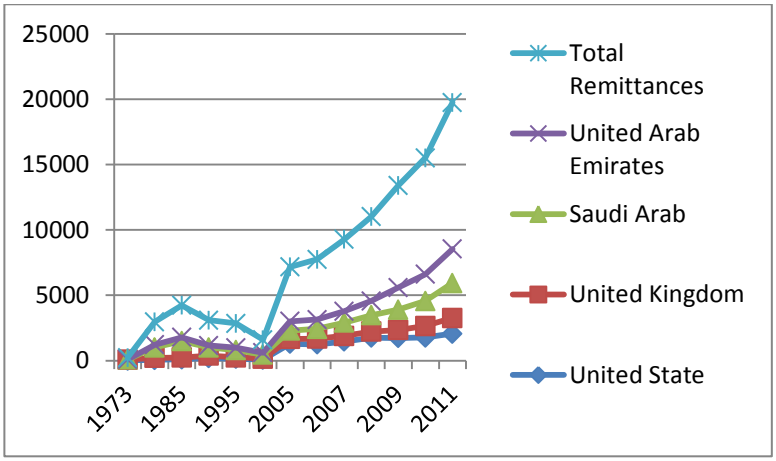
Appendix:

Figure 1: Episode of remittances inflows to Pakistan (1973-2010)



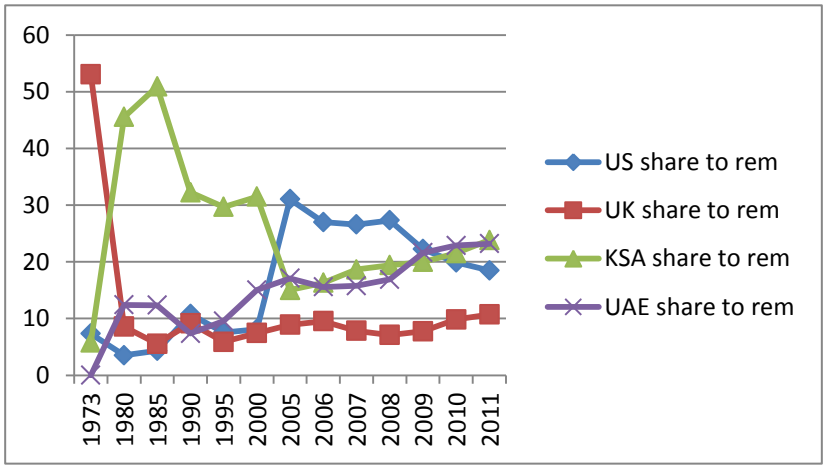
Source: World Development Indicators (WDI, 2011)

Figure 2: Remittances inflows (in US $ million) for major destinations countries.



Source: State Bank of Pakistan

Figure 3: Share of remittances inflows by source country



Source: State Bank of Pakistan

Figure 4. Cyclical Components of the Home GDP, Households Consumption, Host GNP and Remittances Using the HP Filter (1973-2010): A Comparative Look

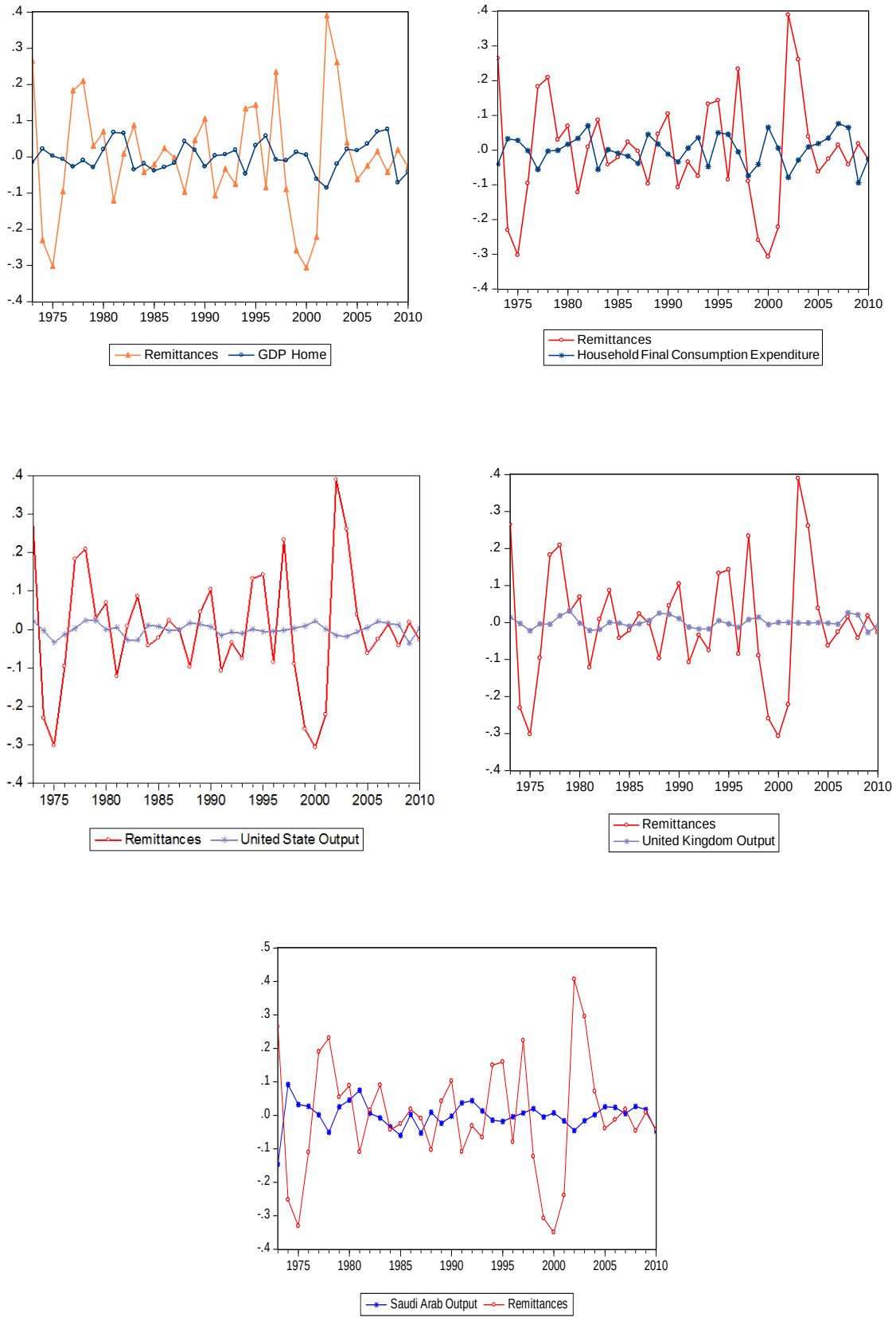


Table 1. Results for Unit Root Test:

Variables'	Level		HP	BK	HP	BK
	ADF	PP	ADF		PP	
GDP (Home)	-2.69	-2.63	-4.41*	-4.53*	-4.05*	-10.54*
Remittances	-3.07	-2.05	-5.40*	-7.74*	-5.87*	-14.16*
Consumption Exp.	-2.79	-2.80	-5.99*	-6.38*	-11.26*	-21.72*
GNP (US)	-1.39	-1.85	-5.22*	-6.93*	-6.01*	-11.68*
GNP(UK)	-2.35	-2.47	-5.66*	-6.50*	-5.07*	-11.55*
GNP (KSA	-1.96	-4.57	-7.75*	-11.32*	-7.89*	-12.20*

ADF and PP represents the Augmented Dickey-Fuller and Phillip Perron unit root test with trends for both level and detrended data. Asterisk,* represents 1% level of significance. For Laglength both AIC and SIC criteria were used.

Table 2. Cross Correlations between Home GDP (Households Consumption) at time *t* (= 1973, …, 2010) and Real Remittances at *t+i and t-i* (*i* = 0, 1,2,3)

		t-3	t-2	t-1	t	t+1	t+2	t+3	Nature of Co-movement
Cross correlation between Home GDP and Remittances	HP	0.31	0.27	0.18	**-0.33***	-0.19	0.02	-0.07	Counter-cyclical and coincident
	BK	-0.01	0.12	0.28	**-0.42***	-0.02	0.24	-0.16	Counter-cyclical and coincident
Cross correlation between households consumption and Remittances	HP	0.32	0.26	-0.05	**-0.40***	0.01	0.37	-0.04	Counter-cyclical and coincident
	BK	0.21	0.31	-0.02	**-0.40***	0.06	0.34	-0.11	Counter-cyclical and coincident

*****Coefficients those are statistically significant at 5% significance level

Table 3. Cross Correlations between Host GNP at time *t* (*t* = 1973, …, 2010) and Real Remittances at *t+i and t-i* (*i* = 0, 1,2,3)

		t-3	t-2	t-1	t	t+1	t+2	t+3	Nature of Co-movement
Cross correlation between US Output and Remittances	HP	0.09	0.03	0.11	-0.01	-0.13	-0.10	-0.07	Acyclical
	BK	0.01	0	0.18	-0.14	-0.01	0.11	-0.08	Acyclical
Cross correlation between Saudi Arab Output and Remittances	HP	0.22	0.15	-0.09	**-0.47***	0.23	0.25	**0.37***	Counter-cyclical and coincident
	BK	**0.45***	**0.36***	0.11	-0.25	-0.02	0.12	0.12	Pro-cyclical and leading
Cross correlation between UK Output and Remittances	HP	-0.15	-0.11	0.21	0.14	-0.06	-0.26	-0.20	Acyclical
	BK	0.03	-0.13	0.17	0.28	-0.06	-0.04	-0.13	Acyclical

*****Coefficients those are statistically significant at 5% significance level

Table 4. Cross Correlations between Host GNP at time *t* (*t* = 1973, …, 2010) and Home GDP at *t+i and t-i* (*i* = 0, 1,2,3)

		t-3	t-2	t-1	t	t+1	t+2	t+3	Nature of Co-movement
Cross correlation between US Output and Home GDP	HP	-0.03	-0.11	-0.14	0.20	0.17	0.01	0.06	Acyclical
	BK	0.03	-0.10	0	0.16	0.09	-0.01	0.23	Acyclical
Cross correlation between UK Output and Home GDP	HP	-0.16	-0.02	-0.02	0.06	0.10	0.08	0.09	Acyclical
	BK	-0.10	0.10	-0.15	0.07	-0.01	-0.02	0.16	Acyclical
Cross correlation between Saudi Arab Output and Home GDP	HP	-0.19	-0.03	0.23	**0.38***	0.11	-0.03	-0.18	Pro-cyclical and coincident
	BK	-0.18	-0.02	0.17	**0.36***	0.24	0.03	-0.06	Pro-cyclical and coincident

*****Coefficients statistically significant at 5% significance level