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**IMPACT OF INTERNATIONAL REMITTANCES ON ECONOMIC GROWTH:  
A CASE STUDY OF PAKISTAN (1975-2016)**

**IMPACTO DE LAS REMESAS INTERNACIONALES EN EL CRECIMIENTO ECONÓMICO:  
UN ESTUDIO DE CASO EN PAKISTAN (1975-2016)**

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**Abstract**

The inflows of income through international remittances are an important source of economic growth and development in Pakistan. In 2015-2016, Pakistan got \$ 20.1 billion as international remittances. To investigate the impact of international remittances on economic growth, it is necessary to grasp the different theories of remittances and migration. The elaborations in the theoretical and conceptual framework, thus recognize the problems, why or how certain relationships exist, and also explain the direction and the nature of the relationships among the variables. The study employed ad-hoc model to check the practical association between international remittances and economic growth in the Pakistan from the time period of 1975 to 2016. Therefore, we started our research work by the following functional form to determine the relationship between economic growth, personal remittances, GFCF and foreign direct investment.

**Keywords**

International remittances – Migration – Foreign direct investment

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## Introduction

An international remittance is a significant source of foreign exchange earnings for Pakistan. In 1982-1983 foreign exchange earnings through remittances in Pakistan was \$2.88 billion, with a continual growing propensity, foreign remittances in Pakistan unpredictable after 1982-1983. In 1990-1991 the amount of foreign remittances was \$1.84 billion and in 1996-1997 it decline to \$1.40 billion. According to Global Development Finance<sup>1</sup>, representative international remittances sent home by migrant workers stand for the second most important source of outside endowment in developing countries. In 2006 the amount of foreign remittances was \$300 billion and official international remittances now total \$93 billion per year.

The arrival of foreign remittances in Pakistan was generally unpredictable with the passage of time. In 1982-83 the foreign exchange earnings through remittances in Pakistan was \$2.88 billion with uninterrupted growing tendency. Foreign remittances pattern in Pakistan fluctuating after 1982-83. In 1990-91 the amount of foreign remittances was \$1.84 billion and in 1996-97 it reduced to \$1.40 billion.

In 1998, it was an almost observed volume of remittances declined by 36%, Due to atomic explosions of 1998, economic bane, the Gulf war and oil price crises which damaged the Arab economies. But in 1999-2000 it cut down to \$0.98 billion. During 2002-03, the size of foreign remittances reached to \$4.23 billion and once more in 2003-04 it was reduced to \$3.87 billion. Pakistanis sent remittances \$336 billion to their country in 2008 and in 2009 a formal source of remittance is \$316 billion. Foreign Remittances has improved in 2012-2013 \$ 11,569.82 million as compared to last year.

Now Pakistan is the 7<sup>th</sup> largest recipient of formally recorded remittances in the world and on number 2<sup>nd</sup> among the Asian countries. The arrival of foreign remittances in Pakistan was generally unpredictable with the passage of time. In 1982-83 the foreign exchange earnings through remittances in Pakistan was \$2.88 billion with uninterrupted growing tendency. Foreign remittances pattern in Pakistan fluctuating after 1982-83. In 1990-91 the amount of foreign remittances was \$1.84 billion and in 1996-97 it reduced to \$1.40 billion.

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## Theoretical link between remittances and economic growth

In this segment, we explain the theoretical link between remittances economic growth. There are mixed views about the effect of international remittances on an economic growth. Some economists believe that international remittances have a positive

<sup>1</sup> World Bank, Goble Development Finance (Washington: World Bank, 2004).

effect on economic growth, at the same time other schools of thought consider international remittances do not have any impact on economic growth. These schools of thought who believe that international remittances influence on economic growth positively their point of views are discussed as under.

From a theoretical and conceptual framework we come to know how international remittances explain different channels through which remittances directly and indirectly affect economic growth positively and some time negatively. The direct effect of international remittances on economic growth is positive because international remittances improve the balance of payment, reduce current account deficit, and decrease dependence on external borrowing<sup>2</sup>. Indirectly international remittances also enhance economic growth through increase in savings and investment in productive way<sup>3</sup>.

According to<sup>4</sup> if recipients have financial limitations that restrict their investment e.g., consequently developing countries remain poor. But international remittances allow receiver families improve their physical and human capital accumulation. Besides, those international remittances can enhance the credit facility of the investors. Then, due to multiplier effects, GDP increases many times, in other words remittances affect economic growth positively.

Negative effects of remittances affect economic growth. It can be explained as: First, most of migrant worker's belong to developing countries and first of all remittances are spent on consumption purpose because they want to improve their living standard.

The second impact of international remittances is change in labour force participation in the home countries. The remittances recipient country has a negative effect on economic growth through a decrease in labour force participation in the home country, because workers migrate and less worker remain in the home country to work therefore production and export decreases. At the end, international remittances may appreciate currency of home country, which reduces export of local goods and services and production in an economy.

## Theories of Migration

There are some major theories of migration.

Classical theory

Neoclassical Theory

Push-pull Theory of migration

Dual Labour Market Theory of Migration

Migration System Theory

New Economics of Labour Migration (NELM) and Livelihood approach

Trans - Nationalism Theory of migration

Roy's Theory of Migration

<sup>2</sup> Z. Iqbal & A. Sattar, "The Contribution of Workers' Remittances to Economic Growth in Pakistan: Pakistan institute of development Economic", Research Report num 187 (2005): 1-17.

<sup>3</sup> D. Ratha, "Worker' Remittances: An important and Stable Source of..."

<sup>4</sup> A. Barajas; M. T. Gapen; R. Chami & C. Fullenkamp, "Do Workers' Remittances Promote Economic Growth?" IMF Paper, Vol: 52 num 1 (2009): 55-82.

### *Classical theory*

Classical theory explains the foreign remittance transfer to poor nations would start industrialization in the poor countries and would take their economies towards rapid economic development and economic growth. Migrants transfer remittances to their home countries would change traditional societies to judicious and independent ideas.

### *Neoclassical Theory of migration*

Perhaps this theory of international migration is the oldest and best known and elaborates the importance of labour migration in the process of economic development. Lewis<sup>5</sup>, Ranis and Fei<sup>6</sup> and Harris and Todaro<sup>7</sup>. This theory explained the different economic factors of migration like geographic differences in the supply of and demand for labour. Some countries have laboured abundantly and some countries have capital abundant. Wages are rising in the labour abundant country and falls in capital abundant country.

Workers will move from low wage countries to higher wage countries. Now results of this migration supply of labour becomes scarce in the labour abundant countries and wages will be rise while the supply of labour becomes scarce in the labour abundant countries and wages will be fall. So wages differences and rates of employment between the domestic and host countries are very important factors of migration. According to the new classical theory, migrant workers want to maximize their satisfaction level. In such case, to achieve the equilibrium level in the economy the government of the migrant country is advised to allow the people for migration Borjas and Miller<sup>8</sup>. According to this theory of migration the process of migration from the domestic country to foreign countries by explaining various microeconomic and macroeconomic variables. On a macroeconomic level, decision of migration depends upon the comparison of cost and benefit of migration Sjaastad<sup>9</sup> and Todaro<sup>10</sup>.

Migration steps will be taken if the benefits are greater than the cost. According to this theory of migration the most significant factors that affect the decision to migrate are increased in the expected earnings in the foreign countries, better opportunities for employment, language differences, migration costs and distance between the countries. On the other hand, an improvement in expected income in the domestic country declines the chance to migrate.

Government policies affect migration decisions that also affects factors of migration. For example minimum wage law in the domestic countries decrease the likelihood of finding jobs in the foreign countries. At the macroeconomic level, the neo-classical theory explains that real wage differences in different countries are a major

<sup>5</sup> W. A. Lewis, "Economic Development with Unlimited Supplies of Labor", The Manchester School of Economic and Social Studies num 22 (1954):139-191.

<sup>6</sup> G. Ranis and J. C. H. Fie, "A Theory of Economic Development", American Economic Review, num 22 (1961): 139- 191.

<sup>7</sup> J. R. Harris and M. P. Todaro, "Migration, Unemployment and Development: A two Sector Analysis", American Economic Review, num 60 (1970): 126-142.

<sup>8</sup> G. Borjas & M. Miller, The Age of Migration (Basingstoke: Palgrave, 2003).

<sup>9</sup> L. A. Sjaastad, "The Costs and Returns of Human Migration", Journal of Political Economy, num 70 (1962): 80-93.

<sup>10</sup> M. P. Todaro, International Migration in Developing Countries (Geneva: ILO, 1976).

reason of migration. Workers migrate from low wage level countries to high wage level countries. The capital is transferred from higher wage countries to lower wage countries. At the international level equilibrium take place when there is no wage difference in all the countries.<sup>11</sup>

### *Push-Pull Theory of Migration*

The Push and Pull theory of migration in the domestic and foreign countries. The choices of migration depend on these factors of migration in the home and host country and are thought useful in the process of improvement from one country to another country. There are following economic, demographic factors and socio political factors were included in this theory like as high unemployment, low standards of living in the domestic country and population growth. The above mentioned factors were pushing factor. But in receiving countries, migration factors are called pull factors like as good economic condition, demand for labour and political stability, incentives for migration and rules and regulations in the foreign country. Push factors were the negative properties in domestic country and the positive properties were incorporated in the pull factors<sup>12</sup>.

### *Dual Labour Market Theory of Migration*

Neoclassical theory of migration explains the different factors of migration except institutional factors; we added these institutional factors in dual labour market theory of migration. Prior<sup>13</sup> explains the significance of race and sexual category in the process of migration in dual labour market theory of migration. It is also explains the division of labour market meant that labour market dived into two parts primary and secondary.

In primary labour market capital intensive methods of production were adopted and labour intensive production method of production used in the secondary labour market. Primary segment workers had higher income and better employment opportunity and they enjoyed a high standard of living because they are able to work with the modern capital technique.

Secondary segment workers were unskilled and worked at the bottom of the labour market. Pior<sup>14</sup> explains three reasons of demand for labour in international modern industrial societies. Firstly, labour shortage 2nd it required to fill the base position in the job ladder and shortages of labour in the secondary in the dual labour market. The last explanation was also enclosed by the first two explanations. Shortages of labour created vacancies in the bottom position in the job ladder. It brought demographic and social changes in modern industrial societies.

### *Migration System Theory*

This theory of migrations incorporated a various discipline and through light on the process of migration. This theory based on the mixture of the migratory movements with

<sup>11</sup> M. P. Todaro, International Migration in Developing...

<sup>12</sup> P. Datta, Nepali Migration to India. Paper presented in the Regional Population Conference, South Asia's Population in a changing Asian Context organize by International Union for The Scientific Study of Population. Bangkok, Thailand. 2002.

<sup>13</sup> M. L. Pior, Birds of Passage: Migration Labour in Industrial Societies (Cambridge: Cambridge University Press, 1979).

<sup>14</sup> M. L. Pior, Birds of Passage: Migration Labour in...

the relationships of micro and macro structures. In the macro structure the entire economy of the world, relations among states, and forces at local, national and global level were including.

But in the micro structures the social relationships between the migration on receiving and sending countries were included. This theory focused on the world market, particularly on the effects of capitalist's relations on non-capitalists unimportant societies through the actions of the multinationals, governments, etc. International migrations occur because labour, land and raw materials fell under the influence of the market control.

International migration was not so much impressed by policies towards the global flows of goods and capital. According to migrate system theory, international migration was an outcome of globalization and modern capitalist economy had created a mass of mobile workers looking for better opportunities.

#### *The New Economics of Labour Migration*

The new economics of labour migration theory deals with family. In this theory of migration family is taken in the analysis of migration. The individual emigrant was considered a subset of the family. The decision of migration was based on the cost and benefit analysis and this cost and benefits were shared with emigrant and his family members.

The migrant worker was also in agreement of the family members on the basis of cost and benefit analysis<sup>15</sup>. This theory explained the phenomenon of coinsurance because the cost and benefit that was generated from migrant worker shared among family members. The new economic, labour of migration theory did not ignore the value of individual activity in taking a decision for migration. Individual activity was also explained in the decision making unit with his family<sup>16</sup>. The NELM theory examined an economy and the more sociological relation with the human being in migration. According to the new economics of labour migration, international remittances among families were essential for migration decision.

#### *Trans-nationalism Theory of migration*

This theory of migration explains with the help of increasing up to date technologies, fast communication system and globalization and easy access of modern facilities. They are also able to establish cross border activities with their family members. Trans-nationalism activities mean those activities that are performed repeatedly at borders. The author also explains transnational's with the help of the above argument as focus on power shared by concerned group groups of the society, state, governments and also transnational's from below to create from the people and perceptions of the society. Therefore, it is a helpful discrimination that determines the nature of transnational's migration. Describe those transnational's methods that connect with their hosts as well as the home countries in which migrants create dimensional social relationship. In this case the stress is given to the migrants framing ties and their use of structure to contain and oppose the complex circumstances of their migration occurred.

<sup>15</sup> O. Stark and D. Bloom, "The New Economics of Labor Migration", *The American Economic Review*, Vol: 75 num 2 (1985): 173-178.

<sup>16</sup> O. Stark, *The Migration of Labor* (Cambridge: Blackwell, 1990).

*Roy's Theory of Migration*

This theory of migration (1951) elaborates that income inequalities are the main factor of migration among the domestic and foreign countries. The people who were living in the upper group of income scale had fewer tendencies towards migration and also had a greater inequality in home country than the foreign country. The people whose country living were in the lower group on the income scale had more incentive to migrate and also had a less disparity in domestic country than the foreign country. There might be established inverse relationship between migration rate and relative inequality in the case of the foreign country had a very irregular relative income distribution. The relationship between migration rate and the relative income disparity became positive in case of the foreign had a relative equal distribution.

According to this theory, there existed an inverted U relation among relative inequality and migration. For example, If the average income of a migrant country was less than the average of the foreign countries and the value of Gini coefficients was closer to one and similar levels of inequality in both countries than the migration ratio would be maximum, due to income disparity between domestic and foreign country everybody would be an incentive to emigrate. This theory also investigated the relationship between development and migration.

At the start of the industrialization, due to low wage migration rate was also low and in the advanced countries due to developments the migration rate has been increased. Migration rate decreased due to decrease in the wage disparity among the countries over time<sup>17</sup>. Moreover, poverty was a hurdle in the way of migration because the poor countries it was difficult to finance for migration. The main factors that affected the decision to migrate were higher income in the foreign country. There were many other important variables that affect the decision of migration, like factors of war, cultural injustice and political stability at foreign country.<sup>18</sup> The author further throws light on some of the determinants of the foreign migration theoretically.

These determinants were<sup>19</sup>: (a) Precipitate income difference or real wage disparity between domestic and foreign countries. If the probability of real income earning in the foreign country is higher as compared to home country, then migration took place toward that host country. It means for the decision of migrating most important variable is expected relative wage between the home and host country. (b) The economic and business conditions in both home and host countries. The business cycle of the host and home countries is responsible for migration between different countries. During prosperity and the shortage of labour in the foreign countries are increasing the chances of migration. On the contrary, during the depression and higher unemployment decreases the chances of migration. At the same time the migration decision also depends on real income disparity among the domestic and foreign countries. (c) Emigration policies: If the immigration policies in host countries are adverse this discourages migrants, while not absolutely, as there are chances of illegal migration to some foreign countries.

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<sup>17</sup> R. Rotte and V. Michael, Determinant of International Migration: Empirical Evidence for Migration from Developing Countries to Germany, IZA Discussion Paper 12, Institute for the Study of Labor, 1998.

<sup>18</sup> A. Solimano, Globalizing Talent and Human Capital: Implication for Developing Countries, ABCDE Conference Europe, Oslo, 2002.

<sup>19</sup> A. Solimano, Globalizing Talent and Human Capital: Implication...

After analysing of various theories of remittances and migration and exploring the important determinants of foreign remittances in the economic history of Pakistan are found helpful for selecting the appropriate variables and the construction of the econometric model to estimate the impact of international remittances on economic growth in Pakistan. Different remittances theories of motivations explain different types of remittances like potential remittances that are very simple and do not require further remark. Fixed remittances are derived from the altruistic theory of motivation for migration. The discretionary remittances depend on the difference between real interest rates, exchange rates and macroeconomic stability in the host and home country. Another side of the coin of discretionary remittances is saved remittances. Other things remaining the same, if the flow of discretionary remittances increase then saved remittances decrease. Saved remittances create the stock of wealth which boosts up Pakistan economy.<sup>20</sup>

International remittances explain different channel that impact on economic growth. Some economists believe that international remittances have a positive effect on economic growth<sup>21</sup>. At the same time other schools of thought international remittances do not have an impact on economic growth.

Different remittances theories of the motivations were also explained different economic, social, cultural and political determinants of international remittances in Pakistan. It was concluded that remittances concept cannot explain without understanding the term migration. After analysing the literature review a lot of studies, we came to know that migration is one of the most important determinants of remittances. Keeping in view, the importance of the international migration, different theories of migration are also disused in this section.

## Data and methodology

The main purpose of this section is to elaborate the source of the data, type of data, and interpretation of data concerning to research problem under study. Additionally, this section highlights some background information on the model specification and research methodology. Therefore, at the end of this section methodological framework is formulated to answer the research question, i.e. impact of international remittances on poverty. The rest of the section organized as: Segment 3.1 discusses model specification of international remittances and economic growth. Segment 3.2 consists of a description of the all the variables in the research Segment 3.3 deals with the source of data of all the concern variables. Segment 3.4 discusses the methodology to achieve the objective of the study. Finally, segment 3.5 presents the conclusion.

## Model Specification

The study employed ad-hoc model to check the practical association between international remittances and economic growth in the Pakistan from the time period of 1975 to 2016. Therefore, we started our research work by the following functional form to determine the relationship between economic growth, personal remittances, GFCF and foreign direct investment.

<sup>20</sup> S. Wahba, "What Determines Workers Remittances?", *Finance and Development*, Vol: 28 num 4 (1991): 41-44.

<sup>21</sup> Z. Iqbal & A. Sattar, "The Contribution of Workers' Remittances to Economic..."

$$GDP = f (REM, GDP, FDI) \quad (4.1)$$

The econometric form of the model can be written as:

$$GDP = \beta_0 + \beta_1 REM + \beta_2 FDI + \beta_3 GFCF + \varepsilon \quad (4.2)$$

Where:

GDP =GDP (current US\$)

REM =Personal remittances, received (current US\$)

FDI = Foreign direct investment, net inflows (Bop, current US\$)

GFC = Gross fixed capital formation (current US\$)

### **Description of the variables**

The variables used in research studies were explained as under:

#### **Personal Remittances**

Remittances Defined:

A remittance is a transfer of money by a foreign worker to an individual in his or her home country. Money sent home by migrants competes with international aid as some of the largest financial inflows to developing countries

#### **Gross Domestic Product**

“Gross domestic product measures the market value of the total produced in an economy, but includes only that output produced by economic resources located within that economy”. The gross domestic product is major macroeconomic variable which has a positive impact on economic growth of a country.

#### **Foreign Direct Investment (FDI)**

According to World Bank “FDI is defined as the investment made to acquire a lasting management in an enterprise operating in a country other than that of the investor”. FDI is an investment through by a corporation or person in one country in business interests in another country, in the type of each establishing big business operations or acquiring business assets in the other country, such as ownership or controlling interest in a foreign company.

#### **Gross Fixed Capital Formation**

Gross fixed capital formation (formerly a gross domestic fixed investment) comprises of expenditure on fixed assets of a country and net change in the level of inventories. It includes land improvements (fences, ditches, drains, and so on); plant, machinery, and equipment purchases; and the construction of roads, railways, and the like, including schools, offices, hospitals, private residential dwellings, and commercial and industrial buildings. According to the 1993 SNA, net acquisitions of valuables are also considering capital formation.



Independent Variables	Expected Sign
Personal remittances	Positive
FDI	Mixed
GFCF	Positive

Table 1  
Independent variables and its expected sign  
Source of Data

This study used time series data which can be obtained from various sources in estimating the impact of international remittances on poverty for the period of 1975 to 2016. Data of all variables included in a research study except economic growth are acquired from "World Development Indicators". Some data are collected from Economic Survey of Pakistan.

**Methodology**

*Stationarity of Data*

According to the time series possessions, non-Stationary variables in the data construct spurious results. This study wish to observe the impact of personal remittances, Gross fixed capital formation and foreign direct investment on economic growth. In organize to avoid from spurious regression results obtain by using an ordinary least square method. In classifying to check whether the time series data is stationary or not, we will perform unit root test. If the data is stationary at level, then we will apply the OLS method. If the data of essential variable are stationary at first differences, then we will apply Johansen Juselius Co-integration approach. If data of variables are stationary at level or the first difference means that mixed order I (0) and I (1) then we will use unit root test to check the stationary of the variables.

*Unit Root Test*

Stationary of the variables can be checked with the help of unit root test. First of all clarifies the meaning of stationary and non-stationary time series data. The time series data is said to be stationary if these conditions are fulfilled or exist, like as mean, variance and covariance all are found to be time invariant. For example, any series like it is said to be stationary if the underlying condition satisfies for all values of t and t = 1, 2, 3..... T

$$E (Y_t) = \mu \quad \text{constant mean} \quad (4.3)$$

$$\text{Var} (Y_t) = E (Y_t - \mu)^2 = \sigma^2 \quad \text{constant variance} \quad (4.4)$$

$$\text{Cov} (Y_t, Y_{t+s}) = \text{cov} (Y_t, Y_{t-s}) = \gamma_s \quad \text{covariance depends on s, not t} \quad (4.5)$$

Equation (4.3) declared that series has constant mean and equation (4.4) confirmed that the series has a constant variance, while equation (4.5) showed that the covariance between any two values of Y from the series depend only on the difference part in time between those two values (s) and not on the point in time (t). In equation (4.5) "s" denoted the different part of time between two successive values of the time series Y and indicated the time period. The time series data are to be non-stationary if the probability distribution of mean, variance and covariance of the data depends on time.

Dickey and Fuller introduced the concept of Augmented Dickey - Fuller to check the stationary of the variables with the help of unit root test. First of all, check the stationary of the data in order I (0) mean that data is stationary at level do nothing to make it stationary. If this condition is not satisfied, then we have to make it stationary in order I (1). If this condition is not fulfilled, then take the stationary in order I (2) and so on if series required the difference to become stationary, then the series will be integrated of order  $Z_t \sim I(d)$ . The random walk, model defined as the time series data moved downward or upward with no particular trends and if the series have a specific pattern either downwards or upwards were known as random walks with a drift like an AR (1) procedure.

$$Y_t = \alpha + \rho Y_t + \varepsilon_t \quad (4.6)$$

If  $|\rho| < 1$  then the equation (4.6) is stationary  $|\rho| = 1$  then AR (1) procedure in equation (4.6) is non-stationary. Furthermore, the AR (1) procedure in equation (4.6) reduces to a non-stationary random walk series if these conditions were fulfilled  $\alpha = 0$  and  $|\rho| = 1$  and in case of a random walk with drift if  $\alpha \neq 0$  and  $|\rho| = 1$ .

*Augmented Dickey Fuller Test*

As a Dickey Fuller test and Augmented Dickey Fuller Test can be used to examine the stationary of the data. We will apply to ADF test incorporate the probability of serial correlation in the error term. ADF supported by their regressions. Equation first is without constant trend.

$$Y_t = \rho Y_{t-1} + \varepsilon_t \quad (4.7)$$

Second equation with constant

$$Y_t = \alpha + \rho Y_{t-1} + \varepsilon_t \quad (4.8)$$

And third equation with constant and trend

$$Y_t = \alpha + \rho Y_{t-1} + \beta_t + \varepsilon_t \quad (4.9)$$

Where:  $Y_t$  = relevant time series  $\alpha$  = constant (intercept)  $t$  = time trend  $\varepsilon$  = residual term.

Our Null hypothesis and Alternative hypothesis will be stated as:

Null hypothesis  $H_0: \rho = 1$  (Data is not stationary)

Alternative hypothesis  $H_1: \rho \neq 1$  (Data is stationary)

Decision rule, if  $ADF^* > t$  critical value, then the null hypothesis is rejected and conclude that the data is stationary and if  $ADF^* < t$  null hypothesis is not rejected and conclude that Data is stationary. ADF test results will decide the technique or method we have to apply to estimating the model. If all our mention variables are stationary at level, then we will apply the Johansen co-integration technique. If all mention our variables are stationary at mixer of I (0) and I (1) then it is blunder to apply the Johansen co-integration technique and this problem can solved by apply some advance technique name as autoregressive distributed lag model (ARDL) which was developed by Pesaran et al.<sup>22</sup> Augmented Dickey Fuller test decide the technique or methods for estimating the mention above model given in equation (4.2). All our mention variables are stationary at mixer of I

<sup>22</sup> M. Pesaran; Y. Shin and R. Smith, "Bound Testing Approaches to the Analysis of Level Relationships", Journal of Applies Econometrics, num 16 (2001): 289-326.

(0) and I (1) then ARDL technique developed by Pesaran et al<sup>23</sup> has been employed to estimate the model in equation (4.2). Now we explain the autoregressive distributed Lag method to estimate a model.

*ARDL Approach to Co-integration*

There are some merits of ARDL approach that are discussed as under: The autoregressive distributed lag technique will be used only one single equation to estimate the LR (long run) and SR (short run) impact of the model simultaneously. The estimates obtained from the autoregressive distributed lag method are efficient and unbiased. When we are applying autoregressive distributed lag procedure then the problem of serial correlation and endogeneity is solved.<sup>24</sup> Autoregressive distributed lag technique to co-integration is useful for small samples as compare to Johansen Juselius co-integration technique and Engel-Granger. The autoregressive distributed lag (ARDL) approach to co-integration does not need that all variables to be the identical order. This technique can be used any order of integration whether I (0) or I (1) or mixer of both. When we are going to apply ARDL approach unit root test has no significant important in determining the integration order of the mention variables in the given model. (ARDL) autoregressive distributed technique to co-integration was first time use by the Pesaran et al.<sup>25</sup> to overcome the disadvantages of Johansen co-integration approaches and Engle Granger. ARDL technique is the combination of autoregressive and distributed lag models.

*ARDL Model Specification*

For two variables case  $X_t$  with n lags and  $Y_t$  with n lags the general form of the error correction model can be written as:

$$\Delta Y_t = \alpha_0 + \gamma Y_{t-1} + \theta X_{t-1} + \sum_{j=1}^{n-1} \alpha_j \Delta Y_{t-j} + \sum_{j=0}^{m-1} b_j \Delta X_{t-j} + \varepsilon_t$$

**(4.10)**

Function of dependent variable with independent variable

$$POV_t = f(REM_t, FDI_t, GDP_t, \mu_t)$$

Overall model

$$\Delta(GDP)_t = \alpha + \beta_1(GDP)_{t-1} + \beta_2(REM)_{t-1} + \beta_3(GFCF)_{t-1} + \beta_4(FDI)_{t-1} + \sum_{i=1}^{P_1} \delta_1 \Delta(GDP)_{t-i} + \sum_{i=0}^{P_2} \delta_2 \Delta(REM)_{t-i} + \sum_{i=0}^{P_3} \delta_3 \Delta(GFCF)_{t-i} + \sum_{i=0}^{P_4} \delta_4 \Delta(FDI)_{t-i} + \varepsilon_t$$

**(4.11)**

*Long run equation*

From the Bound test if we inference there exist a long run relationship among the variables in the model then long run coefficient can be estimated by means of the under mention equation.

<sup>23</sup> M. Pesaran; Y. Shin and R. Smith, "Bound Testing Approaches to the..."

<sup>24</sup> M. Pesaran; Y. Shin and R. Smith, "Bound Testing Approaches to the..."

<sup>25</sup> M. Pesaran; Y. Shin and R. Smith, "Bound Testing Approaches to the..."

**(4.12)**

$$GDP_t = \alpha_o + \varphi_1 GDP_{t-1} + \varphi_2 REM_{t-1} + \varphi_3 GFCF_{t-1} + \varphi_4 FDI_{t-1} + \varepsilon_t$$

Short run equation

The short run parameters of the variables with error correction in the model can be estimated from the following equation.

$$\Delta GDP = \alpha_o + \sum_{i=1}^n b_1 \Delta GDP_{t-i} + \sum_{i=1}^n b_2 \Delta REM_{t-i} + \sum_{i=1}^n b_3 \Delta GFCF_{t-i} + \sum_{i=1}^n b_4 \Delta FDI_{t-i} + ECT_{t-1} + \varepsilon_t \tag{4.13}$$

ECT<sub>t-1</sub>= Lagged error correction term

*Bound Testing Procedure*

Before estimating long run coefficient and error correction models first of all we will apply joint significant F-test or Wald test to check the presence of long run relationship. Null hypothesis and alternative hypothesis to measure the impact of international remittances on poverty in Wald test is written as under:

Null hypothesis  $H_0: \beta_1 = \beta_2 = \beta_3 = \beta_4 = 0$  (No co-integration exist)  
 Alternative hypothesis  $H_1: \beta_1 \neq \beta_2 \neq \beta_3 \neq \beta_4 \neq 0$  (Co-integration exist)

In equation (4.1) the coefficient of lagged variables are simultaneously equal to zero if you accept null hypothesis and it means no co-integration. There is long run relation or co-integration if we accept alternative hypothesis it also means at least one of the parameters of the lagged variables is not equal to zero. The decision of accepting or rejecting the null hypothesis or alternative hypothesis depends on Wald test. We conduct the Wald test on lagged level variables and compute F - Statistics.

The computed value of F- Statistics is compared with the critical values of F- Statistics developed by Pesaran et al. The critical values of F- Statistics has two critical bound, uppers bound I (1) and upper bound I (0). If calculated F value is greater than the upper bound then null hypothesis is rejected it means there exist long run relationship. If F-calculated is less than the lower bound then null hypothesis is accepted it means there is no long run relationship among the variables. At the end, if calculated F- Statistic lies between two bounds then for the given level of significant results of Wald test is inclusive. The equation of (4.11) the un-restricted error correction models relating to the impact of international remittance on economic growth.

The rest of the section is organized as: Segment 4.1 presents unit root test. Segment 4.2 examined bound test. Descriptive analysis of the variables is presented in segment 4.3. Segment 4.4 discusses long run estimating results. Short run results are presented in segment 4.5. Finally, segment 5.6 presents the conclusion.

**Unit Root Test**

The first and foremost duty of the researcher is applied Augmented Dickey Fuller test is to investigate the stationary of non-stationary of all variables include in the model when time series data is used for analysis of the model and to proceed further research

work. The results of the Augmented Dickey Fuller test are shown in table 2 and it explains GDP, REM and FDI are stationary at the level I (0) But GFCF is stationary at first difference I (1).

Unit Root Test on Level I (0)						Unit Root Test on First difference I (1)							
Variables	No ne	La gs	Interc ept	La gs	Trend & Interc ept	La gs	No ne	La gs	Interc ept	La gs	Trend & Interc ept	La gs	Conclu sion
<b>GDP</b>	6.75	0	4.19	0	1.02	0	...	...	.....	...	.....	...	I (0)
<b>REM</b>	4.73	0	3.65	0	1.73	0	...	....	.....	...	.....	...	I (0)
<b>FDI</b>	4.28	7	3.62	7	2.11	7	...	...	.....	....	.....	...	I (0)
<b>GFCF</b>	.....	...	.....	...	.....		-3.99	0	-4.58	0	-4.62	0	I (1)

Table 2

Augmented Dickey Fuller Test

Note: Values in brackets are the lag lengths, which are chosen by using the Schwarz information criterion. The null hypothesis under both the ADF is that the variable contains a unit root

**Bound Test / Wald Test**

To prove the existences or not existences of the long run relationship among the variables, bound test / wald test has been used. We pursue the bound testing technique and for this purpose, we construct a null hypothesis and alternative hypothesis. The results of bound test are reported in table 3.

Null hypothesis  $H_0: \beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = \beta_6 = \beta_7 = 0$  (No Co-integration exist)

Alternative hypothesis  $H_1: \beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = \beta_6 = \beta_7 \neq 0$  (Co-integration exist)

Equation	F-statistic	5% critical value bounds		10% critical value bounds	
GDP/ REM, FDI, GFCF	4.384370	I (0)	I (1)	I (0)	I (1)
		3.23	4.35	2.72	3.77

Table 3

Test for Co-integration

Note: Critical values are obtained from Pesaran et al. (1996). The critical values bound table is given in Appendix

F- Statistics value was computed from the Wald test that is 4.384370 which is greater than the upper bound at 5% and 10%. These results indicate that we are accepting the alternative hypothesis of co-integration and rejecting the null hypothesis. So, it is proved that there exists a long run relationship in the model.

### Descriptive Analysis of the Variables

The results of descriptive statistics of the variables included in the model are presented in table 4 which are calculated through E-view 9. Table 4 elaborates the distribution of the data for the dependent and independent variables. It provides the Mean, Median, Standard Deviation, Maximum, Minimum, Skewness, Kurtosis and Jarque-Bera (normality test) of the variables.

	GDP	REM	GFCF	FDI
<b>Mean</b>	7.03e <sup>+10</sup>	3.48e <sup>+09</sup>	1.10e <sup>+10</sup>	8.27e <sup>+08</sup>
<b>Median</b>	5.01e <sup>+10</sup>	2.06e <sup>+09</sup>	8.93e <sup>+09</sup>	3.22e <sup>+08</sup>
<b>Maximum</b>	2.32e <sup>+11</sup>	1.46e <sup>+10</sup>	3.02e <sup>+10</sup>	5.59e <sup>+09</sup>
<b>Minimum</b>	6.32e <sup>+09</sup>	4.12e <sup>+08</sup>	7.23e <sup>+08</sup>	-4000000.
<b>Std. Dev.</b>	6.24e <sup>+10</sup>	3.49e <sup>+09</sup>	8.97e <sup>+09</sup>	1.35e <sup>+09</sup>
<b>Skewness</b>	1.288505	2.016965	1.021772	2.481456
<b>Kurtosis</b>	3.579652	6.157059	2.766948	8.525757
<b>Jarque-Bera</b>	12.20971	45.91933	7.403177	96.53783
<b>Probability</b>	0.002232	0.000000	0.024684	0.000000
<b>Sum</b>	2.95e <sup>+12</sup>	1.46e <sup>+11</sup>	4.63e <sup>+11</sup>	3.47e <sup>+10</sup>
<b>Sum Sq. Dev.</b>	1.60e <sup>+23</sup>	4.99e <sup>+20</sup>	3.30e <sup>+21</sup>	7.44e <sup>+19</sup>
<b>Observations</b>	42	42	42	42

Table 4  
Descriptive Statistics  
Source: Authors' calculations

The feature of the data is explained in the above table. The average of the data is explained through mean value. The middle value of the data is shown through median. Minimum shows the lowest observation, whereas the maximum shows the highest observation. The degree of dispersion or speeds of data from their mean value is shown through standard deviation. Skewness is the degree of asymmetry of a distribution, if the frequency curve has a longer tail to the left of the central maximum, the distribution have a negative skewness, if the frequency curve has a longer tail to the right of the central maximum as compared to the left, the distribution have a positive skewness.

Kurtosis measures the degree of peakedness of a distribution, if the distribution having a comparatively high peak so it is called leptokurtic, whereas if the distribution having a relatively lower peak than it is called platykurtic. The last term which is used in the above table is Jarque-Bera. This test is applied to measure the degree of normality of the distribution of data.<sup>26</sup> The dependent variable GDP has averaged 7.03e<sup>+10</sup>. The

<sup>26</sup> D. N. Gujarati and D. C. Porter, Basic Econometrics (Washington: McGraw. Hill International Edition, 2009).

standard deviation of GDP is only  $6.24e^{+10}$  which mean the economic growth of Pakistan is deviate only  $6.24e^{+10}$  from the average  $7.03e^{+10}$  in the study. The largest value of GDP is  $2.32e^{+11}$  while lowest value is  $6.32e^{+09}$ . In the same way the mean, median, standard deviation, maximum and minimum value of the dependent is exhibited in this table.

Personal remittances having maximum value  $1.46e^{+10}$  & minimum value is  $4.12e^{+08}$ , but its mean value is  $3.48e^{+09}$  and standard deviation is  $3.49e^{+09}$ . GFCF having maximum value  $3.02e^{+10}$  minimum value  $7.23e^{+08}$ , mean value  $1.10e^{+10}$  and standard deviation is  $8.97e^{+09}$  which mean the gross fixed capital formation of Pakistan is deviate only  $8.97e^{+09}$  from the average  $1.10e^{+10}$  in this research work. Thirdly, the mean of FDI is  $8.27e^{+08}$ , standard deviation, maximum, minimum value is  $5.59e^{+09}$ ,  $-4000000$ ,  $1.35e^{+09}$  respectively. The following table 4.3 throws light on the correlation among the defendant with independent variables and independent variables with each other.

### Long Run estimating results

After finding the long run relationship among the variables, though Wald/Bound tests. We are now able to measure the long run coefficients through ARDL approach by estimating equation (4.12) of the impact of international remittances on economic growth of Pakistan. We have applied the ARDL approach to estimating model on different lags and taking different variables, but the results of some variables are significant so we dropped the most insignificant variables. After some process we are able to get the results of our model that indicates all variables are significant. The values of all parameters indicate good performance of the model. The finding of estimated long run parameters is exhibited in the table 5.

We have specified three explanatory variables like personal remittances, gross fixed capital, foreign direct investment.

Dependent variable: GDP		ARDL (1, 0, 0, 0)		
Variables	Coefficient	Std. Error	t-Statistic	Prob.
REM	3.725246	0.886781	4.200865	0.0002
GFCF	6.629297	0.481643	13.763912	0.0000
FDI	-5.342851	1.960403	-2.725384	0.0099
C	-7737179870.31	2308958963.0709	-3.350939	0.0019

Table 5  
Estimated Long Run Coefficient using the ARDL Approach  
Source: Author's calculation

Impact of core independent variable (personal remittances) on the GDP of Pakistan is explained firstly as the value of the coefficient is positive 3.725246 it means that in the long run there exist a positive and significant relationship between GDP and personal remittance if 1 unit increase in personal remittance will cause GDP increase by 3.725246 unit. So, a personal remittance is the main determinant of GDP in Pakistan. The studies by Azam and Khan, Iqbal and Sattar, Ahmad et al. found the positive impact on GDP. Directly and indirectly personal remittances affect GDP positively. The direct effect of international remittances on economic growth is positive because international remittances improve the

balance of payment, reduce current account deficit, and decrease dependence on external borrowing and through human capital. Indirectly international remittances also enhance economic growth through increase in savings and investment in productive way.

Barajas et. al<sup>27</sup> found that if recipients have financial limitations that restrict their investment e.g. consequently developing countries remain poor. But international remittances allow receiver families improve their physical and human capital accumulation. Besides, this international remittance can enhance the credit facility of the investors. Then, due to multiplier effects, GDP increases many times, in other words remittances affect GDP positively.

The second independent variable is gross fixed capital formation that has a positive and significant effect on GDP in Pakistan. This shows that an increase in gross fixed capital formation will lead to increase in GDP in Pakistan. Particularly, one unit increase in gross fixed capital formation will lead to increase GDP by 6.629297 in this research study. From all above results shows gross fixed capital formation has a positive and significant impact on economic growth in Pakistan. These results are according to the studies by Beddies<sup>28</sup>, Gbura and Thadjimichael, Gbura, Bakare, Orji and Mba. It is also supported by the Harrod-Domar model Romer<sup>29</sup> and Lucas<sup>30</sup> which verifies growth rate of national income or GDP will positively be associated to saving ratio and gross fixed capital formation.

The expected relationship between FDI has negative on economic growth of a country. The coefficient value of FDI is -5.342851. It means there is negative relationship between the FDI and GDP. FDI has a negative relationship with economic growth. The FDI negative impact is supported by this study Kogid et al.

### Error Correction Estimating Results

In order to determine the shorts run dynamic parameters we use the unrestricted error correction model. ECM results are reported in table 6.

Dependent variable: DEPI		ARDL (1, 0, 0, 0)		
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D (REM)	2.200023	0.630813	3.487601	0.0013
D (GFCF)	3.915072	0.814386	4.807394	0.0000
D (FDI)	-3.155334	1.508290	-2.091994	0.0436
CointEq (-1)	-0.590571	0.121748	-4.850768	0.0000

Table 6  
Error Correction Representation for the Selected ARDL Model  
Source: Authors' calculations

<sup>27</sup> A. Barajas; M. T. Gapen; R. Chami & C. Fullenkamp, "Do Workers' Remittances..."

<sup>28</sup> Beddies, Investment Capital Accumulation and Growth. Some Evidence From Gambia: 1964-1998. IMF Working Paper 99/117. 1999.

<sup>29</sup> P. M. Romer, "Increasing Returns and Long Run Growth", Journal of Political Economy, Vol: 94 num 5 (1986): 1002-1037.

<sup>30</sup> R. E. J. Lucas, "On the Mechanics of Economic Development", Journal of Monetary Economics, num 22 (1988): 3-42.



Table 6 shows the short run parameters for the long run association explained in the Co integration equation. The coefficient of ECM is negative and significant. The results show that the ECM coefficient is negative and significant. Particularly, the estimated coefficient of the error correction model is  $-0.590571$  percent. ECM indicates a median speed of adjustment from the preceding year to the long-run equilibrium. Furthermore the results of table 4.5 show that DREM (personal remittances) and a GDP of Pakistan is positively and significantly related to each other in the short run. Here 'D' shows the first difference of the variable. Its coefficient value is  $2.200023$  it means if 1 unit increase in personal remittance will cause an increase in GDP by  $2.200023$  units. According to Barajas et al.<sup>31</sup> if recipients have financial limitations that restrict their investment e.g. as a result developing countries remain poor. But international remittances allow receiver families enhance their physical and human capital accumulation. Besides, this international remittance can enhance the credit facility of the investors. Then, due to multiplier effects, GDP increase many times, another explanatory variable is gross fixed capital formation that has a positive and significant effect on GDP in Pakistan. This shows that an increase in gross fixed capital formation will lead to increase in GDP in Pakistan. Particularly, if 1 unit increases in Gross fixed capital formation will lead to increase GDP by  $3.915072$  in this research work. These results are according to the studies by Beddies, Gbura and Thadjimichael, Gbura, Bakare, Orji and Mba. It is also supported by the Harrod-Domar model Romer and Lucas which verifies growth rate of national income will positively be associated with saving ratio and gross fixed capital formation. The negative impact of FDI on GDP. If one unit increase in FDI than GDP will decline by  $3.155334$  units.

The aim of this section is to measure the impact of international remittances on economic growth in Pakistan for the period of 1975-2016. The results of unit root tests are mixture co-integration order that is why we have applied the ARDL approach to measure the coefficient of the variation. We have pointed out main three determinants of GDP of Pakistan economy. These determinants are personal remittances, gross fixed capital formation and FDI. We have concluded all other variables in this model except FDI have a positive and significant effect on economic growth of Pakistan.

### Conclusion and policy recommendations

International remittances are a secure source of income in Pakistan and give support to improve economic growth. At a country level International remittances are spent for various aims. The individual spent international remittances for consumption and investment purpose to expand economic growth of the country. Due to the importance of international remittance the present study examines the research question and the results drawn from this study. This section discusses the in detail the possible policy implication to make international remittance more useful instrument for increasing economic growth in Pakistan

This section concludes the effect of international remittances on economic growth in Pakistan for the period of 1975 to 2016 by applying the ARDL approach on the simple linear econometric model. In the 2<sup>nd</sup> and 3<sup>rd</sup> sections the hypothesis and objectives of this study obtains from the theoretical and empirical literature review are presented. It was observed that the following were the main factors that impact on economic growth of Pakistan personal remittances, gross fixed capital formation and foreign direct investment.

<sup>31</sup> A. Barajas; M. T. Gapen; R. Chami & C. Fullenkamp, "Do Workers' Remittances..."

In the 4th section we discuss that data of all the variables are collected from world development indicator and economic survey of Pakistan. To check the stationarity of the time series data unit root test is used. From ADF test, this study finds most of the variables are stationary at a level like GDP, personal remittances and GFCF, I (0) and FDI are stationary at first difference I (1). So, it is concluded from the unit root test that all variables in this research study are mixture order of co-integration. To check the existence of the long run relationship we have applied bound test / Wald test. After that we have constructed autoregressive distributed lag model for the estimation of a long run and short run parameters. The short run relationship and speed of adjustment mechanism toward the long run among the variables is measured with the help of Error Correction Model (ECM). However, ARDL is used to estimate the long run relationship. The empirical results and its interpretation are discussed in section 5<sup>th</sup>.

GDP and personal remittances are positively and highly significantly associated in the long run as well as short run. Direct effects of personal remittances though improve the balance of payment, reduce current account deficit, and decrease dependence on external borrowing and trough human capital. Indirectly international remittances also enhance economic growth through increase in savings and investment in productive way. From the ARDL technique and ECM this study found gross fixed capital formation is also positive and significant impact on economic growth in Pakistan because the coefficient of GFCF is 6.629297 and this positive relationship of GFCF is supported by the Harrod Domar Model.

Another important factor that impact on economic growth of concern country is FDI. In the short run FDI negatively impact on economic growth. In the long run FDI has negatively related to economic growth. In this way individual will work more and macroeconomic condition of the country improves.

### **Policy Recommendations**

On the bases of the results of this research work, policy makers and government should encourage international remittance inflows. So that's a positive significant effect of international remittance on economic growth be achieved. In attaining this positive effect, the following measures are suggested to enhance international remittances in Pakistan.

High cost of remitting money through financial institution is the main hurdle in the way of transferring money. Government should reduce transfer costs of remitting money back. For this purpose government should order the commercial banks and other money transfer representative, to reduce their transfer cost.

In the home country government must take different measures to create political stability in the economy, so that people in the foreign country must spend their remittance in the home country.

To promote foreign remittances, overseas Pakistani foundation should provide guidance in promoting investment opportunities in the productive field in the home country. Yet investment is more profitable in the host country. The government must control social, political aggression and develop infrastructures, create stability in the energy sector in the home country.

The government should establish a facilitation centre in those countries where mostly population migrates like Saudi Arabia, Dubai, U.K. and U.S.A to solve the problems of migrant and encourage them to send their income through a financial institution.

With reference to the empirical analysis carried out in this study to justify and clarify the mixed findings and contentious position of literature concerning workers' remittances it has become clearer that the direction of remittances is to the extent of economic challenges faced by any recipient country. These challenges differ from one country to the other ranging from developed, developing, and least developed to landlocked developed according to the word classification by United Nation (as amended on 20<sup>th</sup> September, 2011), the channels of remittances either to productive or unproductive use are greatly influenced by these divers' challenges. Whenever way one looks at it, this study concludes that remittances flow contributes its quota to the growth in output and increase the consumption and investment volume within the period under consideration.

### **Limitation to the study**

The present study is unable to include all the economic, political, social and many other variables because data of some of these variables is not available. An international remittance is wide, vast and interesting field for further research. The area of future research is:

To further understand the importance of foreign remittances, its impact can be estimated by using various other variables in context to Pakistan.

This question is considered vital for further research and gives some hint to the further researcher work on international remittances and its impact on economic growth in Pakistan.

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