Remittances Flow to Pakistan: A Gravity Approach

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ABSTRACT

This study investigates macroeconomic determinant and potential of remittances flow to Pakistan from selected 12 major partners, using the augmented Gravity model on panel framework from 1995 to 2012. The Generalized Least Square technique is used to explain the macroeconomic behaviour of remittances flow. The result shows that the standard Gravity variables explain the remittances flow, and the result of augmented variables shows that the real exchange rate and inflation rate have significant positive, whereas the interest rate has significant negative impact. The binary variable for common language and GCC shows significant positive impact indicating importance of the Gulf region and common language for remittances flow. The potential of remittance flow shows existence of high potential in Japan, Germany, Norway, Qatar and Kuwait respectively. It urges Pakistan to send migrant workers to potential economies, and make domestic environment investment friendly and reduce interest rate to encourage remittances.

Keywords: remittances flow, gravity model, panel data, Pakistan

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1. INTRODUCTION

The remittance inflow is the major source of foreign exchange reserve and payments for developing countries, which are persistently facing chronic trade and fiscal deficit. According to the United Nation, (2013), there are 232 million international migrants in the World, of which 59 percent live in developed and 41 percent in developing economies. The developing economies receive 60 percent of total world's remittance flow, accounting 414 billion in 2013[2]. The South Asian economies are major migrant sending countries and remittance inflow is an important source of international investment and foreign exchange reserve.

Pakistan is a capital deficient country of 180 million peoples with highly sluggish trade and economic growth performance. It is characterized by lower investment and productivity growth. It sends migrant workers and remittance received is a major source of capital flow. Approximately 7.4 million Pakistanis are working around the globe and send $15 billion remittances in 2013. The migrant workers are broadly categorized into two groups. First groups comprise professional and qualified workers migrate and settle in developed economies and second group comprise short term low skilled migrant workers. The first category migrants found in developed economies, i.e. USA, UK, Germany and France, and second group of migrant, is major sources of remittances, is found in Gulf countries. The Saudi Arabia and UAE are major economies contributing 30 and 20 percent respectively. The figure 1 in appendix shows that the share of Saudi Arabia has increased from 20 percent in 2007 to 30 percent in 2012. The Middle East emerged as largest markets for lower skilled temporary migrants, which is followed by developed European, 28.3 percent, and American economies, 16.2 percent. The remittances from developed economies is determined by the traditional trading partners, i.e. USA 15 percent and UK 14 percent, see figure 2 in appendix. The remittance from USA has drastically reduced from 34 percent in 2001 to 15 percent in 2012, whereas that of the United Kingdom has modestly increased from 7 percent in 2001 to 14 percent in 2012.

This study investigates macroeconomic behaviour of remittance flow to Pakistan from major 12 partner countries, using Gravity model on panel framework. The remittances flow is modelled using economic conditions of home and partner countries, and estimated model is then used to analyse potential of selected partners to send remittances. The rest of this study is organized as follows: Following the introduction in section 1, section 2 reviews selected empirical literatures. The methodology and data issues are discussed in section 3, and results are presented in section 5, whereas section 6 concludes the study with policy recommendations.

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[2] The World Bank, (2013).

2. LITERATURE REVIEW

This section discusses impact of remittances flow on economic growth, and reviews selected empirical literature on determinants of worker remittances.

2.1. Remittances and Economic Growth

The International remittance according to Jr, (2009), is the money transferred to the household, by the migrant workers working outside the country of their origin. The remittance is the largest source of international capital flow to developing countries, Barajas, (2009). The remittance flow to developing countries are expected to reach 414 billion in 2013. The World Bank expects an average annual growth of 8 percent during 2013-2016. South Asian economies are major recipient of worker remittances, accounting $115 billion in 2013 and expected to reach $154 billion in 2016[3]. Pakistan ranked top 8th recipient of worker remittances with an annual flow of $15 billion in 2013.

The empirical studies urge mixed impact of remittances on economic growth of recipient economy. (Stark and Lucas, 1988; Faini, 2002), argues that the remittances have a significant growth enhancing impact. Mughal, and Anwar, (2012), urges that the remittance flow increases economic prosperity and reduces poverty level and economic disparities. Siddique, et al., (2012), found that the remittance leads to productivity growth in Bangladesh, India and Sri Lanka, whereas (Barajas et al, 2009; Chamia, 2003), found no relationship between remittances and economic growth, whereas Jawaid and Raza, (2014), urges that the remittances flow has significant positive impact on India, Bangladesh, Sri Lanka and Nepal, whereas negative impact is observed in economic growth of Pakistan. The rest of this section discusses channels through which remittances affect economic growth of recipient economy.

2.1.1. Aggregate Demand

The inflow of remittances increases domestic purchasing power which results increase in aggregate demand for consumption, which induces investment and productivity growth. Adams, (2006), urges that the consumption expenditure constitute the largest portion of remittance in recipient economy. The increase in demand for consumption goods induces productivity growth and employment level.

2.1.2. Financial Development

The remittances send by the migrant workers are an important source of international payment and investment in capital deficient developing economies. The flow thus develop financial sector of recipient countries and provide liquidity for international transactions. (Levine, 1997; Rajan and Zingales, 1998) urges that the poor economic performance of many developing countries is due to

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[3] Migration and Development Brief, the World Bank, (2013).

inadequate finance.   The remittances constitute the largest source of external finance in developing economies. Giuliano, and Arranz, (2009), argue that the remittance flow increases economic growth host developing economies through financial sector development. Qayyum, and Nawaz, (2014), urges that remittances flow to Pakistan increase steady-state output growth and capital stock through financial development.

2.1.3. Dutch Diseases

 The remittance flow according to Dutch disease perspectives, negatively affects economic growth of recipient countries through appreciation of real exchange rate and distorting the trade balance. The Swan-Corden-Dornbush model, argues that the remittances induces aggregate demand results increase in domestic price level and exchange rate. Rodrik (2008) urges that the appreciation of real exchange rate makes the country's exports expensive and deteriorates competitive position of exports in international markets. Makhloof, and Mugal, (2013), investigated Dutch Diseases in Pakistan arising from international remittances by investigating its impact on the real effective exchange rate. The findings shows that the remittances from Persian Gulf contribute to the Dutch disease, whereas those of North America and Europe do not. Javaid, (2009), urges that the remittances flow exert upward pressure on real exchange rate and causes Dutch Diseases phenomena of South East Asian economies.

2.1.4. Labour Market

The outflow of migrant workers from remitting economy results, decrease in available labour force and increase cost of labour. The outflow of labour thus results in the declining competitiveness of recipient economy, Bussolo, and Medvedev, (2007). Pakistan is labour intensive economy with 13 million unemployed workforce. The lower domestic and foreign investment along with sluggish productivity growth and unemployment level of Pakistan negates stated supposition.

2.2.   Review of Empirical Literature

The review of above discussed empirical literatures urges mix impact of remittances on economic growth of recipient economy. This section reviews selected empirical literature on macroeconomic determinants of migration and remittances.

Nishat, and Bilgrami, (1993), investigated determinants of worker remittances in Pakistan using survey data of 7061 migrants from Gulf countries. They investigate motivational behaviour of these migrant towards remittances based on altruism and self-interest theories. The dependent variable in monthly remittances in rupees which is explained by a set of explanatory variables such as income, overseas experience, number of dependents, family status, value of property, year of schooling and other dummies. The results show both altruism and self-interest motives determine remittances. They

suggested sending unskilled and less educated workers, and attractive business investment opportunities to attack remittances.

El-Sakka, and Mcnabb, (1999), investigate macroeconomic determinants of migrant remittances to their countries of origin. They use annual data of Egypt for the period of 1965 to 1991 for cash remittances and 1974 to 1991 for imports financed through remittances. The result shows that the both exchange rate and interest rate differential are important in attracting remittances. The results also show that imports financed through remittances have higher income elasticity, suggesting either imports are consumer durable and luxury goods.

Lueth, and Ruiz-Arranz, (2006), applied Gravity model to explain bilateral migrant remittances of major remittance recipient developing countries, i.e. Bangladesh, Croatia, Indonesia, Kazakhstan, Macedonia, Moldova, Philippines, Serbia, Montenegro, Slovenia, Tajikistan and Thailand. The result shows that the Gravity model explained remittances flow quite well as 50 percent variation in remittances flow explained by few gravity variables. The model is later extended the model and approached 85 percent explanation of variation.

Vargas-Silva, and Huang, (2006), investigate whether the macroeconomic condition of the host country or recipient country determine worker remittances, using data of Brazil, Colombia, the Dominican Republic, El Salvador, Mexico and the USA. Two data sets from 1881: 1 to 2003:4 is used in this study: the first dataset contains US net aggregate remittance flows with the rest of the world and the second dataset contains remittance received by the Mexico. Time series variance decomposition, impulse response function and Granger causality analysis derived from the vector error correction model is used to explain macroeconomic behaviour. The results indicate that remittances respond more to change in condition in the host country than macroeconomic conditions of the home country. The domestic poverty level, unemployment, economic and political stability of remitting country encourages outflow of workers.

Jr, (2009), investigate determinants of international remittances in developing countries. He aims to investigate what causes developing countries to receive different level of international remittances, using variables such as skill composition of migrants, poverty, interest rate and exchange rate. The panel data estimation technique is used to investigate the relationship. Panel work file comprising 76 lower and middle income developing countries. The findings show that countries with higher skilled migrant receives lower and lower skilled migrant sending country receives greater, per capita remittances. The result also shows that the poverty level of the migrant sending country does not have the positive impact of level of remittance inflow.

Lin, (2011), investigate the determinants of remittances to Tonga, using GMM in a dynamic panel with the lag value of the dependent variable, for the period of 1994Q1 to 2009Q1.The dependent variable is the growth of remittances in the quarter. In order to address potential

endogeneity concerns lagged values of real GDP growth of remitting countries, lagged unemployment rate, and lagged interest rate differentials. The finding of study shows that the macroeconomic condition of remitting countries and exchange rate fluctuation influences remittance. The findings of this study do not find any evidence of the Dutch Diseases in Tonga as the real exchange rate does not appear to be affected.

Ahmed, and Martinez-Zarzoso, (2014), investigate external and internal factors driving remittances flows from 23 source countries to Pakistan using Gravity model for the period of 2001-2011. The distinguishing factor is the use of transaction cost of remittance alternative to geographical distance. The result shows that several factors have significant effect on remittances such as an improved economic condition on receiving country, migrant stock in Pakistan, financial development has a significant impact and political stability, geographical distance, economic conditions and unemployment rate do not appear to play a substantial role. The findings of the study recommend policy to focus on the transaction cost of sending money.

The review of the above empirical literature identifies the economic condition, distance, inflation rate, interest rate, real exchange rate, etc., as major determinants of remittances flow. This study investigates the macroeconomic behaviour of remittance flow to Pakistan from selected major 12 partners. The estimated model is then used to determine potential of remittances flow from selected partners. The study thus explain behaviour and potential of remittances flow.

3. METHODOLOGICAL FRAMEWORK

3.1. Modelling Remittances Flow

The Gravity model was introduced to international trade and capital flow by Tinbergen in 1962. It describe most stable relationship in international economics, that is, the economic interaction between larger economies is stronger than smaller one, and closer economies attack more than far off. The standard Gravity model of remittance flow is presented as follows:

$$WR_{ijt} = \beta_{i1} + \beta_2 Y_{it} + \beta_3 Y_{jt} + \beta_5 D_{ij} + \mu_{it} \qquad (1)$$

Where: Wij presents remittance flow to Pakistan i from partners j, Yi presents real domestic product of Pakistan measure for domestic production capacity, and Yj is the real economic condition f trading partner. The Dij is bilateral distance from capitals measured in Km. The standard Gravity equation 1 is augmented by the addition of macroeconomic variables such as the bilateral real exchange rate (RERij), domestic inflation, domestic interest rate and dummy variables for countries with a common

official language (LANGij), and Gulf countries (GCC). Ln presents natural log. The augmented Gravity model of worker remittances is presented as

$$LnWR_{ijt} = \beta_0 + \beta_1 LnY_{it} + \beta_2 LnY_{jt} + \beta_3 LnD_{ij} + \beta_4 LnRER_{ijt} + \beta_5 LnINF_{it} + \beta_6 LnRT_{it} + \beta_7 CLANG_{ij} + \beta_8 GCC + \mu_{it} \qquad (2)$$

The real bilateral exchange rate with trading partner of Pakistan is not directly available and generated using data of the nominal exchange rate and relative prices (measure by relative GDPDs).

$$RER_{ijt} = ER_{itj}\left(P_{Jt}/P_{it}\right) \qquad (3)$$

Where, $ERij$ is the bilateral exchange rate, P_j is price level trading partner and P_i is price level in Pakistan. As per theory of Gravity model and empirical literatures, the coefficients β_1, β_2, β_4 and β_6 are expected be positively associated, whereas β_3 and β_5 are negatively associated with remittance flow. The dummy variable coefficients β_7 and β_8 are assumed to positively associated.

3.2. Potential of Remittance Flow

Following, Helmers et al., (2005), the ratio of predicted and actual remittance flow is used to investigate potential of remittances flow to Pakistan from selected major economies.

$$WRp_{ijt} = \frac{\sum \overline{WR}_{ijt}}{\sum WR_{ijt}} \qquad (4)$$

Where: WRp_{ijt} is potential of remittance flow, $\sum \overline{WR}_{ijt}$ is the predicted export flow, whereas $\sum WR_{ijt}$ is the actual flow. The value of indices $WRp_{ijt} > 1$ indicates that the actual flow is lesser than predicted indicating untapped potential, whereas the value $WRp_{ijt} < 1$ indicate that the actual flow is greater than predicted indicating exhausted potential. The value $WRp_{ijt} = 1$ indicates actual flow equals predicted.

3.3. Data

The annual data on remittance inflow to Pakistan from selected 12 major partners[4], from 1995 to 2012, has been taken from Economic Survey of Pakistan, published by Ministry of Finance, Govt.

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[4] Bahrain, Canada, Germany, Japan, Kuwait, Norway, Oman, Qatar, Saudi Arabia, UAE, United Kingdom and United States of America.

of Pakistan. The Data on GDP, inflation, interest rate, the official exchange rate, GDPD is taken from International Financial Statistics, published by the IMF. The data of distance and official language are collected from Centre d'Etudes Prospectives et d'informations internationales (CEPII). The GCC dummy is created valuing 1 if GCC member, 0 otherwise.

4. ESTIMATION RESULTS

This section will discuss results of Gravity model of remittances solved using Generalized Least Square (GLS) technique with cross sectional weight. The log linear model is used to address the problems of serial correlation and heteroskedasticity. The result of macroeconomic determinants of remittance flow, is presented in the Table 1.

TABLE 1. MACROECONOMIC DETERMINANTS OF REMITTANCE FLOW

Macroeconomic Variable	Generalized Least Square			Random Effect Model		
	Coeff.	t-Stat.	Prob.	Coeff.	t-Stat.	Prob.
C	-10.270	-8.516*	0.000	-8.586	-1.155	0.249
LnY_i	2.210	21.618*	0.000	2.148	6.067*	0.000
LnY_j	0.652	48.998*	0.000	0.966	7.747*	0.000
$LnDIS_{ij}$	-2.566	-42.960*	0.000	-3.100	-4.172*	0.000
$LnRER_{ij}$	0.468	60.512*	0.000	0.359	5.114*	0.000
$LnINF_i$	0.214	3.486*	0.001	0.330	2.033**	0.043
$LnRT_i$	-0.219	-5.891*	0.000	-0.371	-3.082*	0.002
GCC	1.177	19.800*	0.000	1.203	1.869***	0.063
$LANG_{ij}$	1.710	16.817*	0.000	1.216	2.903*	0.004
Diagnostic Tests						
Adjusted R^2	0.987			0.794		
Dw. Stat.	1.508			0.766		
F-Statistic	1980.288 (0.000)			104.524 (0.000)		
JB. Stat	0.196 (0.906)			4.417 (0.109)		
S.E of regression	1.007			0.469		
Bias Proportion	0.000			0.000		
Variance Proportion	0.111			0.017		

Source: Author's estimation. Note: *, ** and *** indicates significant at 1, 5 and 10 percent level respectively

The estimated result shows that the remittances flow to Pakistan is positively determined by the economic conditions of both countries involved and negatively determine by bilateral distance, validating the application of Gravity model on remittance flow. The real exchange rate shows a significant positive impact. The deprecation of real exchange rate by 1 percent results increase in remittance flow by 0.468 percent. The domestic inflation rate has significant positive impact on remittance inflow, indicating an increase in remittance flow to finance consumption expenditures. The result of interest rate shows significant negative impact, which implies that higher the interest rate lower the domestic investment and hence remittance flow for investment purpose. The result of

dummy variable shows that remittances flow from member of the GCC countries are 1.177 times greater than the rest of the world, and language dummies show that Pakistani workers trend to migrate towards countries with the same language, English. The remittances flow from countries with common language is 1.71 times greater than others.

The coefficient of determination shows that 98.7 variation in dependent variable is explained by the selected explanatory variables of the model. The result of JB. Stat. shows normality of residual, DW Stat. shows model does not contain serial correlation and F-stat. conform goodness of fit of the regression model. The result of S.E of regression, Bias Proportion and Variance proportion validates forecasting efficiency of the model.

The high explanatory power of the model along with favourable diagnostics test results, encourages use of the model to evaluate potential of remittance flow to Pakistan from selected trading partners. The actual and predicted value of remittances flow is used to investigate potential of remittances flow. The results are presented in the Table 2.

TABLE 2. POTENTIAL OF REMITTANCE FLOW

Trading Partners	1995	2000	2005	2010	2012
Bahrain	0.259	0.483	0.575	0.684	0.653
Canada	1.079*	1.576*	0.827	0.842	0.888
Germany	1.575*	2.078*	1.405*	1.386*	1.506*
Japan	1.798*	1.929*	1.938*	2.064*	2.759*
Kuwait	1.152*	1.014*	1.118*	1.094*	1.099*
Norway	1.180*	1.582*	1.362*	1.309*	1.360*
Oman	0.807	1.091*	1.009*	0.943	0.945
Qatar	1.043*	2.107*	1.017*	1.093*	1.129*
Saudi Arabia	0.893	0.974	0.946	0.902	0.925
UAE	0.557	0.727	0.800	0.755	0.740
United Kingdom	0.989	1.191*	1.051*	0.984	0.947
United States	0.829	0.976	0.821	0.854	0.873

Source: Author's calculation. Note * presents existing of potential.

The results show that the remittance flow from major partners has significantly exhausted potential with major partners, i.e. USA, Saudi Arabia, UK, UAE, Oman and Bahrain respectively, whereas potential is observed in Japan, Germany, Norway, Qatar and Kuwait respectively

5. CONCLUSION

This study investigate the macroeconomic determinants and potential of remittance flow to Pakistan from its major partners using augmented Gravity model, on panel framework of 12 cross sections for the period of 1995 to 2012. The model is solved using Generalized Least Square technique, and sensitivity analysis is performed by solving the model using the panel random effect model. The

predictive efficiency of model is tested using various diagnostic tests. The estimated coefficients of the model are then used to estimate the potential of remittance flow from selected partners based on actual and predicted value of remittances flow.

The result of the augmented Gravity model shows significant positive impact of the economic condition of the home and partner countries, and negative impact of bilateral distance. The result of real exchange rate and domestic inflation rate show significant positive, whereas that of domestic inflation shows significant positive impact indicating increase in remittance flow for the consumption purpose. The result of the interest rate shows significant negatively affects, and dummy variables show higher remittances flow from member of GCC and countries with the same language. The results remittances potential shows that the remittance from major partners has significantly exhausted potential with major partners, i.e. USA, Saudi Arabia, UK, UAE, Oman and Bahrain respectively whereas high potential is observed in Japan, Germany, Norway, Qatar and Kuwait. This study constraint by the sample size, urges Pakistan to make its domestic environment investment friendly and reduce interest rate to encourage remittances for investment purpose.
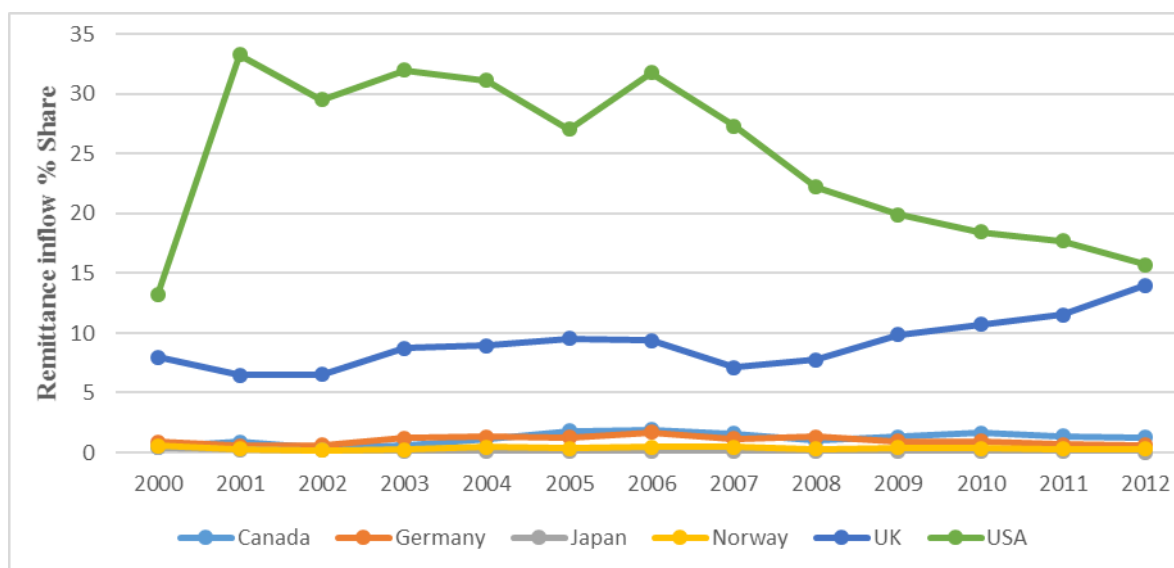
Appendix

FIGURE 1. REMITTANCES FLOW FROM GULF COUNTRIES
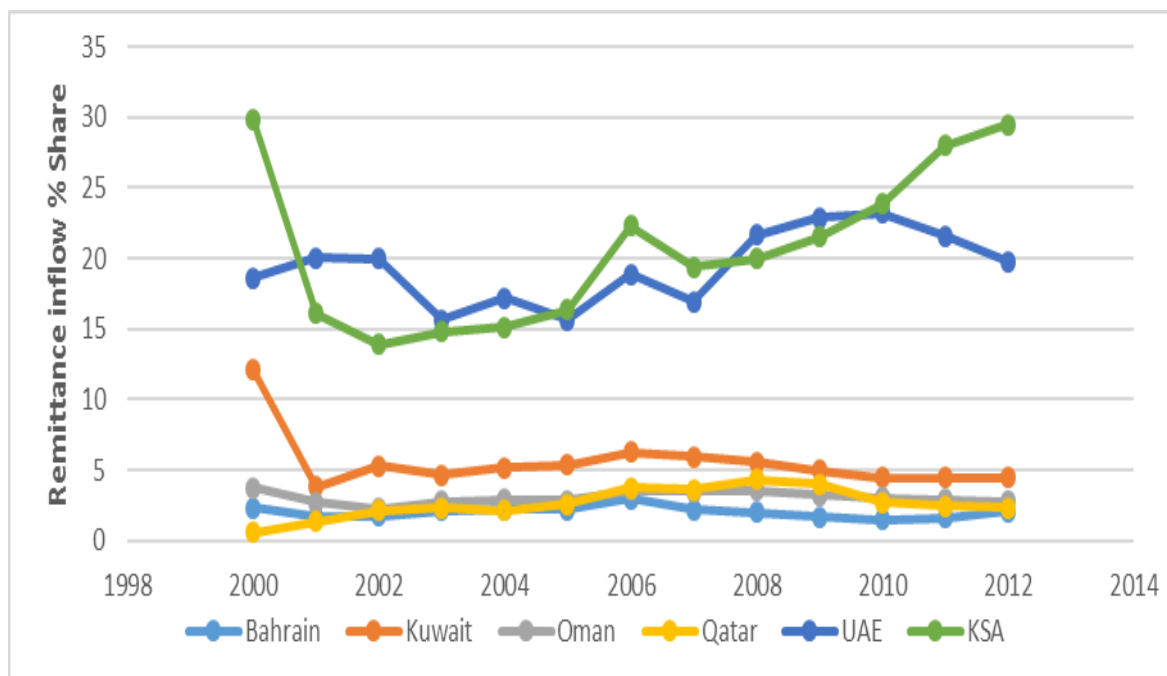
Source: Author: Data taken from Ministry of Finance, Govt. of Pakistan, (2012-13)

FIGURE 2. REMITTANCES FROM DEVELOPED COUNTRIES

Source: Author: Data taken from Ministry of Finance, Govt. of Pakistan, (2013)

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