Oil Prices and Workers Remittances in Pakistan: An Empirical Analysis

Submitted By

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16/ Mphil/PIDE/2009

Submitted To

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A Dissertation submitted to the Faculty of Pakistan Institute of Development Economics Islamabad in Partial fulfillment of the Requirement for the Degree of MPhil Economics

Pakistan Institute of Development Economics Islamabad

Acknowledgements

I would like to express my sincere gratitude to my dissertation supervisor Dr. Hasan M.Mohsin for his valuable cooperation, moral support, encouraging advices and motivation that helped me greatly for completing my research. He is well aware of the problems that students face during their research work. I have learned and experience lots of things under his capable supervision.

I am deeply obliged to my teachers who taught me well and provided knowledge related to different fields of economics.

I am also highly indebted to other people that informally supported me well including Dr. Ejaz Ghani, Mehmood Khalid, Ghulam Saghir, Noaman Akram, Iqrar Rizvi, Irfan Ali, Imran Ali, Raja Rehan, M. Ramzan, PIDE library staff, PIDE computer lab staff and many other people who supported me with various helpful material and suggestions.

Dedicated to my Mother and Father

Abstract

This study constructs the relationship of oil prices and worker's remittances from the Gulf Cooperation Council (GCC) to Pakistan. It formulates the effects of all six member countries which have not enough labor to work in the local industries. Pakistan has also lots of migrants in the GCC countries which gets a reasonable amount of remuneration and sent it back to their household. By using the Panel data estimation technique, it highlightes the multiple variables effects and also the sensitivity of oil prices with the worker's remittances. The other independent variables which also play quite significant role in effecting the pattern of remittances outflows to Pakistan. The countries which are endowed with huge oil reserves also get huge inflow from oil exports. This inflow results into rise in the demand for industrialization which in turn also arises with the demand of human resource. The Kingdom of Saudi Arabia and United Arab Emirates has huge inflow of foreign workers and most of the Pakistanis are also working over there. So these countries are most effective in the variations which also affect the international oil prices and also the outflow of worker's remittances. As GCC countries are countering the diplomatic situations, they should also focus upon their local industry whether it depends on the labor force which includes foreigners in huge number, so they should formulate the policy which favors the diasporas to work over as it is the main source of income their families living at home.

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Chapter One

1- Introduction

The world is teemed with different resources found in different countries of different continents. Every resource has its own contribution and value for the development of a certain nation. So the country having resources more than its own may export them to other countries where those resources are needed the most. In case of human resources, many countries export their human resources to other countries.. So workers are demanded from those countries which have more labor force from its own needs. Migrants while residing in labor importing country also get remuneration of the provided services in terms of local currency and they send their earned income to their families in their home country in order to fulfill the consumption requirement as well as incrementing investment opportunities in the country. At aggregate level, all the income received from migrants of a country from all over the world considered as remittances receipts of that country.

Workers' remittances flows vary from one country to another. Exchange rate is one of the significant factors that results into difference in the remittances flows. If a country has dominant currency in terms of exchange rate, it encourages more immigrants to come. Nevertheless, it may happen that a country having low valued currency with big population of immigrants to that country having more valued currency with small population of immigrants from the preceding one. So the flow of remittances of first country could be more than the latter country.

More than 200 million people who live outside their countries of birth sent home an estimated $316 billion in remittances in 2009 (Migration and Remittances, World Bank.org). This

increment shows that the flow of remittances had increased with the passage of time. The major labor importing countries are Kingdom of Saudi Arabia, United Arab Emirates, Kuwait, Qatar, Bahrain, United Kingdom, United States of America and Canada. If we take the case of developing countries, Pakistan is also one of those developing countries which get a relative share of remittances from its migrants abroad. According to Migration and Remittances Factbook 2011, 9 million people from Pakistan working in different nations in which 12.6% are skilled and trained people. It shows that as people working there, so they get paid in the local currency of the respective country and send back to their home country.

In April 2011, Pakistan aggregated international inflow as $1030.42 million which was around 4.2% of the GDP in 2008 (State Bank of Pakistan). The major share came from UK, USA and GCC[1] countries, which shows a clear indication of more external labor force over there. This surge in remittances inflows result in rise of the foreign reserves as they have reached $17 billion in April 2011. In Pakistan, the migrants altruistically sent remittances in order to fulfill basic consumption needs and to make their families' living standards enhanced. Meanwhile, workers' remittances need much attention regarding different factors affecting these flows. The cost of these flows is a big hurdle that reduces the net remittances. In Pakistan, the State Bank of Pakistan, Ministry of Finance and Ministry of overseas Pakistanis has initiated a program named, "Pakistan Remittances Initiative (PRI)", for the facilitation of flow of remittances free of any cost. Meanwhile, as shown in figure 01, we can see the graphical relationship of remittances from Kingdom of Saudi Arabia and United Arab Emirates with oil prices, showing the movement of these two variables is much symmetrical. It means that there is not much

[1] GCC stands for Gulf Cooperation Council include Bahrain, Kingdom of Saudi Arabia, , Kuwait, Oman, Qatar and UAE.

asymmetry except in few years, shows that rise in oil prices has a gradual impact over remittances flows.

1.1- Remittances

Remittances are basically the amount of money earned and goods purchased by a person from another country and transmitted back to his home country. Mostly, people from developing nations find highly remunerative jobs in developed nations but their family members are residing in their native country. The basic benefit for the people of developing nations working in developed countries is the difference in the exchange rate of currencies. So, when they send back to their home land and convert it to local currency, it enhances their well being.

According to International Financial Statistics (IFS) (International Monetary Fund (IMF) data base), remittances are added to balance of payment account in three sections which are, compensation of employees, workers' remittances and migrants' transfers. The first category represents the gross earnings of diasporas living for less than twelve months which is actually spent in the host country and never be remitted. The second category includes transfer of money from workers to their family living at home country for more than twelve months. The third category includes the migrant transfers which is basically the net wealth of workers who move from one country of employment to another. These remittances are sent through formal channels like postal services, banks, credit unions and money transferring organizations.

Beside these formal channels, there are also informal channels of remittances which are not actually recorded like sent via friends or member of the home country who are going back having sum of money which is received by the family member of the sender. The other informal channels in which money is not physically transferred is known as Hawala, Hundi etc. which are

active in South Asian countries like India, Pakistan and Bangladesh. This system includes different agencies which collect money from workers and workers' families collect it in their home country from any designated person or office authorized by the agency. So there is no official record for such kind of transfers because the amount given by the worker in host country is collected in the host country but the amount collected by the workers' family member is collected within the home country.

1.2- Oil Prices, GCC and OPEC

From the inception of the global economy, oil plays its vital role in providing the major share of energy along with other remaining sources throughout the world. So with the development of industrialized nations, oil demand has been increased. Hence the nations with oil production and obviously having exports of oil started acquiring huge oil revenues. So these revenues result into the development in these countries which are not been accomplished with the native workers.

Beside all this, GCC countries (excluding Bahrain and Oman) are also members of Organization of Petroleum Exporting (OPEC) Countries (which comprise two-third of the world's oil reserves) and they can collectively influence the world oil prices and other petroleum related products. Table 01 shows a brief description of GCC countries, about crude oil production, crude oil consumption, net export/import ratio and total oil exports to United States which is also one of the major importers of oil in the developed world. For all GCC countries, their own crude consumption is far less than their production (except Bahrain), so they export the remaining oil to other nations. The local demand for oil requires some production framework which means they also require some human capital for different industries. At one side, the excess production of oil by GCC countries is traded to get more and more revenues but on the other hand, the

imported human resource is hired to accomplish the production projects that in turn get remittances and send it to their home countries, these remittances are basically compensation to those nations which import oil. They ultimately send their people to earn more and more and return it back to their homeland.

As far as OPEC is concerned, its major role is to influence the world oil prices. The production level assigned to each country contains certain quota which means that each member country could produce more or less from the allocated quota. Hence, the size of the production results also into large revenue generation for oil exporting countries. OPEC has also played its role in the 1973 war with oil embargo, exerted more and more pressure on other developed nations to cease-fire and also provided with a stabilizing framework to overcome future threats. This oil embargo ceases the local production of the major oil importers which in turn made consolidated focus on economic repercussions. Later on in 1980, during Iran-Iraq war, Iraq increased its production of oil that afflicted the OPEC framework of setting world oil prices. This huge supply with a reduction in oil demand caused a decline in the world oil prices which ultimately caused a decline in the oil revenues of oil exporting countries.

The same situation persisted when Iraq invaded Kuwait from which OPEC found it not united and suffered severely with these inter-nations conflicts. During wars, there is replacement of imported labor occurs as most of the Arab migrants decreased which is being taken up by South Asians (Indians, Pakistanis and Sri Lankans) and South East Asians (Chinese, Filipinos and Malaysians) workers (Serageldin et. al 1984). This replacement might have occurred due to instability in the Gulf countries but South Asians and South East Asians had preferred to work

over there in those circumstances. The other reason might have been the level of unemployment and less employment opportunities in those countries[2].

Hence, expatriation towards Gulf from these regions provided quite profound work environment which helped a lot to groom the GCC economy. This is because the local labor is not well equipped to handle all the goods and service sectors and they also need proper consultation and support from professional and skilled people. So many people migrated there seeking variety of opportunities. Since 1971, around 3.6 million laborers from Pakistan preceded six Middle Eastern countries, mainly to Saudi Arabia which reached up to over seven million in 2005 including illegal immigrants and over-stayers (Ministry of Labor 2005). These people provided services there against suitable remunerations.

So an oil price hike generates profits which in turn create opportunities for investment that ultimately results in increased demand of man power. So, people want to work more in oil exporting countries and find fewer opportunities in other developed nations. On the other hand, the oil importing countries suffer with the rise in the oil prices which ultimately have a negative impact on domestic industry through which the local demand for labor decreases.

For a labor importing country, this rise in the demand for labor also increases remittances flows. Now, this seems quite obvious that oil prices can play a major role in changing remittances flows as different industries need oil as a source of energy that is also considered as a cost a capital. The oil exports to other countries especially labor exporting countries would be compensated with the inflow of remittances which overcome the extra price paid due to hike in the international oil prices. The oil exporting countries also acquire excess profits which are also

[2] The actual reason was the inter-country conflicts that created uncertainty and lack of pecuniary benefits.

shared with the imported labor force. This is not achieved recently but if we go decades back, oil price boom resulted into increasing demand of labor by GCC countries. Pakistani labor force had also moved to GCC countries which ultimately rise their percentage of total migrants' labor over there. So the impact of oil price hike remained in the later years with a consistent rise in the demand of external labor.

1.3- Objective

The purpose of this research is to outline the contagious relationship between oil prices and worker's remittances flows in Pakistan. The 1973 war formed a new scenario that forced the Gulf countries to oil embargo. This is the basic tool that produced sensation in the other oil importing nations which ultimately undertaken a serious concern for cease-fire. The conflict resolved after some time but the oil embargo produced huge oil revenues and also stimulated the local industry. The demand for labor in the next years remained consistent with the oil price hike provides some relationship that would be examined extensively in this research.

The remittances from GCC countries to Pakistan increased dramatically. Those remittances were 4.2 percent of GDP in 2008 which rose up to 5 percent in 2009 (World Bank). Many of the Diasporas including Pakistani migrants also kept on remitting huge remunerations to their native countries during oil crises. The purpose we set is to find out answers of many questions regarding remittances inflow as mentioned below:

- Does oil price play significant role in determining workers' remittances from selected Gulf countries?

- Do workers' remittances inflows change significantly during oil crises times or not?

- Is there any asymmetry in the flows of workers' remittances from selected Gulf countries to Pakistan?

The fundamental need of such questions deals with the behavior and outcomes resulted with the history of oil prices that the fluctuations mainly occurred due to the policies made by the oil producing nations. These countries are also dependent upon the foreign labor force through which, a huge outflow of remittances received by labor exporting nations, is also affected with the changing pattern of oil prices. So, we would estimate and analyze the effects of Gulf region war zone history that how much it has affected the remittances outflows and also the well-being of labor exporting nations.

Chapter Two

2- Literature Review

There is not so much vast literature regarding the relationship between oil prices and worker's remittances except few papers but we have tried our best to add the most conducive research that is related with issues regarding these. Our literature review includes different articles from the renowned journals. These papers have provided us with different dimensions of behavior of remittances and also for oil prices. The literature relevant to the dissertation has been classified into three groups which are, Publications related to Pakistan, Publications related to developing countries and other international publications[3].

According to Kock and Sun (2011), the recent increase in the flow of remittances to Pakistan originates mainly from the host countries in the Gulf and the rise in remittances from the United Arab Emirates became closer to the level of remittances from the United States. Morshed and Pitafi (2008) argued that, with the jump in oil price, domestic labor use decreases and labor export increases. They further elaborated that, oil price hike results into decline in the oil consumption, steady state capital and overall consumption. It shows that the impact of an oil shock is different today as it was in 1970s. In 1982-83, the inflow of remittances from the Middle East to Pakistan, through official channel was 2.4 billion US dollars and also the recent decline in the oil prices and slowing down of economic activity in the Middle East, has resulted in the reduction in the inflow of remittances (Burney (1987)).

[3] The papers reviewed are summarized and added in the appendix.

It means that the relationship of oil prices with workers' remittances is not anew phenomenon. On the other hand, the flow of migrant workers to these GCC countries has also increased from the last four decades. According to Amjad (1986), one third of the increase in the labor force during the years 1978-83, was absorbed by migration to the Middle East. It means that lots of migrants from the developing nations preferred to work in Gulf countries as the rise in oil prices and oil export revenues favored domestic industry resulting into rise in the demand for labor.

Nevertheless, remittances receipts are pro-cyclical for Sri Lanka (Leuth and Arranz (2007)) and counter-cyclical for India (Gupta (2008)). On the other hand, Leuth and Arranz also found that, remittances increase in response to oil price shocks, reflecting that most Sri Lankans are employed in the Gulf States. Naufal and Termos (2009) find the impact of remittances on remitting countries and they also have chosen GCC countries for their study. Their findings enhance the relationship of oil prices and workers' remittances but they restricted it only for the outflow of remittances from the oil exporting countries.

Kock and Sun (2011) explained the current situation of oil price hike and worker's remittances that higher skill workers have boosted the flow of remittances to Pakistan. They also find that higher earning capacity have increased the flow to remittances from people working in other countries to Pakistan. They also believed as like Lucas and Stark (1985) that, flow of remittances from the people working in developed labor importing nations to their native country is due to altruism.

So, as we can see that remittances and oil prices are the important topics which are still under discussion and many of the researchers are trying to find out new dimensions and methodologies. As we know, Remittances are very important source of foreign exchange reserve and also an

income (after exports) for every developing country. According to World Bank, the flow of documented remittances exceeds 300 billion in 2007. This rise in remittances flow show that people whether they are skilled or not want to work in other developed nations for highly paid jobs. The behavior to work abroad mostly encourages people, due to job conditions and the wage offered in their native country which seems quite low contrasted to their consumption expenditures.

Naufal and Termos (2009) use Panel data estimation approach with remittances from GCC countries taken as a dependent variable. The data set consists of unbalanced panel of six countries. So the problem of shortage of data is overcome with the help of the panel data estimation technique. A working paper written by Chami, Fullenkamp and Jahjah (2003) also discuss the importance of panel data estimation for 113 countries with the same reason of missing values in the data sets and to provide the heterogeneity in the estimated coefficients. Bouhga (2004) also discusses remittances motives for Morocco which is also a developing country having lots of workers abroad. According to Gupta (2005), growth of remittances in India rises with the increase in the total earnings of the migrants. She also concluded that periods of low economic growth tends to raise remittances flows. Suzan and Pozo (2004) explained the impact of workers' remittances on the real exchange rate by using panel data estimation approach for 13 Latin American and Caribbean nations. They also elaborated that, workers' remittances grown significantly in these countries from 1987 to 1997.

Beside remittances, we also reviewed most of the papers regarding oil. Hamilton (2003), reports the non-linearity of oil prices and its gradual impact on GDP growth. He further adapted different functional forms and explain the flexible approach of how oil prices affect the

economic activity. Katsuya Ito also explains the importance of oil price volatility and its impact on macroeconomic variables of Russia.

So we can easily conclude here that remittances are very important and lucrative for the development and standard of living for every developing nation. Pakistan is also one of the developing countries which are also suffering through with economic ups and down and due to energy crises, its exports are severely reduced. So in this case, remittances are one of the main contributors for overcoming the current account deficit and also compensate the job losses and reduction in the income level. The literature also discusses the importance of remittances at broad level whether it affects the macroeconomic variables of a certain nation or it is being affected from any international or local economic determinants. Therefore, our main objective here is to see how remittances flows from GCC countries are being affected from international crude oil prices and also some of the other control variables.

Chapter Three

3- Data and Methodology

By Starting with the main model of Morshed and Pitafi (2008), they elaborated that the reduction in output of a labor exporting country is mitigated by an accompanying increase in remittances from oil exporting countries. They also elaborated that hike in remittances resulted in rise in domestic capital and decline in domestic labor. They constructed an inter-temporal optimizing model for two small open economies in which one country imports oil and exports labor and the other country does the reverse. They analyzed effects of an oil price shock and changes in the remittances outflow on oil importing and labor exporting country. For oil exporting country, the profit from oil production is,

$$\pi = pf(L_m) - \omega L_m$$

Where π the total profit, p is the price of oil, ω is the wage rate and L_m is the imported labor.

Now, in labor exporting country, the household maximizes the following utility function,

$$\int_0^{\infty} U(C)e^{-\beta t}dt$$

The household uses capital (K), labor (L) and amount of oil used as inputs to produce output (N). So, the production function will be *F (K, L, N)*. The total income (domestic production and remittances) is used for consumption, oil import payments and for the creation of additional capital. So, the capital accumulation equation is,

$$\dot{K} = F(K, L, N) - C - pN + \omega L_m$$

Now, the Hamiltonian for this problem is,

$$H = U(C)e^{-\beta t} + \lambda e^{-\beta t}(F(K, L, N) - C - pN + \omega(1 - L))$$

and the transversality condition is,

$$Lt_{t\to\infty}\lambda K e^{-\beta t} = 0$$

After differentiating, all required functions, *dN/dP<0* implies a downward sloping oil demand curve. When the oil prices increase, the return from working abroad increases so, the labor exporting country exports more labor and uses less labor in the domestic production, yields *dL/dP<0*. An increase in labor will increase the marginal productivity of both labor and oil use

and thus more of these two factors will be used in production, i.e. *dN/dK, dL/dK>0*. This signifies the main theme of our study that how oil prices impact the workers' remittances and how it changes over the passage of time.

3.1- Methodological Framework

Variables which are the main focus of our research are *Oil Prices (Average of Dubai, UK Brent, Nigerian Forcados and West Texas) ($/barrel)* and *Remittances (million dollars) inflows* to Pakistan from all of the six GCC countries. There are also other control variables determining remittances outflows from GCC countries including *Oil Consumption, Oil Production, Rate of Interest* and *Per Capita GDP Differential (million dollars)* ranges annually from 1973 to 2010. The only dependent variable is remittances whereas the remaining variables are taken as explanatory variables. The major data sources for these data sets are, *International Financial Statistics (IFS) (CD version), British Petroleum (via web), Energy Information Administration ((EIA) (via web))* and *Handbook of Statistics (State Bank of Pakistan)*. The methodology chosen for this study is *Panel Estimation Approach*. The basic reason for choosing this is to get ease and accuracy in the estimation results for countries of the same region. The functional form regarding specification is as follows,

$$R = f(P, B, Pd, I, G) \qquad (1)$$

Where,

R= Remittances Inflows from GCC Countries to Pakistan

B= Oil Consumption (thousands barrel)

Pd=Oil Production

I= Interest Rate[4]

G=Per Capita GDP Differential

This specification comprises of unbalanced panel data of 6 cross sections and 38 time intervals having 228 observations in total. The general equation of our panel estimation is as follows,

$$R_{it} = \beta_0 + \beta_1 P_t + \beta_2 B_{it} + \beta_3 Pd_{it} + \beta_4 I_{it} + \beta_5 G_{it} + \alpha_i + \varepsilon_{it} \qquad (2)$$

Here *i* stand for cross sections whereas *t* stands for time interval. Here, α_i is the time constant factor (allowed to be correlated with price of oil) which captures all the unobserved effects called as fixed effect. We can also write equation (2) as,

$$R_{it} = \beta_0 + \beta_1 P_t + \beta_2 B_{it} + \beta_3 Pd_{it} + \beta_4 I_{it} + \beta_5 G_{it} + \mu_{it} \qquad (3)$$

Where $\mu_{it} = \alpha_i + \varepsilon_{it}$ which is the composite error

Here, if ε_{it} is correlated with P_{it}, it means that the Fixed Effect model is applicable otherwise not[5]. Further extending this specification, we shall also include cross section dummies for each country effects and time dummies also called Least Square Dummy Variable or LSDV method in Fixed Effect model. By including cross section dummy, the equation (3) will become,

$$R_{it} = \beta_0 + \theta_i D_i + \beta_1 P_t + \beta_2 B_{it} + \beta_3 Pd_{it} + \beta_4 I_{it} + \beta_5 G_{it} + \mu_{it} \qquad (4)$$

[4] Interest rate includes deposit rate.

[5] As T>N which means that the time observations are more than the cross section observations so, Fixed Effect Model is more appropriate in this case.

Where D_i = 1 One by one for each cross section (five dummy variables including intercept)

= 0 Otherwise

Here, θ_i is the intercept varying coefficient for dummy variables. In order to avoid dummy variable trap, we shall include only five dummy variables with intercept or six dummy variables excluding intercept.

Now if we include time dummies, the equation (3) will become,

$$R_{it} = \beta_0 + \gamma_i D_i + \beta_1 P_t + \beta_2 B_{it} + \beta_3 Pd_{it} + \beta_4 I_{it} + \beta_5 G_{it} + \mu_{it} \quad (5)$$

Where D_i = 1for 1973, 1979 and 2003-2007 respectively.

= 0 Otherwise

In this equation, γ_i is also intercept varying coefficient including three time dummies which are, 1973, 1979 and 2003 to 2007 respectively. For avoiding dummy variable trap, we shall do the same as mentioned above for model (4). In order to restrict these coefficients, we shall use Wald test having null hypothesis of $\hat{\beta}_0 = \widehat{\theta}_i$ and alternative hypothesis of $\hat{\beta}_0 \neq \widehat{\theta}_i$ for varying intercept in cross sections. For coefficient restriction of time varying intercept, the hypothesis would be $\hat{\beta}_0 = \widehat{\gamma}_i$ for null and $\hat{\beta}_0 \neq \widehat{\gamma}_i$ would be alternative hypothesis.

After intercept varying coefficients, we shall also include some slope varying coefficients. So we repeat the same procedure in equation (3) for slope varying coefficients for all cross sections.

$$R_{it} = \beta_0 + \delta_i D_i P_t + \beta_1 P_t + \beta_2 B_{it} + \beta_3 Pd_{it} + \beta_4 I_{it} + \beta_5 G_{it} + \mu_{it} \quad (6)$$

Where δ_i is the slope varying coefficient for all cross sections dummies (multiplied by oil prices)

Now, the slope varying coefficients for time dummies would be,

$$R_{it} = \beta_0 + \pi_i D_t P_t + \beta_1 P_t + \beta_2 B_{it} + \beta_3 Pd_{it} + \beta_4 I_{it} + \beta_5 G_{it} + \mu_{it} \quad (7)$$

Where $\pi_i$is the slope varying coefficient for all time dummies (multiplied by oil prices).The null and alternative hypothesis for the Wald test restrictions are the same as in equation (4) and (5). $\hat{\beta}_1 = \hat{\delta}_i$ and $\hat{\beta}_1 = \hat{\pi}_i$ are the null hypothesis for both cross section and slope varying coefficients whereas $\hat{\beta}_1 \neq \hat{\delta}_i$ and $\hat{\beta}_1 \neq \hat{\pi}_i$ are the alternative hypotheses respectively.

3.2- Panel Unit Root Tests

With the growing involvement of macroeconomic tradition in the panel data estimation, where a large sample of countries constitutes the cross-sectional dimension providing data over long periods of time series; so, the issues of stationarity and Cointegration have also emerged in panel data. Our study also have large period of time series, T with cross sections, N, which could also contain some non-stationarity. These Panel Unit root tests are based on Dickey-Fuller (DF) and Augmented Dickey Fuller (ADF) tests which are quite intricate than the traditional time series tests. Here, the information from both time series and cross sections is taken in order to bring out whether the data is stationary or having unit root. The basic null hypothesis of most of the panel unit root tests is having non-stationarity while alternative hypothesis declares stationarity. There are different tests regarding panel unit root in which we will discuss few of them here.

3.2.1- Levin, Lin and Chu Test (LLC)

This test is basically formed by Levin and Lin in 1992 which was published with Chu after ten years in 2002. The basic specification for this test is as follows:

$$\Delta Y_{it} = a_i + \rho Y_{it-1} + \sum_{k=1}^{n} \emptyset_k \Delta Y_{it-k} + \delta_{it} + \theta_t + u_{it} \quad (8)$$

This equation contains both fixed effects and time trends (which are a_i and θ_t) which are the determinants of heterogeneity. The hypotheses are,

$$Ho: \rho=0$$

$$Ha= \rho<0$$

Where null hypothesis shows unit root while alternative hypothesis shows stationarity in the data.

3.2.2- Im, Pesaran and Shin Test (IPS)

Im, Pesaran and Shin extended the Levin and Lin test allowing heterogeneity and providing a procedure having average of the individual unit root test statistics. The specification for this test is as follows:

$$\Delta Y_{it} = a_i + \rho Y_{it-1} + \sum_{k=1}^{n} \emptyset_k \Delta Y_{it-k} + \delta_{it} + u_{it} \quad (9)$$

Where the hypothesis have now become,

$$Ho: \rho=0 \text{ for all } i$$

$$Ha= \rho<0 \text{ for at least one } i$$

So null shows unit root for all cross sections while it allows for at least one cross section to be stationary.

The IPS requires $\bar{t}$ statistics which is basically average of the individual ADF t-statistics which is,

$$\bar{t} = \frac{1}{N}\sum_{i=1}^{N} t_{\rho i}$$

So the basic IPS statistics for testing unit root is given by,

$$t_{IPS} = \frac{\sqrt{N}(\bar{t} - \frac{1}{N}\sum_{i=1}^{N} E(t_{it}|\rho_i = 0)}{\sqrt{Var(t_{it}|\rho_i = 0)}}$$

Which the proved following the standard normal distribution.

3.2.3- Maddala, Wu and Choi Test

Maddala, Wu and Choi presented a test that could also be estimated with unbalanced panels. For N unit root tests, the MWC test takes the following Fisher type test,

$$\rho = -2\sum_{i=1}^{N} Ln\rho_i$$

Where, ρ_i is the coefficient of probability limit values to test the unit root in panel data estimation. It follows χ^2 distribution with 2 degrees of freedom.

3.3- Hausman Test

Hausman test is formulated by Hausman in 1978 in order to make a choice between fixed effects and random effect models. Hausman basically assumed that, there are two estimators (β_0 and β_1) and also, he introduced two hypothesis testing methods. So under null hypothesis, both estimators are consistent but β_0 is inefficient but under alternative hypothesis, β_0 is consistent and efficient but β_1 is inconsistent. So, the basic aim of Hausman test statistics is to see the difference between the fixed effects and the random effects estimators. So the rejection of the null shows that the regressors and the residual term is correlated with the individual unobserved effect.

$$H= \quad (\hat{\beta}^{FE} - \hat{\beta}^{RE})'\left[var(\hat{\beta}^{FE}) - var(\hat{\beta}^{RE})\right]^{-1}(\hat{\beta}^{FE} - \hat{\beta}^{RE}) \quad \sim \chi^2(k)$$

By solving the above equation, if the difference between the estimators is significant, then we reject the null hypothesis and do fixed effect model which will be appropriate in this case and fail to reject means that random effect model would be better.

3.4- Panel Cointegration Test

The process of panel co-integration is to judge the problem of spurious regression, which exists only in the presence of non-stationarity. The panel Cointegration is required when there is a simple spurious regression where both explanatory and explained variables are integrated of the same order but the residuals contains a stochastic trend. On the other hand, there is also a special case when both dependent and independent variables are integrated in the same order but this time, the error term is stationary.

There are different tests for estimating co-integrating relationship among variables in panel but we will use only Pedroni tests for checking co-integrating relationship between oil prices and remittances. Pedroni has explained different statistics for checking co-integration that allow heterogeneity. The proposed model from Pedroni is as follows:

$$Y_{it} = a_i + \delta_t + \sum_{m=1}^{M} \beta_{mi} X_{mit} + u_{it} \qquad (10)$$

Beside this, Pedroni proposed seven different co-integration statistics to capture the within and between effects. These are, Panel *v* statistics, panel *ρ* statistics, panel *t* statistics (parametric and non-parametric) and the between effect statistics are, group *ρ* statistics, group *t* statistics (parametric and non parametric). The test statistics of these tests are given below:

a- Panel v-statistic

$$T^2N^{3/2}Z_{vN,T} = T^2N^{\frac{3}{2}}/(\sum_{i=1}^{N}\sum_{i=1}^{T}L_{11i}^{-2}e_{i,t-1}^2)$$

b- Panel ρ-statistic

$$T\sqrt{N}Z_{\rho N,T-1} = T\sqrt{N}(\sum_{i=1}^{N}\sum_{i=1}^{T}L_{11i}^{-2}e_{i,t-1}^2)^{-1}\sum_{i=1}^{N}\sum_{i=1}^{T}L_{11i}^{-2}(e_{i,t-1}\Delta e_{i,t} - \lambda_i)$$

c- Panel t-statistic (Non- Parametric)

$$Z_{tN,T} = (\sigma_{N,T}^2\sum_{i=1}^{N}\sum_{i=1}^{T}L_{11i}^{-2}e_{i,t-1}^2)^{-1/2}\sum_{i=1}^{N}\sum_{i=1}^{T}L_{11i}^{-2}(e_{i,t-1}\Delta e_{i,t} - \lambda_i)$$

d- Panel t-statistic (Parametric)

$$Z_{tN,T}^{*} = (s_{N,T}^{\sim *2}\sum_{i=1}^{N}\sum_{i=1}^{T}L_{11i}^{-2}e_{i,t-1}^{*2})^{-1/2}\sum_{i=1}^{N}\sum_{i=1}^{T}L_{11i}^{-2}e_{i,t-1}\Delta e_{i,t}$$

e- Group ρ-statistic

$$TN^{-1/2}Z_{\rho N,T-1}^{\sim} = TN^{-1/2}\sum_{i=1}^{N}(\sum_{i=1}^{T}e_{i,t-1}^{\hat{}2})^{-1}\sum_{i=1}^{T}(e_{i,t-1}\Delta e_{i,t} - \lambda_i)$$

f- Group t-statistic (Non-Parametric)

$$N^{-1/2}Z_{tN,T}^{\sim} = N^{-1/2}\sum_{i=1}^{N}(\sigma_i^2\sum_{i=1}^{T}e_{i,t-1}^{\hat{}2})^{-1}\sum_{i=1}^{T}(e_{i,t-1}\Delta e_{i,t} - \lambda_i)$$

g- Group t-statistic (Parametric)

$$N^{-1/2}Z_{tN,T}^{*} = N^{-1/2}\sum_{i=1}^{N}(\sum_{i=1}^{T}s_i^{*2}e_{i,t-1}^{*\hat{}2})^{-1/2}\sum_{i=1}^{T}e_{i,t-1}\Delta e_{i,t}$$

3.5- Asymmetric Test for Cointegration

For determining the long-run relationship between any two variables, Engle and Granger (1987) has shown that if the two variables are cointegrated (with I (1)) then the whole procedure is associated with the short-run Error Correction Model (ECM) based on the symmetric adjustment having second step based on the following equation:

$$\Delta\hat{\mu}_t = \rho\hat{\mu}_{t-1} + \varepsilon_t \qquad \varepsilon_t \sim IID(0, \delta^2)$$

Where the error term $\hat{\mu}_t$ belongs to linear equation (estimated through OLS e.g. between any two variables y and x). So, the null and alternative hypothesis will be, *Ho:* $\rho=0$ and *HA:* $\rho<0$, then, the ECM equations are as follows,

$$A(L)\Delta y_t = B(L)\Delta x_{t-1} - \varphi\hat{\mu}_{t-1} + \omega_t \qquad \omega_t \sim IID(0, \delta^2)$$

$$A(L)\Delta x_t = B(L)\Delta y_{t-1} - \sigma\hat{\mu}_{t-1} + \tilde{\omega}_t \qquad \tilde{\omega}_t \sim IID(0, \delta^2)$$

Where $\varphi = (1 - \alpha_1)$ and $\sigma = (1 - \alpha_2)$ and $A(L)$ and $B(L)$ are polynomial lag operators.

For the case of asymmetric relationship, Enders and Granger (1998) and Enders and Siklos (2001) formulated an alternative specification instead for the second step Engle Granger test, called the MTAR or momentum threshold autoregressive model),

$$\Delta\hat{\mu}_t = I_t\rho_1\hat{\mu}_{t-1} + (1 - I_t)\rho_2\hat{\mu}_{t-1} + \tilde{\varepsilon}_t \qquad \tilde{\varepsilon}_t \sim IID(0, \delta^2) \qquad (11)$$

Where I_t is the Heaviside indicator function based on threshold value (τ[6]).

$$I_t = \begin{cases} 1 \; if \Delta\hat{\mu}_{t-1} \geq \tau \\ 0 \; if \Delta\hat{\mu}_{t-1} < \tau \end{cases}$$

This asymmetric version of Error correction model then replaces the single error correction term in equation with two error corrections, multiplied by two Heaviside indicator functions respectively. The null hypothesis of no Cointegration and alternative hypothesis with asymmetry are $\rho_1 = \rho_2$ which are tested by using conventional coefficient restriction test.

As we are concerned with the panel data estimation and we also seen that there is a Cointegration relationship exists between oil prices and workers' remittances. So we will also apply the same specification test between these two variables with the help of the results of equation 03. By using the residuals, we will use Indicator function with the general threshold value of zero, as, representing positive value equal to one and negative value equal to zero. So, our asymmetric ECM equation will be,

$$\Delta R_{it} = \Delta P_{t-1} + \Delta P d_{it-1} + \Delta B_{it-1} + \Delta G_{it-1} + \Delta I_{it-1} + \Delta R_{it-1} + \Delta\hat{\mu}_{it} + \omega_{it} \quad \omega_{it} \sim IID(0, \delta^2) \qquad (12)$$

[6] Generally, the specified threshold level is equal to zero.

This equation will determine that is there any asymmetric relationship between oil prices and workers' remittances or not. The empirical estimations of all of the above specifications will be discussed in the next chapter.

Chapter Four

4- Empirical Analysis

In the previous chapter, we discussed about different specifications and different tests which will now be solved empirically. These empirical results will explain the basic idea of how oil prices and all other control variables affect workers' remittances.

The table 03 describes the descriptive statistics detail for all the variables which are in stacked form for each cross section country in which the probability value except Oil Production (Pd) is zero.

Now, from table 04, the estimated regression for ordinary least square (OLS) shows outcomes for all the explanatory variables. The outcomes include different statistics which are slope coefficient, standard error, t-statistics and probability value. The slope coefficient for oil prices, oil consumption and rate of interest is positive which results into rise in remittances while for oil production and GDP differential, it is negative showing that rise in these variables corresponds to decline in remittances. Here, as we are testing our hypothesis at 95 percent confidence level so all the explanatory variables except GDP differential and interest rate have p-value less than 0.05 means that we reject our null hypothesis.

4.1- Empirics for Panel Unit Root Test

Now, by using the above tests, we check for our data sets whether they are stationary or not.

For Panel Root test, we start with our dependent variable with four different methods for checking stationarity with both intercept and slope coefficients. In table 05, we can see that, at level, all required statistics for remittances show unit root as p- value is equal to one while at

first difference, the p-value for all the respective methods are equal to zero shows that the data is stationary. It means that all four statistics are much reliable in elaborating stationarity at first difference and unit root on level.

Now, for the case of oil prices, we can see in table 06 that at level, all the panel unit root test statistics for oil prices have unit root but after taking it first difference, it becomes stationary. So, both remittances and oil prices are integrated of order one which means there must be a cointegrating relationship between these two.

For the case of Interest rate data (table 07), the data shows unit root only for PP-Fisher Chi-square test at level but it is stationary for all other tests also at first difference same as for oil prices and workers' remittances but for oil production (table 08), it shows unit root at level, but at first difference, all the required tests show stationarity.

For GDP differential (table 09) there is unit root in the data at level but except Levin, Lin and Chu, all other tests show stationarity at first difference while in table 10, oil consumption is also stationary at first difference but at level, it shows unit root.

4.2- Estimation with Dummy Variables

In our equation 04, which is basically fixed effect least square dummy variable model (LSDV) results are shown for all explanatory variables as well as the cross section dummy variables. Here, D1 is a dummy for Bahrain; D2 is for Saudi Arabia, D3 for Kuwait, D4 for Oman, D5 for Qatar, and D6 for United Arab Emirates. For avoiding dummy variable trap, we use only five dummies with intercept. For the case of oil prices, the coefficient for oil prices (table 11) is around 4 with p-value equal to zero, shows that it strongly rejects the null hypothesis. Same is the case with oil production with zero p-value but for GDP differential, the p-value is more than

confidence level which shows insignificance. Similarly, null hypothesis is rejected for all dummies instead of Oman showing insignificance.

After estimating and interpreting coefficients, now we apply Wald test for coefficient restriction that the coefficient of intercept is equal to the dummy variable coefficient. Here in table 12, all the dummy variable coefficients are different from intercept and F-statistics and Chi-square statistics also show that the null hypothesis is rejected with zero p-value. It means that, as described above, the coefficients of dummy variables are different so, it adds into intercept showing country wise variation.

Now, by estimating equation 05, we introduced here three time dummies, D01 is for 1973-1975, D02 is for 1979-1981 and D03 is from 2003-2007 respectively. In table 13, we can see that null hypothesis for oil prices, oil production and oil consumption is rejected whereas we fail to reject remaining variables. For the case of time cross section dummies, the difference between the coefficients and the intercept is not very large which results into insignificance of the time dummy coefficients. It shows that the oil price shocks occurred in these respective periods of time are not so much effective in affecting remittances flows.

Meanwhile, after imposing the restrictions, we can see in table 14 that the null hypothesis is rejected as both the time dummy coefficients are different from intercept with p-value of both F-Statistics and Chi-square statistics near to zero. So after adding the time dummy coefficients and intercept, the added coefficient is reduced because of the negative sign of both time dummy coefficients.

Now after estimating equation 06, Table 15 shows that all the cross sectional dummies are multiplied with oil prices for detecting what changes occurred in the oil price slope coefficient.

Same as above, the dummy coefficients will be added and we can see that the slope dummies for Bahrain and Oman (D1 and D4) are insignificant having also negative coefficients. The major thing here is to see that oil price are insignificant which means that for all cross sections, when added to the oil prices coefficients will be reduced to zero (instead of Saudi Arabia). The Wald test carried out to be significant as the F-statistics and Chi-statistics coefficients are zero (table 16) which means that all the cross section dummy coefficients are different from that of oil price coefficient.

In equation 07, just like we multiplied oil prices with cross section dummies, we will do the same for time dummies. Here in table 17, we can see that time dummies have still negative coefficients and p-values show insignificance. In table 18, after imposing equal slope coefficient restriction, we can see that F-statistics and Chi-statistics coefficients are more than the critical value which means that both coefficients are not the same.

4.3-Empirics for Hausman Test

From table 19, it can be seen that chi-square statistic is more than critical and its value shows sign of significance at 5% level. So, we reject our null hypothesis and prefer fixed effect test over random effect. Hence, it means that the coefficients of both fixed and random effect are not the same and the individual unobserved effect is correlated with the residual term and the explanatory variables. Meanwhile, the output showing the coefficient estimates from the random and the fixed effects estimators along with the variance of the difference and the associated p-values for the hypothesis that the difference is positive for both oil production and rate of interest but for oil consumption and GDP differential, it shows no variation: but the main thing is that the chi square coefficient signifies the null and also for oil prices which is main concern of our study.

4.4- Empirics for Panel Cointegration Test

As in table 20, both remittances and oil prices are integrated of order one, so there must be a cointegrated relationship between these two. In order to find such relationship, table 20 shows Pedroni Cointegration test which shows the four statistics results for individual intercept only. Here in table 21, we can see that the probability values for all four statistics except panel v-statistics, fail to reject the null of no cointegration while for weighted statistic, all statistics coefficients are more than the critical which shows that there is a cointegration relationship between oil prices and remittances. So with intercept and trend only panel v-statistic rejects the null for no cointegration whereas all other statistics fail to reject for null (shown in table 21).

Now in table 22, for the case of no intercept and trend, we can see that all the Pedroni cointegrating statistics show that all coefficients are more than the critical value and the p-value also shows rejection of null hypothesis for no cointegration.

4.5- Asymmetric Test for Cointegration

After estimating our equation 12, we can see from table 23 that when disequilibrium is above the threshold level, the adjustment in the worker's remittances to achieve the long run equilibrium is quite slower. It means that the magnitude of the removal in the disequilibrium is 25 percent but when the disequilibrium is below the threshold level (which is zero), the adjustment occurs quite early and it retains back to the threshold level. The restrictions imposed also reject the null and justifies the cointegration between oil prices and workers' remittances with asymmetry. In this case, the catch up is achieved in each period and fluctuations are quite lower and move around the threshold level.

Chapter Five

5- Conclusion and Policy Recommendation

It has been observed that oil prices are the major determinants in effecting worker's remittances. This is because the demand of foreign human resource increases by the GCC countries and inflow of foreign workers ultimately impact in terms of worker's remittances to home countries. This rise in oil prices induced investors to invest more in oil rich countries with imported manpower. It can also be concluded that there is a symmetrical relationship between oil prices and worker's remittances for Pakistan which is also one of the part of our objective because the elasticity coefficient for oil price is higher which in turn leads to increase worker's remittances.

By taking account of our empirical results, it can be seen that there is positive relationship between oil prices and workers' remittances. Well for the case of ordinary least square results, we can see that the elasticity of oil prices is more than unity, which is quite robust regarding our hypothesis. It means that the GCC countries and Pakistan should be well aware about the high sensitivity of oil prices that retained in the crises of 1970 and also couple of decades later, the global financial crises, which can vary the response for remittances. The expatriates can also beware of such kind of circumstances from which they have to choose whether to stay and work in this country or to move somewhere else.

From the least square dummy variable specification, we can see that the intercept and slope coefficients of Kingdom of Saudi Arabia is positive and after adding with the intercept and also respectively with the oil price elasticity, it provides the distinct observation that as the labor from Pakistan over there is huge (since 1970, Kingdom of Saudi Arabia has hosted Pakistani Worker's

on large scale) in number as compared to other GCC countries, so the elasticity and also the intercept coefficient is quite high which means that the other country specific rules, laws regulations and domestic enforcements also have a varying impact on remittances outflows. Meanwhile, for the case of other GCC countries having less population, the country's specific effects are not much able to affect the remittances outflows. The reason behind this is the economic integration and the unification of these six countries so the country with huge population of native people and also with lots of expatriates can do more than the others.

Meanwhile, the regression results after using Panel data estimation are also helpful as most of the values are missing from the data but by using cross section and time series observations, this problem is also solved. The cross section dummy variable coefficients are more significant as well as the time dummies which means that the oil shocks of 1973, 1979 and 2003-2007, have no significant role in effecting worker's remittances. The cointegrating relationship also suggests that oil prices and workers' remittances have long run relationship that can also be considered as long term behavior of the change in remittances of Pakistan and also other developing nations.

The GCC countries as the case of European Monetary Union (EMU), has an irrevocable fixed exchange rate which is also a major reason for the expatriates to work over there. As the GCC economies are oil dependent, having little intra-trade, lack of convergence in macroeconomic fundamentals and lack synchronization in business cycles has urged all of the foreign workers to avail this opportunity as this policy favors the working environment and also much better remuneration as compared to other countries demanding foreign labor. Meanwhile the impact of remittances on social status of the households stands remarkable as regarding the current situation, the investment opportunities are far more in rural areas (household industry) and the motive for altruism is a priority, so, it helped a lot in the reduction of poverty especially in rural

areas as the head of the household provides better education and improves their chance to get in the labor market and get better paid jobs.

This relationship tends to provide us the framework that the local industry requires more oil for production purposes and also requires labor. Besides this, other explanatory variables also provide a better significant relationship that supports our hypothesis. The response of the GCC countries could be crucial as they have pegged their currency to United States (US) dollar. The pegging of currency might be horrible (but not quite ineffective for the reduction in the economic growth) for the GCC central banks because, all the foreign workers convert local currency into their home currency which means that a lot of income is flowing outside the country that raises the living standard of foreign workers' families residing in home country . It may happen that the workers convert the local currency into a widely accept currency like US dollar so this may result in reduction of foreign reserves. But at the end, the these kind of discrepancies are overcome by the huge foreign inflow of oil revenues as it is one of the major energy input for different industries running around the globe.

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Annexure

3.1- Publications related to Pakistan

PUBLICATION	OBJECTIVE	METHODOLOGY & DATA SOURCES	RESULTS & CONCLUSION
Kock & Sun (2011).	Forces that have driven remittances flows to Pakistan in recent years.	• Panel Data Estimation & Bayesian Estimation. • FBS, IFS and Haver analytics.	Skill, Investment return and exchange rate, all play major role in effecting remittances.
Morshed & Pitafi (2008).	Effects of oil shocks on remittances and oil importing countries.	• Intertemporal Optimizing model. • WDI, IFS.	Estimated coefficient for Pakistan is positive.
Burney (1987).	Impact of remittances on the Pakistan's GNP Growth, Savings and Balance of Payments.	• Log-linear model. • Pakistan Economic Survey.	Rise in remittances leads to rise in GNP.
Adams Jr. (1992).	Income Groups acquiring Remittance.	• OLS. • Provincial household data.	Remittances results into decline in the Gini coefficient and Theil entropy measure.

Malik (2008).	Impact of rising oil prices on Macroeconomy of Pakistan.	• Log-linear Model. • IFS, ADB.	Oil prices and output are strongly related.
Mohammad (2010).	Correlation between Oil Prices and Export Earnings of Pakistan.	• OLS (ECM and Johansen Cointegration). • IFS, WDI, Economic Survey of Pakistan.	Oil price volatility has been negatively correlated with export earnings
Shah (1983).	Trends and patterns of Pakistani workers from 1970 and onwards.	Theoretical Work.	Remittances provide 40 percent of the foreign exchange earnings in the country.
Amjad (1986).	Remittances and the Overall Development of the Economy.	General Calculations.	Investment decisions must be channelized by the government.

3.2- Publications related to other Developing Countries

PUBLICATION	OBJECTIVE	METHODOLOGY & DATA SOURCES	RESULTS & CONCLUSION
Ruiz & Silva.	Impact of remittances inflows on Mexico's Monetary Policy.	• VAR Model. • Federal Reserve Bank of St. Louis and Mexican Central Bank.	Remittances flows explain about 7 percent of the variance in interest rates.
El Sakka.	Macroeconomic policy variables on the worker's remittances to Jordan.	• Log- linear Model. • IFS, IMF BOP statistics manual.	Significant relationship between the level of income at home and the inflow of remittances.
Gupta (2005).	Determinants of remittances to India.	• Log-linear Model. • Handbook of Indian Economy, RBI's Bulletin and IMF's BoP statistics manual.	Relationship of remittances with oil prices is insignificant.
Leuth & Arranz (2007).	Response of remittance receipts whether it is pro-cyclical.	• Vector Error Correction Model (VECM). • IMF BoP statistics manual and Sri Lankan National Statistics.	Remittances rise with the surge in the oil prices.

Matiur Rahman.	Dynamics of the determinants of expatriates' remittances from Saudi Arabia to Bangladesh.	• ARDL, VECM. • IFS Year Book, Various Issues of Economic Trends.	VECM confirms strong long run relationship.
Bougha-Hagbe (2004).	Altruism, attachment to the home country, and portfolio diversification.	• Intertemporal Optimizing model & Log-linear model. • Morocco authorities.	Remittances have covered trade deficits and contributed to recent surpluses of current account.
Lucas Stark (1985).	Remittances patterns among individuals in Botswana.	• Piece wise linear equation and logit equation. • National Migration Study of Botswana 1978-79.	Motive of pure altruism would results into rise in remittances flows to home country.
Amuedo-Dorantes & Pozo.	The impact of worker's remittances on real exchange rate is tested for Latin American countries.	• Panel data estimation. • WDI, IFS, Penn World Table.	Rise into the worker's remittances results into 22% rise in the real exchange rate.

3.3- Other International Publications

PUBLICATION	OBJECTIVE	METHODOLOGY & DATA SOURCES	RESULTS & CONCLUSION
Naufal &Termos (2009).	Responsiveness of remittances from the GCC to price of crude oil.	• Panel Data Estimation. • WDI, IFS and AMF.	Estimated coefficient is positive and quite high.
Barajas, Chami, Fullenkamp, Gapen and Montiel (2009).	Relationship of workers' remittances and economic growth of the recipient country	• Panel data estimation. • IFS.	The relationship between remittances and long-term growth is not much significant.
Guiliano and Ruiz-Arranz (2005).	Relationship between remittances and financial development.	• Panel data estimation. • IFS, WDI, IMF BoP statistics manual.	Remittances have positive relationship with GDP per capita growth.
Hamilton (2003).	Nonlinear relation between oil price changes and GDP growth.	• OLS, GLS. • Bureau of Economic Analysis and Bureau of Labor Statistics.	Linear regression of output on lagged oil prices exhibits instability over time.

Katsuya Ito	Impact of oil prices on the macroeconomic variables in Russia.	• OLS, VAR, VEC. • IFS, EIA.	Rise in Oil price affects real exchange rate and real GDP in Russia.
Ilahi and Shendy (2008).	Testing the association between GCC countries' financial and remittances outflows in the Middle East.	• Panel Data Estimation. • WEO, WDI, IFS, Penn World Table.	Periods of high oil prices result in balance of payment pressures in oil importing countries.
Kenneth Rogoff	Role of oil prices in the macroeconomy.	• OLS • WEO, IFS.	The very large oil price shocks will play a large role in the future recessions.
Ravichandran & Alkhatlan (2010).	Impact of oil prices on GCC stock markets.	• LM test, GARCH. • Daily Stock market price & NYMEX Oil Price.	Effects of oil price change transmitted to macroeconomic indicators affecting the long term linkages between markets.

Kumar,Bakardzhieva	To investigate on the monetary policy coordination among the GCC countries.	• OLS, ECM. • WDI, EIU.	The GCC agreement with its customs union and allows to enlarge their markets.
Mimouni,Abu Ali & Al-Azzam (2012).	Linkage between the crude oil prices and the stock markets of GCC countries.	• GARCH. • EIA.	The oil prices have an impact on all financial markets especially in major oil producing countries.
Riccardo Faini	Impact of interest rates and exchange rate policies on remittances.	• OLS, LM. • IFS, IMF BoP Statistics Manual.	The real exchange rate coefficients are lower than in the short run suggesting that temporarily lower remittances.
Balderas & Nath (2005).	The aim is to check the effects of remittances on inflation.	• OLS, VAR. • Bank of Mexico.	Remittances have significant effect just only after 1994.

Tables

Table 01: Description of Crude oil for GCC countries

	KSA		UAE		Kuwait		Qatar		Oman		Bahrain	
	2008	**2009**	**2008**	**2009**	**2008**	**2009**	**2008**	**2009**	**2008**	**2009**	**2008**	**2009**
Total Oil Production (Thousands bpd)	10783	9760	3047	2795	2729	2496	1203	1212	761	816	48.4	48.4
Crude Oil Production (Thousands bpd)	9261	8250	2681	2413	2586	2350	924	927	757	812	35	35
Consumption (Thousands bpd)	2297	2438	503	492	337	372	142	147	102	115	44	45
Net Exports/Imports (Thousands bpd)	8486	7322	2543	2302	2391	2124	1061	1065	659	701	4.43	3.43
Total Oil Exports to USA(Thousands bpd)	1529	1004	4	40	210	182	NA	10	18	30	NA	2

Source: U.S. Energy Information Administration

Table 02: GCC Stock of International Migrants

Country	**Estimated Number of International Migrants at Mid-Year**				
	1990	**1995**	**2000**	**2005**	**2010**
KSA	4742997	4610694	5136402	6336666	7288900
UAE	1330324	1715980	2286174	2863027	3293264
Kuwait	1585280	1089545	1500442	1869665	2097527
Bahrain	173200	205977	239366	278166	315403
Qatar	369816	405915	470731	712861	1305428
Oman	423572	582463	623608	666263	826074
Total	8625189	8610574	10256723	12726648	15126596

Source: United Nation Database

Table 03: Descriptive Statistics for all Variables in Stacked Cross Sections

	R	P	PD	I	G	B
Mean	212.41	31.72	87.33	5.36	14770.70	376.19
Median	102.72	24.44	91.15	5.58	9998.66	88
Maximum	1559.56	97.26	123.66	9.04	85604.38	2460
Minimum	10.28	11.53	36.07	1.22	4542.90	15.38
Std. Dev.	265.76	20.79	16.98	2.05	13721.25	608.06
Skewness	2.43	1.57	-0.80	-0.25	2.98	1.83
Kurtosis	9.93	4.71	3.76	2.25	12.63	5.09
Jarque-Bera	348.81	62.33	15.36	3.91	625.66	86.85
Probability	0	0	0	0.14	0	0
Sum	24852.00	3710.95	10216.74	626.73	1728172	44014.47
Sum Sq. Dev.	8192930	50144.90	33437.23	485.5564	2.18E+10	42888733
Observations	117	117	117	117	117	117

Table 04: Ordinary Least Square Results

Variable	Coefficient	Std. Error	t-Statistic	P-Value
C	202.70	79.66	2.54	0.01
P	3.27	0.75	4.38	0
PD	-2.76	0.67	-4.10	0
G	-0.001	0	-0.56	0.58
B	0.36	0.02	18.33	0
I	4.12	6.09	0.68	0.50

Table 05: Statistical Summary Panel Unit Root Test for Remittances

	At Level		At 1st Difference	
Method	Statistic	P-Value	Statistic	P-Value
Levin, Lin & Chu t	6.10	1	-4.91	0
Im, Pesaran and Shin W-stat	7.17	1	-3.83	0
ADF - Fisher Chi-square	0.47	1	44.71	0
PP - Fisher Chi-square	0.41	1	53.83	0

Table 06: Statistical Summary Panel Unit Root Test for Oil Prices

	At Level		At 1st Difference	
Method	Statistic	P-Value	Statistic	P-Value
Levin, Lin & Chu t	4.61	1	-17.75	0
Im, Pesaran and Shin W-stat	3.86	1	-17	0
ADF - Fisher Chi-square	0.61	1	186.01	0
PP - Fisher Chi-square	2.04	1	185.22	0

Table 07: Statistical Summary Panel Unit Root Test for Interest Rate

	At Level		At 1st Difference	
Method	Statistic	P-Value	Statistic	P-Value
Levin, Lin & Chu t	-3.11	0	-19.88	0
Im, Pesaran and Shin W-stat	-3.07	0	-8.68	0
ADF - Fisher Chi-square	24.71	0.01	53.43	0
PP - Fisher Chi-square	6.59	0.76	38.81	0

Table 08: Statistical Summary Panel Unit Root Test for Oil Production

	At Level		At 1st Difference	
Method	Statistic	P-Value	Statistic	P-Value
Levin, Lin & Chu t*	0.10	0.54	-9.42	0
Im, Pesaran and Shin W-stat	-0.67	0.25	-10.30	0
ADF - Fisher Chi-square	17.11	0.15	100.90	0
PP - Fisher Chi-square	14.04	0.30	110.50	0

Table 09: Statistical Summary Panel Unit Root Test for GDP Differential

	At Level		At 1st Difference	
Method	Statistic	P-Value	Statistic	P-Value
Levin, Lin & Chu t*	3.87	1	-1.49	0.07
Im, Pesaran and Shin W-stat	4.62	1	-6.91	0
ADF - Fisher Chi-square	1.65	1	63.67	0
PP - Fisher Chi-square	3.25	1	63.56	0

Table 10: Statistical Summary Panel Unit Root Test for Oil Consumption

	At Level		At 1st Difference	
Method	Statistic	P-Value	Statistic	P-Value
Levin, Lin & Chu t*	7.36	1	-3.51	0
Im, Pesaran and Shin W-stat	9.33	1	-3.64	0
ADF - Fisher Chi-square	0.11	1	35.22	0
PP - Fisher Chi-square	0.06	1	78.39	0

Table 11: Fixed Effect Model with Cross Section Dummies

Variable	Coefficient	Std. Error	t-Statistic	P-Value
C	328.46	60.10	5.47	0
P	3.92	1.27	3.08	0
PD	-3.19	0.74	-4.29	0
G	0	0	1.24	0.23
B	0.16	0.06	2.79	0.01
D1	-143.69	59.25	-2.43	0.02
D2	261.43	67.02	3.90	0
D3	-129.99	44.16	-2.94	0
D4	-90.96	65.17	-1.40	0.16
D5	-267.99	46.17	-5.80	0

Table 12: Wald Test for Equation 04

Test Statistic	Value	P-Value
F-Statistics	14.11	0
Chi-Square	70.57	0
	Null Hypothesis Summary	
Normalized Restriction (= 0)	Value	St. Error
$\hat{\beta}0 - \hat{\theta}1$	472.15	91.78
$\hat{\beta}0 - \hat{\theta}2$	67.03	98.73
$\hat{\beta}0 - \hat{\theta}3$	458.45	86.19
$\hat{\beta}0 - \hat{\theta}4$	419.42	96.29
$\hat{\beta}0 - \hat{\theta}5$	596.45	92.31

Table 13: Fixed Effect Model with Time Dummies

Variable	Coefficient	Std. Error	t-Statistic	P-Value
C	199.86	80.04	2.50	0.01
P	3.35	0.76	4.42	0
PD	-2.78	0.68	-4.10	0
G	-0.001	0	-0.59	0.56
B	0.36	0.02	18.06	0
I	5.14	6.20	0.83	0.41
D01	-17.15	117.91	-0.15	0.89
D02	-57.72	54.66	-1.06	0.29

Table 14: Wald Test for Equation 05

Test Statistic	Value	P-Value
F-Statistics	3.69	0.03
Chi-Square	7.37	0.03
	Null Hypothesis Summary	
Normalized Restriction (= 0)	Value	St. Error
$\hat{\beta}0 - \hat{\gamma}1$	217	143.57
$\hat{\beta}0 - \hat{\gamma}2$	257.57	95.30

Table 15: Fixed Effect Model for slope varying Cross Sectional Dummies

Variable	Coefficient	Std. Error	t-Statistic	P-Value
C	226.21	50.32	4.50	0
P	1.87	2.91	0.64	0.52
PD	-3.16	0.69	-4.59	0
G	0.01	0.01	2.72	0.01
B	0.16	0.06	2.96	0.01
P*D1	-2.93	2.21	-1.33	0.19
P*D2	9.85	2.69	3.66	0
P*D3	-4.28	1.44	-2.97	0
P*D4	-0.66	2.57	-0.26	0.80
P*D5	-11.07	1.71	-6.47	0

Table16: Wald Test for Equation 06

Test Statistic	Value	P-Value
F-Statistics	15.8	0
Chi-Square	79.31	0
	Null Hypothesis Summary	
Normalized Restriction (= 0)	Value	St. Error
$\hat{\beta}1 - \hat{\delta}1$	4.80	4.97
$\hat{\beta}1 - \hat{\delta}2$	-7.98	5.19
$\hat{\beta}1 - \hat{\delta}3$	6.15	3.99
$\hat{\beta}1 - \hat{\delta}4$	2.52	5.37
$\hat{\beta}1 - \hat{\delta}5$	12.94	2.83

Table 17: Fixed Effect Model for Slope Varying Time Dummies

Variable	Coefficient	Std. Error	t-Statistic	P-Value
C	200.25	80	2.50	0.01
P	3.36	0.76	4.43	0
PD	-2.79	0.68	-4.11	0
G	-0.0001	0	-0.59	0.56
B	0.36	0.02	18.06	0
I	5.18	6.20	0.84	0.40
P*D01	-1.49	10.22	-0.15	0.89
P*D02	-1.70	1.54	-1.10	0.26

Table 18: Wald Test for Equation 07

Test Statistic	Value	P-Value
F-Statistics	4.07	0.02
Chi-Square	8.13	0.02
	Null Hypothesis Summary	
Normalized Restriction (= 0)	Value	St. Error
$\hat{\beta}1 - \hat{\pi}1$	4.85	10.18
$\hat{\beta}1 - \hat{\pi}2$	5.05	1.79

Table 19: Hausman Test Results

	Test Summary	**Chi-Sq. Statistic**	**Chi-Sq. d.f.**	**P-Value**
	Period random	30.80	4	0
Variable	Fixed	Random	Var(Diff.)	P-Value
PD	-1.93	-2.76	0.48	0.23
G	-0.001	-0.001	0	0.12
B	0.35	0.36	0	0.43
I	2.44	4.11	71.30	0.84

Table 20: Pedroni Cointegration Test between Remittances and Oil Prices with Individual Intercept

Alternative Hypothesis: Common AR Coefficients (Within-Dimension)				
	Statistic	P-Value	Weighted Statistic	P-Value
Panel v-Statistic	6.15	0	6.62	0
Panel rho-Statistic	-0.83	0.20	-3.17	0
Panel PP-Statistic	-0.44	0.33	-2.64	0
Panel ADF-Statistic	-1.50	0.07	-2.03	0.02

Table 21: Pedroni Cointegration Test between Remittances and Oil Prices with Intercept and Trend

Alternative Hypothesis: Common AR Coefficients (Within-Dimension)				
	Statistic	P-Value	Weighted Statistic	P-Value
Panel v-Statistic	2.89	0	3.22	0
Panel rho-Statistic	1.08	0.86	-0.81	0.21
Panel PP-Statistic	1.27	0.90	-1.12	0.13
Panel ADF-Statistic	-0.17	0.43	-0.58	0.28

Table 22: Pedroni Cointegration Test between Remittances and Oil Prices with no Intercept and Trend

Alternative Hypothesis: Common AR Coefficients (Within-Dimension)				
	Statistic	P-Value	Weighted Statistic	P-Value
Panel v-Statistic	8.99	0	10.47	0
Panel rho-Statistic	-2.52	0.01	-4.73	0
Panel PP-Statistic	-1.69	0.05	-3.19	0
Panel ADF-Statistic	-1.69	0.05	-2.43	0.01

Table 23: Asymmetric Test for Cointegration

Variable	Coefficient	Std. Error	t-Statistic	P-Value
D(P(-1))	1.29	0.45	2.84	0.01
D(PD(-1))	-0.79	0.47	-1.70	0.09
D(B(-1))	0.53	0.13	4.00	0.00
D(R(-1))	0.30	0.08	3.68	0.00
D(R(-2))	0.40	0.08	4.79	0.00
D(P(-2))	0.34	0.64	0.54	0.59
I*(RD(-1))	-0.26	0.07	-3.64	0.00
(1-I)*(RD(-1))	0.04	0.05	0.81	0.42

Table 24: Asymmetric Coefficient Restriction Test

Test Statistic	Value	P-Value
F-Statistics	11.49	0
Chi-Square	11.49	0
	Null Hypothesis Summary	
Normalized	Value	St. Error
$\rho_1 = \rho_2$	201.73	80.80

Figures

Figure 01: Flow of Remittances from KSA & UAE to Pakistan & World Crude Oil Price

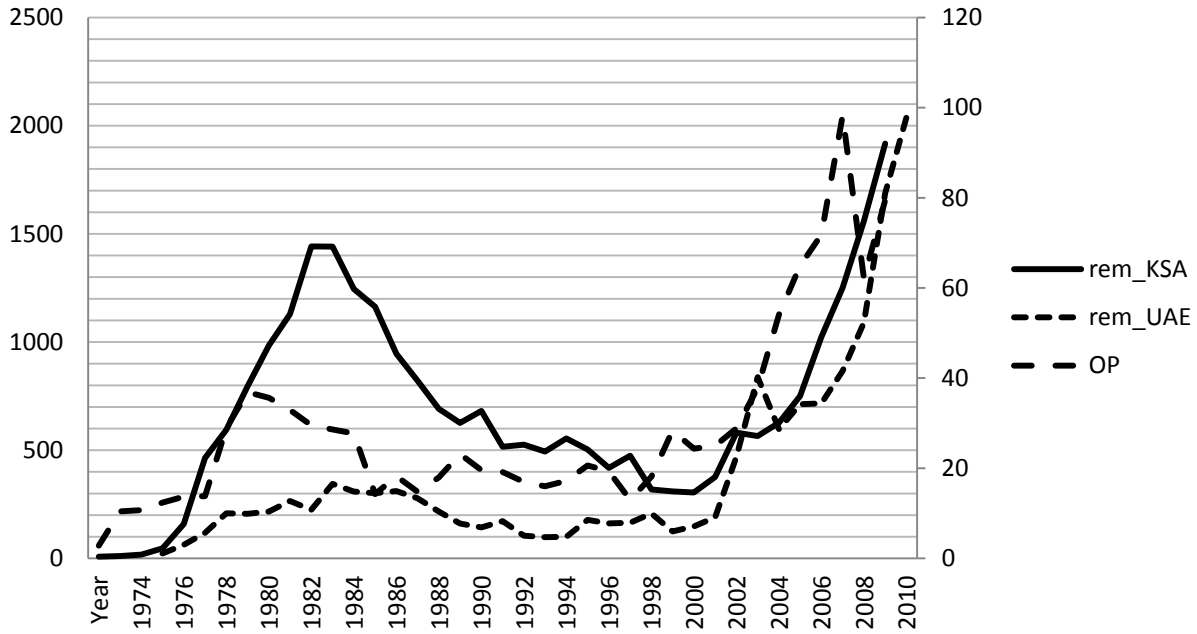

Figure 02: Flow of Remittances from EU & GCC Countries to Pakistan (1997-2008)

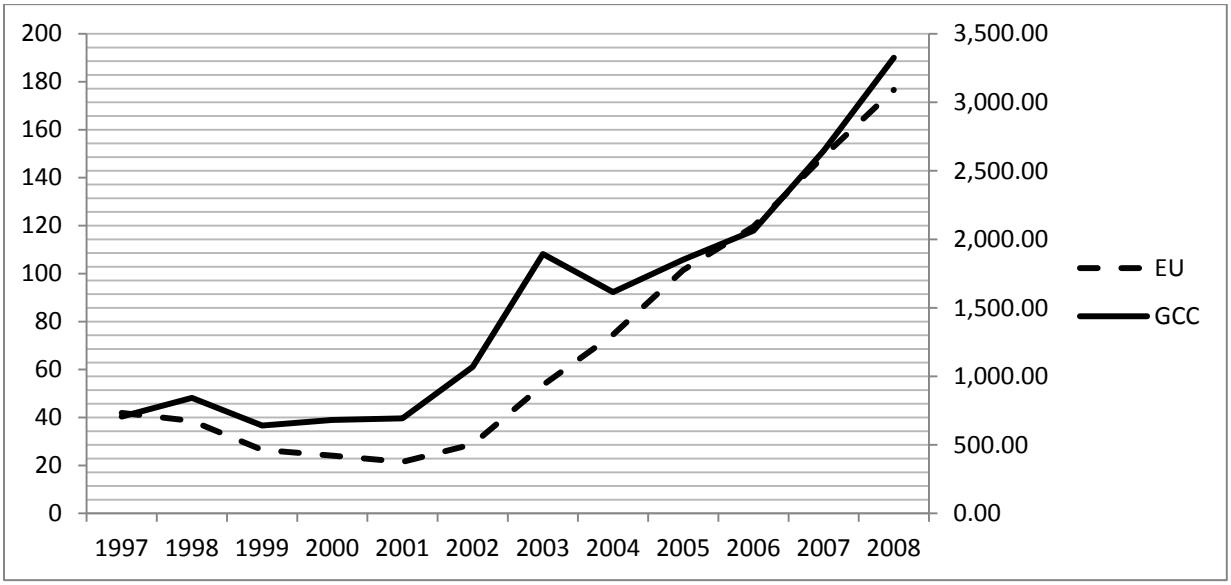

Figure 03: Crude Oil Prices from 1868 to 2004

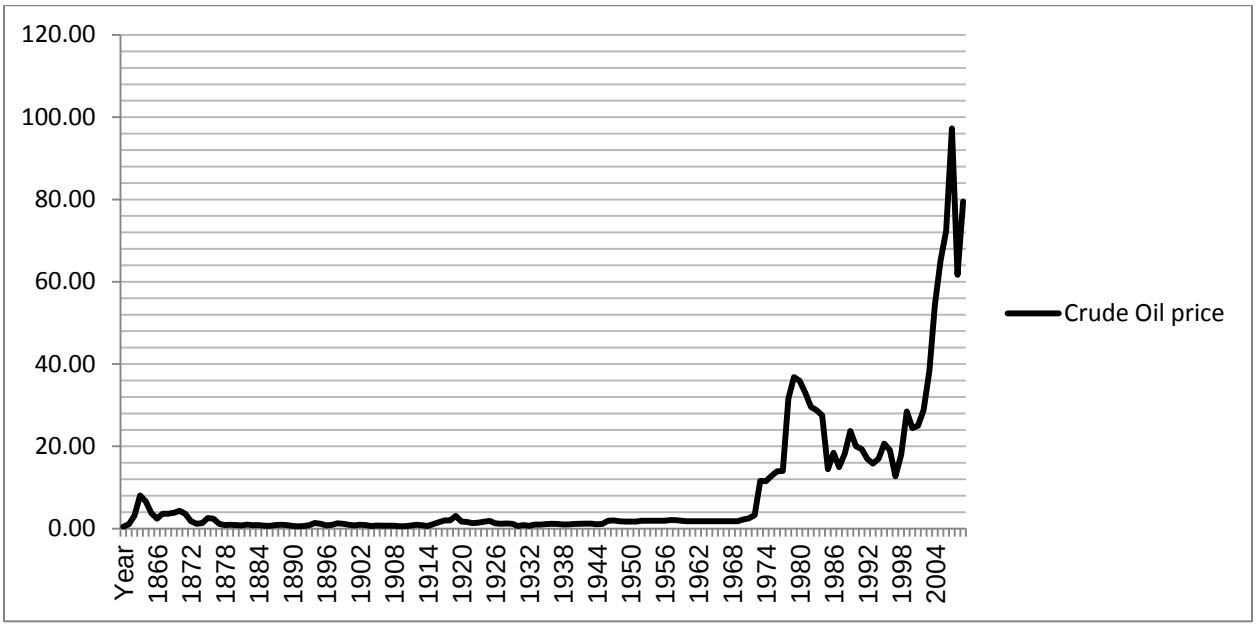

Figure 04: Total Oil Production of Major Oil Producing Countries (in Million, 1965-2010)