Macro Level Determinants of Remittances to Pakistan

Yousaf Zaman¹, Khair-Uz-Zaman², Shadiullah Khan³

Abstract
Remittance inflows to developing world stand tall among the sources of foreign finance. The purpose of this study is to explore the macro level factors that shape remittance inflows to Pakistan over the study period 1973 to 2010. Using time series data autoregressive distributed lagged model (ARDL) bounds testing approach is employed for parameters’ estimation. Results of the study reveal that income level at home, number of emigrants, increase in exchange rate and rate of inflation at origin all matters in determination of inflows to the country. Long run impact of the former three variables on remittances remained significantly positive while the impact of the domestic price level was substantiated with negative sign.

Key words: Pakistan, Remittances, Macro Level Determinants, Cointegration

1. Introduction
Funds channeled from one place to another are termed as remittances. These flows of cash funds can be internal or external. When individuals migrate from one place to another within a country in search of earnings the monies transferred their off are known internal/intra-national remittances. Whereas, external/international remittances represent that part of the overseas workers’ earnings which they send back home. According to Bascom (1990) external remittances constitute that fraction of foreign workers’ earnings/accumulated stock of wealth which they transfer to their home countries on altruistic and/or self-interest grounds. In other words external remittances are inflows to home countries from destinations where the migrants work and reside.

The ease of human mobility due to integration of the world economy has enabled labor exporting nations to accumulate remittances on unprecedented scale. Based on World Bank’s measuring procedure (adding up flows, such as workers’ remittances, compensation of employees, and migrant transfers) inflow of remittances to developing world stood at US $160 billion, probably under estimated by at least 50 percent as flows through informal channels could not be accounted for (GEP, 2006).

During seventies the average annual inflows of remittances at the world level amounted to US $14.3 billion (see appendix table 1). By the next decade it grew by 212.5 percentage points relative to the previous decade. In nineties the average annual inflows grew rather sluggishly by 131%. However, the first decade of the new Century recorded average inflows of US $303.69 billion, registering a growth rate of 194.5% over the previous decade. In respect of Pakistan the average annual inflows during seventies stood at US $0.71 billion. In eighties a growth rate of 305% was recorded with the inflows to the tune of US $2.31 billion, on average. However events at the national and international level (such as freezing of foreign currency accounts, sanctions in response to nuclear tests, gulf crisis etc.) adversely affected inflows to the country with a 37% decline during nineties. With the advent of new Century funds transfers from overseas Pakistanis reached to a new height of US $4.9 billion average registering a 235% growth in comparison to the average inflows of the previous decade.

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Remittances are supposed to promote the economic cause of the labor-exporting economies at micro as well as macro level. Migration of mostly unemployed persons not only reduces job demands domestically, but their funds transmission from abroad provide additional resources for development. Beside investment remittances used for consumption purposes also help in production expansion through multiplier effect (Nishat and Bilgrami, 1993; Stahl and Arnold, 1986). In consonance with the same findings Adams (1998) demonstrates that remittances, particularly external remittances, are utilized for physical asset accumulation in rural Pakistan. In addition, monies sent home by foreign workers also contribute to correction of balance of payments and poverty reduction in the home countries (Ahmad, Sugiyarto and Jha, 2010; IMF, 2005). Besides when expatriates leave foreign countries they also bring new technology, managerial skills and changed attitude with them to their home countries. Although external remittances are thought supportive at the individual as well as state level, one has to pay due attention to negative aspects of the inflows, such as moral hazard effect (Chami, Fullenkamp and Jahjah, 2003), brain drain and dutch disease.

So, in recognition of the positive impact of remittances on receiving families in general and as the second main source of foreign reserve for the country in particular, this study aims at assessing the relative importance of some domestically generated forces that are supposed to play a crucial role as far as accumulation of remittances is concerned. These factors may represent socio-demographic aspects, performance of domestic and host economies, relative socio-political scenarios, funds remitting facilities etc. The study analyzes the macro level factors responsible for workers’ transfers from abroad to Pakistan over the study period. The variables examined include: per capita income, number of Pakistani workers abroad, exchange rate, and rate of domestic inflation. Although various means are exploited for funds transmission from abroad this study is confined to the investigation of officially recorded inflows that take place through official channels only. Rest of the paper contains sections like: a sketch of migration and remittances’ history, review of literature, data and methodology, empirical findings and discussions and, conclusion.

2. A Brief History of Migration and Remittances in the Context of Pakistan

Migration from Pakistan can be traced back to the early days of her independence. In the beginning unskilled and semi-skilled workers left Pakistan for England in response to the demands for industrial workers at destination. During 60s and early 70s skilled and qualified Pakistanis found their way to other Western countries and Arab world. In 1973 huge developmental ventures were initiated in the Arab world that could not be completed without the contribution of non-Arab work force. Being a brotherly Islamic country Pakistan quickly responded and became one of the main suppliers of manpower to the region. This phase was followed the movement of educated and professional Pakistanis for prosperous parts of the world including Canada, Middle East, United Kingdom, and United States among others (Arif and Irfan, 1997).

According to Pakistani Missions’ estimates a total of 3.97 million Pakistanis left their homes for foreign destinations upto 2004 out of which Arab countries hosted nearly half of the total emigrants (Year Book, 2004-05). According to Overseas Pakistanis Division the total number of Pakistani expatriates would inflate to around 7 million if those who illegally crossed borders, stayed after the expiry of visa, and those who left home to study abroad are also counted for (Suleri and Kevin, 2006). According to the Bureau of Emigration and Overseas Employment (BE&OE) the total number of registered Pakistani workers who moved to foreign countries from 1971-2010 stood at 5.35 million (see Appendix table 2). According to the government of Pakistan (NMP, 2008) assessment demand for skilled and qualified Pakistani workers demonstrates a rising trend over time. Out of the total number of workers proceeded abroad the percentage of highly qualified, highly skilled, and skilled migrants together stood at 51.29% and 47.76% during the year 2006 and 2007, respectively.

To reap the dividends of labor export government of Pakistan has been always seeking means and ways to promote manpower export. To get benefits from the surplus labor force the policy objectives at the state level include simplification of migration procedures, initiation of emigrant oriented programs, establishment of linkages with foreign missions, organization of foreign fairs, identification of and access to new markets, and opening of labor attaché offices in potential markets (Ahmad, Sugiyarto and Jha, 2010). In 1971 BE&OE
was established to facilitate speedy migration of local workers by Overseas Employment Promoters (OEPs) under a regulated framework. To look after the interests of workers at destination and their loved ones back home another organization, namely Overseas Pakistanis Foundation (OPF), was founded in 1979.

The increased demand for alien workers on the foreign front, and the wide spread domestic unemployment, political unrests, and favorable migration policies at the country level give impetus to the migration of Pakistani workers that caused a sustainable flow of remittances to the country. Besides the expansion of migrant stock, the qualitative aspect of the emigrants also played a crucial role in enhancing the inflows from abroad. Owing to the changing job market the number of qualified and professional migrants kept rising relative to their unskilled and semi-skilled counterparts. It is believed that overseas workers' transfers to Pakistan is ranked third, after export proceeds and foreign investment (Raza, 2008).

Before the oil crisis of 70s remittances to Pakistan were not recognized a potential source of foreign exchange. However, with the increasing demand in the 70s for Pakistani workers in Arab Peninsula the policy makers sensed funds transfers worth consideration.

During seventies the average annual inflows remained in the proximity of US $713 million, ranging from US $136 million in FY73 to US $ 1747 million in FY80 in actual terms. By the next decade the average annual figure grew by 305% in comparison to the previous decade average and stood at US $2.31 billion in absolute terms. In FY83 funds transmitted by overseas Pakistanis even overtook merchandise export earnings. Starting from the year 1983-84 remittances demonstrated falling behavior throughout the eighties. Sluggish economic performance at destination countries and increasing reliance on Hundli system for funds transfers were held responsible for the decline (Hyder, 2003).

During the nineties inflows to Pakistan maintained a sluggish pattern with an annual average of US $1.46 billion. About 37% fall in the average value of 90s was recorded when the value of the consecutive decades were juxtaposed. Freezing of foreign currency accounts and imposition of sanctions in retaliation to the nuclear tests in late nineties were the main drives that significantly curtailed the inflows during the terminal decade of the previous century. However, from 2001 onward remittances kept growing year by year pushing the average to almost US $5 billion per year, except FY04 when the annual inflows declined to less than US $4 billion from a total of more than US $4 billion the preceding year. Following the rising trend the annual remittances to the country in absolute terms touched almost US $9 billion figure by 2010 (see figure 1).

From seventies through nineties Arab world dominated the inflows from expatriates to Pakistan. Kingdom of Saudi Arabia (KSA) and United Arab Emirates (UAE) secured the top two positions among the source countries during this period. In 2002-03 the USA occupied the driving seat among the source countries. Remittances to Pakistan from KSA, UAE, and USA during the year stood at US $581 million, US $838 million, and US $1238 million respectively. Measures taken after 9/11 episode are counted as the primary reasons that pushed USA up the scale. During the period 2001-10 average annual inflows from USA stood at US $1264 million leaving KSA to compete with UAE for second place (see appendix, table 2).

4 The factors responsible for upsurge in remittances include better management of the economy, strengthening of economic fundamentals, competitive exchange rate offered in inter-bank, effective marketing of domestic banks in host countries, crackdown on informal transferring system among others in response to 9/11 happening.
3. Literature Review

Empirical literature on factors responsible for variation in remittance inflows to labor exporting countries identifies two broad categories, namely, micro-level studies and macro-level studies. The former type of studies assigns central role to socio-demographic aspects of the workers abroad and their family members, such as age of migrant, marital status, education and skill level, duration of stay, occupation, number of dependents etc. in remittance determination. The later category, macro-level studies, considers the responsiveness of inward remittances to aggregate variables probing the economic status of the home and host countries, stock of migrants, price level, exchange rate, development of financial market, profit margin and risk structure etc. alongside political and institutional factors. In addition one has to be cognizant of the studies where altruistic and self-interest approaches are used side by side for investigation purposes.

Investigating the factors responsible for variation in inward remittances a study by IMF (2005) confirmed that impact of economic performance of the labor-exporting countries remained significantly negative. Testing the response of remittances in percent of GDP and remittances per capita with respect to a given group of regressors Shrooten (2005) found that both the dependent measures experience fell when there was a rise in domestic per capita GDP. It was found that remittances in percent of GDP and remittances per capita fell by 0.8% and 0.6%, respectively, when per capita GDP of the transition states rose by 1% during the period under consideration. Aghbegha (2006) reported significantly inverse relationship between remittances and domestic income (proxied by per capita GDP. To proxy ‘hardship’ Bougha-Hagbe (2006) employed agricultural GDP so that altruistic behavior could be investigated in respect of some Middle East and Asian countries. As remittances bubbled with an increase in hardship, therefore, it was argued that funds transfers from overseas workers took place on altruistic grounds.

Another group of studies has proved the behavior of remittances pro-cyclical. Research outcome of a study by Ahmad (2008) verified dominance of self-interest in the transfers made by Pakistani diasporas. The two variables, namely growth rate and GDP, used for the purpose remained positively significant over the

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5. For further proof of countercyclical nature of remittances see Gupta (2005), Sayan (2006), Caulibaly (2009), Shahbaz and Aamir (2009), Singh et al. (2010), Bough-Hagbe (2004) etc.
study period. Authenticating the pro-cyclical\textsuperscript{6} nature of remittances Lueth and Ruiz-Arranz (2007) estimated that a one percentage point rise in real domestic income has swollen transfers from overseas Lankans by 2%.

The positive role of number of workers abroad is unanimously recognized in determination of remittances. Using migration of workers from a set of home countries to OECD only Niimi and Slarodan (2006) found that remittances rose by 7% to a 1% increase in stock of migrants. A study by Barua, Alauddin and Akhtaruzzaman (2007), in respect of Bangladesh, over 1993-2005 periods, substantiated the remittances promoting role of Bangladeshi residents abroad. Other studies that corroborated positive association between remittances and migrants’ stock abroad include Gupta (2005), Singh et al. (2010), McCormick and Wahba (2000), Elbadawi and Rocha (1992), Zaman and Ramzan (1996).

A lot of differences among the authors exist regarding the effect of depreciation or appreciation of domestic currencies on remittances. Probing the remitting attitude of Filipinos Dakila and Claveria (2007) found weakening of Peso against a basket of partner countries’ currencies significantly remittances enhancing. Barua et al. (2007) asserted that depreciation of domestic currency relative to partner countries paid dividends. Supporting wealth effect on the basis of their research findings Shahbaz and Aamir (2009) and Zaman and Ramzan (1996) argued that a weak Pakistani Rupee in forex market always attracted extra remittances to the country. Utilizing quarterly data from 1994Q1 to 2009Q4 Lin (2010) found remittance decay impact of Tongan’s currency appreciation in real terms.

Presenting the opposite occurring Lueth and Ruis-Arranz (2007) estimated nearly 0.8% reduction in remittances to Sri Lanka when domestic currency depreciates by 1 percentage point against US dollar over the sample period. Hysenbegasi and Pozo (2002, 2006) asserted that instability in foreign exchange market would always induce expatriates to reduce their transfers till termination of the crisis. According to the authors a fall in range of 18-25 percent in remittances was expected during the crisis episode in forex market. The same negative impact of exchange rate was confirmed by Lianos (1997) for Greece.

Existing literature on remittances is unable to present a single opinion about the role of economic stability at macro level. Barua et al. (2007) argued that rising domestic prices in comparison to host country’s inflation rate decayed funds transfers from abroad. Remittances to Turkey were found falling when the impact of domestic inflation, along other determinants, was investigated during the study period from 1964 to 1993 (Aydas, Bilin & Kivincin, 2005). The same results have been realized during studies by Elbadawi and Rocha, (1992).

To investigate the behavior of the per capita remittances Shahbaz and Aamir (2009) analyzed a sample for 1971 to 2006. Results of the study authenticated that variation in remittances and inflation goes hand in hand. A study by El-Sakka and McNaab (1999) also supported the positive role of inflation in funds transmission by Egyptians residing abroad.

4. Data and methodology

Going through the available literature one finds some macro level factors often employed by researchers when identification of variables responsible for changes in the volume of remittances is the prime objective. In this particular study efforts are made to measure the impact of a brief set of macro level variables, namely per capita income (Pci), number of workers abroad (Wn), exchange rate (Exr) and, domestic rate of inflation (Dinf) on remittances to Pakistan during the 1973-2010 periods.

The proposed model is presented in log-linear form as:

\[ \ln Rem = \alpha_0 + \alpha_1 \ln Pci + \alpha_2 \ln Wn + \alpha_3 \ln Exr + \alpha_4 \ln Dinf + \mu_t \]  \hspace{1cm} (1)

\textsuperscript{6} Other studies that confirm procyclical nature of remittances include Apaa-Okello and Anguyo (2006), Alleyne et al. (2008), Mouhoud et al (2008), Aydas et al. (2005), El-Sakka and McNaab (1999) among others.
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Where
\[ \alpha_1, \alpha_2, \alpha_3 > 0 \text{and } \alpha_4 < 0 \]

Rem – Remittances to Pakistan in real terms expressed in US dollar
Pci – Per capita income at home in real terms
Wn – Number of workers proceeded abroad each year
Exr – Nominal exchange rate
Inf – Domestic rate of inflation

For data purposes Hand Book of Statistics on Pakistan Economy 2010 and Bureau of Emigration and Overseas Employment (BE&OE) are exploited. To convert nominal remittances and per capita income into real terms GDP deflator of the corresponding years is used. Furthermore, exchange rate of Pak. Rupee against US dollar is exploited for expressing per capita income in US dollar. Data on all variables corresponds to financial years except data on Wn, where the number of Pakistani workers abroad belongs to calendar years.

This study analyzes secondary data over the period 1973 to 2010. The method of co-integration is followed for fixation of any long run relationships that may exist among the variables. However, before establishment of any association among the variables stationarity of each data series is checked. Augmented Dickey-Fuller (ADF) test is used to probe the prevalence or otherwise of unit root with intercept and trend and intercept. To check the response of remittances to variation in the set of explanatory variables the Autoregressive Distributive Lag (ARDL)/bounds testing approach, popularized by Pesaran, Shin and Smith (2001), is utilized by the study. Preference of ARDL approach under the present study over other co-integration techniques is justified on several grounds including its i) efficiency in small sample case ii) capacity to estimate short run and long run effects side by side iii) applicability even if variables are integrated of different order and iv) unbiased estimation of the parameters even if some regressors remain endogenous (Harris and Sollis, 2003).

Therefore, employing ARDL approach the UECM under the present study is of the form:

\[
\Delta \ln \text{Re}_t = A + \sum_{i=1}^{m} \alpha_i \Delta \ln \text{Re}_{t-i} + \sum_{i=0}^{n} \beta_i \Delta \ln \text{Pci}_{t-i} + \sum_{i=0}^{n} \gamma_i \Delta \ln \text{Wn}_{t-i} \\
+ \sum_{i=0}^{n} \theta_i \Delta \ln \text{Exr}_{t-i} + \sum_{i=0}^{n} \sigma_i \Delta \ln \text{Inf}_{t-i} + \psi_1 \ln \text{Re}_{t-i} + \psi_2 \ln \text{Pci}_{t-i} \\
+ \psi_3 \ln \text{Wn}_{t-i} + \psi_4 \ln \text{Exr}_{t-i} + \psi_5 \ln \text{Inf}_{t-i} + \mu_t
\]  

(2)

Where \( \Delta \) is difference operator, \( A \) represent intercept and, \( \mu_t \) denotes error term.

Under the bounds testing approach first of all equation (2) has to be estimated by OLS so that long run relationship among the variables could be investigated by carrying an F-test or Wald test employed for checking the significance of lagged level variables jointly. That is, the null hypothesis: \( \psi_1 = \psi_2 = \psi_3 = \psi_4 = \psi_5 = 0 \) (no co-integration) is tested against the alternative hypothesis: \( \psi_1 \neq \psi_2 \neq \psi_3 \neq \psi_4 \neq \psi_5 \neq 0 \) (co-integration) If the computed F-statistic remains less than the lower bound critical value null hypothesis cannot be rejected. On the other hand, if the computed F-value is greater than the upper bound critical value then the alternative is accepted and long run relationship among the variables is validated. Inference remains inconclusive in case the realized value falls within the bounds.

After confirmation of co-integration among the variables the conditional ARDL long run model is estimated in the second step. Long run model to be estimated is of the form:

\[ \]

7 Lower bound and upper bound critical values are extracted from Pesaran et al.(2001).
\[
\ln \text{Re}m_t = A + \sum_{i=1}^{m} \psi_i \Delta \ln \text{Re}m_{t-i} + \sum_{i=0}^{n} \psi_i \Delta \ln Pci_{t-i} + \sum_{i=0}^{o} \psi_i \Delta \ln Wn_{t-i} \\
+ \sum_{i=0}^{p} \psi_i \Delta \ln Exr_{t-i} + \sum_{i=0}^{q} \psi_i \Delta \ln Inf_{t-i} + \mu_t
\]  

(3)

Order selection of the ARDL \((p,q)\) model is based on Schwarz Bayesian criterion. Finally, to get the short run dynamic parameters an error correction model (ECM) is estimated. Under the present study the specified ECM is:

\[
\Delta \ln \text{Re}m_t = A + \sum_{i=1}^{m} \alpha_i \Delta \ln \text{Re}m_{t-i} + \sum_{i=0}^{n} \beta_i \Delta \ln Pci_{t-i} + \sum_{i=0}^{o} \gamma_i \Delta \ln Wn_{t-i} \\
+ \sum_{i=0}^{p} \theta_i \Delta \ln Exr_{t-i} + \sum_{i=0}^{q} \sigma_i \Delta \ln Inf_{t-i} + \lambda ECT_{t-1} + \mu_t
\]

(4)

Where, \(\alpha_i, \beta_i, \gamma_i, \theta_i\), and \(\sigma_i\) are the short run coefficients of the model, \(\lambda\) is speed of adjustment. And, \(ECT\) stands for error correction term obtained from equation (2).

5. Empirical Findings and Discussions

Prior to application of bounds testing technique stationarity of the data series is checked with the help of ADF test. All this is required to determine that no series is stationary at an order higher than \(I(1)\), otherwise, the computed \(F\)-statistics would stand invalid. Result of the ADF test are presented in Table 2, below.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Without Trend</th>
<th>With Trend</th>
<th>Decision</th>
</tr>
</thead>
<tbody>
<tr>
<td>lnRrem</td>
<td>-2.282</td>
<td>-1.809</td>
<td>__</td>
</tr>
<tr>
<td>lnRpci</td>
<td>0.034</td>
<td>-2.010</td>
<td>__</td>
</tr>
<tr>
<td>lnWn</td>
<td><strong>-3.214</strong></td>
<td><strong>-3.847</strong></td>
<td>(I(0))</td>
</tr>
<tr>
<td>lnNer</td>
<td>0.839</td>
<td>-2.533</td>
<td>__</td>
</tr>
<tr>
<td>lninf</td>
<td>-2.375</td>
<td>-2.393</td>
<td>__</td>
</tr>
<tr>
<td>ΔlnRem</td>
<td>-3.639</td>
<td>-3.699</td>
<td>(I(1))</td>
</tr>
<tr>
<td>ΔlnPci</td>
<td>-5.118</td>
<td>-5.086</td>
<td>(I(1))</td>
</tr>
<tr>
<td>ΔlnWn</td>
<td>__</td>
<td>__</td>
<td>__</td>
</tr>
<tr>
<td>ΔlnExr</td>
<td>-4.199</td>
<td>-4.201</td>
<td>(I(1))</td>
</tr>
<tr>
<td>ΔlnInf</td>
<td>-7.059</td>
<td>-7.225</td>
<td>(I(1))</td>
</tr>
</tbody>
</table>

Critical value for the ADF statistic without trend and with trend are \(-2.95\) (p = \(0.05\%\)) and \(-3.54\) (p=0.05%), respectively. And \(\Delta\) is the first difference operator.

All of the variables presented in Table 2, above, are difference stationary except the number of workers’ series which stand stationary even at level. Therefore, ARDL is employed to investigate the impact of chosen regressors on remittance inflows to Pakistan during the study period. Under the bounds testing approach equation 2 is estimated so that long run relationship among the variables could be enquired. Value of the computed \(F\)-statistic is tabulated against the lower bound and upper bound critical values in Table 3 below.
Table 3: Results of Bounds Test

<table>
<thead>
<tr>
<th>Computed F-statistic: 6.945</th>
</tr>
</thead>
<tbody>
<tr>
<td>Critical values</td>
</tr>
<tr>
<td>Lower bound</td>
</tr>
<tr>
<td>1% significance level</td>
</tr>
<tr>
<td>5% significance level</td>
</tr>
</tbody>
</table>

Critical values are obtained from Pesaran et al. (2001), pp. 300, table CI (iii) Case III: Unrestricted intercept and no trend

As the computed value of F-statistic (6.945) exceeds the upper bound value at 5% and 1% percent level of significance (see table 3), therefore, rejection of the null hypothesis and confirmation of co-integration remittances and among the explanatory variables is the outcome.

After smelling co-integration among the variables equation 3 is utilized for estimation of long run coefficients. However, before selection of an ARDL model one has to decide about the proper lag length. Under the present study Schwarz Bayesian Criterion is employed for the purpose. Results of the selected ARDL (1,1,1,1,0) are reported in table 4.

Based on tabulated values in table 4 all variables are substantiated with expected signs. Per capita income top the list of variants as far as inward remittances to Pakistan are concerned. A one percentage change in real per capita income is expected to boost inflow from abroad by more than three and a half percentage points. The outcome of this study is inline with the findings of Ahmad (2008) where dominance of self-interest substantiated. That is, Pakistanis abroad are found to respond positively to the economic cycles back home. Other studies that support the findings of this study includes El-Saaka and McNaab (1999), Aydas et al. (2005) and Lueth and Ruis-Arranz (2007) among others. Another variable that has a healthy impact on remittances is exchange rate, with associated elasticity of 1.31. This means that workers abroad are inclined to accelerate accumulation of wealth and exploitation of investment opportunities back home as home products become cheaper relative to those where they work. Other studies that found positive impact of exchange rate on inflows of remittances to the country includes Zaman and Ramzan (1996) and Shahbaz and Aamir(2009). Stock of work force is also found positively associated with remittances. When the number of Pakistanis abroad rise by one percentage point, remittances to home increase by nearly half a percentage point. The only factor that plays a remittances deterring role is the domestic rate of inflation. Remittances are found to fall by 32% when average price level at home rises by 100%. All this means that stability at macro level and investment friendly climate play a decisive role in remittance channeling to the country. This contradicts the findings of Shahbaz and Aamir(2009) where an altruistic behavior on the part of Pakistani emigrants is demonstrated.

After confirmation of strong long run relationship among the variables one dares to estimate the short run dynamic coefficients. To know about the short run elasticities and adjustment mechanism Error
Correction Model (ECM) specified in equation 4 is estimated. The results of ECM for the selected ARDL (1,1,1,1,0), based on SBC, are reported in table 5.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>St. error</th>
<th>t-statistic</th>
<th>Prob:</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>-15.0283</td>
<td>3.9006</td>
<td>-3.8528*</td>
<td>0.001</td>
</tr>
<tr>
<td>ΔlnPci</td>
<td>0.40129</td>
<td>0.68834</td>
<td>0.58298</td>
<td>0.564</td>
</tr>
<tr>
<td>ΔlnWn</td>
<td>0.021319</td>
<td>0.10666</td>
<td>0.19988</td>
<td>0.843</td>
</tr>
<tr>
<td>ΔlnExr</td>
<td>-2.0792</td>
<td>0.90067</td>
<td>-2.3085**</td>
<td>0.028</td>
</tr>
<tr>
<td>ΔlnInf</td>
<td>-0.19332</td>
<td>0.053379</td>
<td>-3.6216*</td>
<td>0.001</td>
</tr>
<tr>
<td>ECT_{t-1}</td>
<td>-0.59789</td>
<td>0.10140</td>
<td>-5.896*</td>
<td>0.000</td>
</tr>
</tbody>
</table>

ECT = lnRem – 3.6715lnPci – 0.48436lnWn – 1.3102lnExr + 0.32333lnInf + 25.1356C

\[ R^2 = 0.74716 \quad \text{and} \quad \tilde{R^2} = 0.67492 \]
\[ F\text{-stat. (5, 31)} = 16.5484 [0.000] \]
\[ AIC = 14.7992 \quad \text{SBC = 7.5500} \]

*, ** denotes significance at one percent and five percent, respectively.

Results presented in table 5 project that per capita income and stock of workers lose their significance in the short run, because variation in both variables cannot be made on short notice. Hence, they are more relevant to the long run. Variable that play a more aggressive role in the short run is exchange rate, though, with opposite sign. Fall in remittances to depreciation of local currency is understandable. In the short run remitters may prefer their money locked till a new rate is established in foreign exchange market. No drastic change in role of inflation rate is noticed when frame of reference changes from long run to short run. Bearing the same sign the variable remains significant in the short run with parameter lower than it carries in long run. More importantly the estimated coefficient of error correction term (ECT) remains highly significant with negative sign, further authenticating the existence of long run association among the variables. The coefficient of the ETC (-0.59789) suggests that long run equilibrium is restored in a time period less than half a year. That is, any deviation from the stable equilibrium path is corrected within less than six months time.

Figure 1: part a
At the end Cumulative Sum (CUSUM) and Cumulative Sum of Squares (CUSUMSQ) plots are employed to check the stability of long run and short run parameters of the ARDL-ECM. As depicted in part...
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a and part b of figure 1, above, CUSUM and CUSUMSQ plots passes within the 5% critical frontiers, therefore, stability of the long run and short run coefficients is recognized.

6. Conclusion

In this study an effort was made to identify factors responsible for variation in remittances channeled formally by Pakistanis emigrants over the study period. Findings of the study reveal positive impact of domestic real per capita income, stock of workers abroad and, exchange rate depreciation on remittances to the country in the long run, while a rise in domestic prices discourages inflows from abroad. The positive role of per capita income can be justified on two grounds. Firstly, rising per capita income enables households to finance migration of additional members of the family thereby further expanding the remitting capacity of Pakistani diaspora and, secondly business minded emigrants might accelerate transfers so as to grab earning opportunities provided by the expanding performance of the domestic economy. Similarly, increase in inward remittances in response to depreciation of local currency implies that wealth effect is in operation. Overseas Pakistanis are also found to take health of domestic economy into account in their remitting decisions. All this means that economic stability, investment friendly environment, realistic exchange rate, and exportation of surplus labor force can play a significant role in accumulation of remittances.

References


Appendix

Table 1: Decade-wise Average Annual Inflows of Remittances*(US $ Billion)

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Source: Migration and Remittances Fact Book 2011, 2nd ed. The World Bank
* Author’s calculations
** Handbook of Statistics on Pakistan Economy 2010, SBP
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