

## Consequences of Worker's Remittances on Human Capital: An In-Depth Investigation for a Case of Pakistan

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**Abstract:** *Purpose:* This paper aims to empirically investigate the consequences of worker remittances on human capital formation in case of Pakistan. *Methodology:* In order to achieve the target of this study; Autoregressive Distributed Lag (ARDL) Bounds Testing Approach is used for the period from 1981-2011. *Findings:* The findings of this study have exposed that worker's remittances have an adverse impact on human capital formation. The coefficient of worker's remittances is significant at 5 percent level of significance. One important justification for the deteriorating impact of worker's remittances on human capital formation is the negligence of parental care. Particularly, the absence of father or any other close relative from home leads to situations where there can be no checks on the outside home activities of the children. Also, the cultural constraints in the country restrict mothers or any female member of the household to go outside to look after their children's activities. Therefore; the positive impact of worker's remittances in the form of inflow of income is offset by the adverse impact of the negligence of the parental care and hence, human capital is showing adverse performance rather improving. *Originality/ Novelty:* There is hardly any empirical study which investigates the consequences of worker's remittances on human capital formation in case of Pakistan. This is an attempt which may fill this gap.

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**Key words:** Pakistan % Worker's Remittances % Human Capital % Foreign Direct Investment

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### INTRODUCTION

A number of factors have significant influence on the economic wellbeing as well as the standard of living of a society. But there are some of the main factors which have special importance for a particular community. Among these factors the inflow of foreign remittances is one, which is imperative for developing nations. Remittances are very important because in the poor nation income and savings of the people are very low and for uplifting the economy there is need for extra capital and this capital is generated with the help of foreign remittances. In this way remittances enhance the economic growth and welfare of the household. Remittances have not only important for foreign exchange

of money but remittances become a big source of poverty reduction and enhancing human capital in developing countries like Pakistan.

Global remittances experienced a dramatic increase over the years, particularly since 1990 wherein the developing world emerged to be the major beneficiary accounting for 60 percent of the total amount. Because it is the inflow of the remittance which encourage the foreign direct investment in developing countries that is considered the globalized way getting economic growth. There is empirical evidences are available which highlighted the fact that remittances inflows entail wide ranging advantages and disadvantages both for sending as well as receiving countries as well as receiving country. One of the direct effects of remittances is that

they generate income for the recipient country and smooth the consumption pattern of that country in this way remittances become the big cause of investment in human capital of recipient country. The indirect effects of remittances on poverty are felt through GDP growth, enhanced fiscal space and access to foreign exchange for a country.

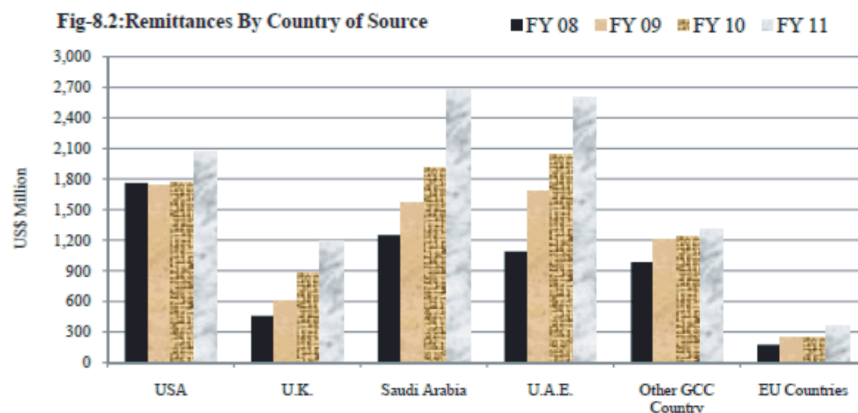
The literature has revealed that remittances had three times larger share as compared to FDI (remittances were \$300 billion and foreign direct investment \$104 billion). Although, the economies which have greater share of remittances are full of income inequality and volatility and have in established and underdeveloped financial markets and remittances are spurring of economic development.

A number of studies are available which investigate the effect of increased remittances for developing countries, have significant impact on poverty reduction, economic growth, education, infant mortality and entrepreneurship (King and Levine [1]; Beck, Levine and Loayza, [2, 3]; and Beck, Kunt and Levine, [4]). With reduction of poverty among nations remittances become the cause of high per capita income, which further enhance human capital in this way benefiting the economy in the long span of time. Remittances directly generate a rise in the recipients' income, smoothening consumption and facilitating investment in human capital,

a major source of development. The indirect effects of remittances on poverty are felt through GDP growth, enhanced fiscal space and access to foreign exchange. These favorable developments highlighted by eminent researchers were counter-balanced as well. For instance emergence of moral hazard, low share of the poor in the remittances and the negative effects of appreciation of real exchange rate were pointed by the investigators too.

In Pakistan, research on international migration has primarily focused on investigating the magnitude and demographic profiles of the out-migrants. More recently, however, the implications of migrant manpower at the macro-level; such as employment of labor force, GNP growth, private savings, private investment, consumption and balance of payments have also been investigated. Moreover, the uses of remittances by migrants' households and by migrants themselves, on return, has been the subject of much empirical research to search not only for incentives and policy prescriptions but also to channeled these resources into productive uses (Shah [5]).

Within this context, the current study contributes to the empirical literature with the objective of investigating the effects of worker remittances on the human capital in the home country. The inflow volume of remittances, the developmental importance of technological changes and



| Country/Region Wise Cash Workers' Remittances |                |                 |             | (\$ Million) |  |
|-----------------------------------------------|----------------|-----------------|-------------|--------------|--|
| Country/ Region                               | Jul-Apr        |                 | % Change    | % Share      |  |
|                                               | 2010-11        | 2011-12*        |             |              |  |
| USA                                           | 1,677.9        | 1,922.4         | 14.6        | 17.7         |  |
| U.K.                                          | 990.9          | 1,263.7         | 27.5        | 11.6         |  |
| Saudi Arabia                                  | 2,085.8        | 2,987.9         | 43.2        | 27.5         |  |
| UAE                                           | 2,091.3        | 2,386.3         | 14.1        | 21.9         |  |
| Other GCC Countries                           | 1,063.5        | 1,226.6         | 15.3        | 11.3         |  |
| EU Countries                                  | 290.8          | 304.6           | 4.8         | 2.8          |  |
| Other Countries                               | 846.4          | 785.7           | -7.2        | 7.2          |  |
| <b>Total</b>                                  | <b>9,046.6</b> | <b>10,877.0</b> | <b>20.2</b> | <b>100.0</b> |  |

Source: State Bank of Pakistan

\* Provisional

human capital for the developing countries like Pakistan encouraged the researchers and policy makers to think about this issue. There are a number of reasons why the link between remittances, human capital and economic growth and development would interest policy makers in Pakistan. According to World Bank estimates the remittances flows to developing countries in 2011 increased by 8.0 percent from \$ 325 billion in 2010 and is forecast to grow at 7 to 8 percent annually till 2014. Compared to the 10.1 percent growth in South Asia, remittances to Pakistan witnessed a strong growth of 25.8 percent in 2011 over previous year. Pakistan has become the fifth largest remittances recipient developing country (Economic Survey of Pakistan [6]).

The general upward trend in remittances during the period this period was composed of a per annum average growth from U.A.E of 32.2 percent followed by U.K. (30.1 percent), Saudi Arabia (27.3 percent), EU countries (25.3 percent), Other GCC Countries (15.1 percent) and USA (9.5 percent) during the period 2007-08 to 2010-11.

The recent impressive performance of the last year, worker's remittances give much strength to current account. The cumulative increase of remittances in 2011-12 is attributed to the government's efforts to divert remittances from the informal to the formal channel. It is because of the launch of Pakistan Remittances Initiative (PRI), the share of workers remittances coming through the banking channel has increased considerably and shows the developing performance of financial sector of Pakistan.

**Research Question:** Whether the inflow of worker's remittances has any significant effect on Human Capital Formation in Pakistan or not?

**Objective:** The objective of the study is to test empirically the consequences of worker's Remittances on Human Capital Formation in Pakistan for the both short term and long term.

#### **Hypothesis:**

$H_0$  = Worker remittances does not effect on Human Capital Formation in Pakistan.

**Literature Review:** A number of social scientists highlighted the significant share of investment in education from remittances by the part of family for improving the standard of living and reducing the range

of poverty trap. The comparative study of Pakistan and El Salvador provided enough evidence that remittances improve the working class condition and reduced child labor and promote schooling (Cox and Ureta [7]; Acosta [8]; Mansuri [9]; Acosta, Fajnzylber and López [10]). By utilizing household data of Philippines, Yang [11] accomplished that there is positive interaction between remittances and educational investment by household. But the results indicate that the impact of remittances on schooling is inconclusive. But the in case of Mexico remittances have little and insignificant impact in rural communities and less educated mothers (Hanson and Woodruff [12]; Borraz [13]; Boucher, Stark and Taylor [14]). Some studies also highlight negative effect of migration and remittances on schooling and welfare of children (Hanson and Woodruff [12]; Lopez [15]; and McKenzie and Rapoport [16]).

On the other hand some of the researchers are of the view that migration has little impact on the well-being of the households as remittances are merely substitutes for household income. They are not sufficiently large to better the households' well-being and to speed up economic development. Recent surveys suggest that migrant incur huge transaction cost to go abroad because the wages earned by the migrants are just meet the subsistence of the household and remain in poverty trap (Chami, Fullenkamp and Jahjah [17]; Rodriguez and Tiongson [18]; Funkhouser [19]). By using household survey data of Indonesian Parinduri and Thangavelu [20] that there is very little and insignificant impact of remittance on schooling and health cares.

Some of the cross-sectional studies of developing nations highlighted the positive and significant impact of remittances on education and health sectors, so in this way remittances promote economic development overall in case of developing countries (Adams and Page [21]; and Adams [22]).

Hanson and Woodruff [12] found that remittances had strong association to higher educational attainment in rural areas of Mexico, especially for female whom mother having low educational background. Lopez [15] found that high inflow of remittance is attached with low illiteracy rates in Mexican communities, but it has mixed evidence on attendance of schooling by both sexes, it is positive for age 5-13 and negative for age 14-17. McKenzie and Rapport [16], reinvestigate the case study of Mexico and they found that children among the age of 16 to 18 had low educational achievements and it was highly negative for those household where mothers have high schooling age.

The case study of Mexico showed that the positive impact of remittance vary with the level of education of parents especially mother (Hanson and Woodruff [12]; McKenzie and Rapport [16]), the variation in results is because of family structure of the developing countries is also very from household to household and locality to locality inside in the country. The poor household of the developing countries preferred their current consumption and indulged their selves with durable goods of daily use in this way they remain low in educational attainments.

For understanding the vertical impact of remittances, Cardona and Medina [23] assessed how inflow of remittances effected the household composition of consumption in developing nations. According to them there are four main compositions of expenditures by those household who get remittance: household consumption, educational expenditure, healthcare expenditure and savings of the household. The empiric shows that only the expenditure of education is changed because remittance. In fact, remittance recipient households spend on average 11% more on education. Although the net erect on other items is nil, it may well be that there is an insurance element associated with remittances as they cover income lost after the severe 1998-1999 recession.

A detailed research is conducted by Dorantes, *et al.*, (2008) to analyze the impacts of remittances on the educational attainment of children in Haiti. The study made a significant contribution to the literature by separating the “migration effect” from “remittances effect” for the first time. Although the receipt of remittances by the household lifts budget constraint and raises the children’s likelihood of being schooled, but out-migration of a family member increases the social and economic responsibilities of the remaining household members as well and thus reduces the likelihood of children being schooled. To find a net impact of remittances receipt child’s education, the study divided the sample size into two groups. They first took pooled data for children from all household and, subsequently, using a sub-sample of children from households who do not experience an out-migration, but still receiving remittances. The results show that remittances raise school attendance for all children regardless of whether they have household member abroad or not. These results suggested that remittances offset significantly the negative effect of migration of a household member on its children education attendance and leads to the accumulation of human capital.

According to Nassir, *et al.*, (2011) remittances have negative impact on schooling of children if the parents of the children are uneducated but it is become positive when parents have education. The performance of the children is very low in the absence of father or any other close relative from home leads to situations where there can be no checks on the outside home activities of the children. So, sometimes remittances have negative impact on the growth of human capital in case of developing countries.

### Data Source and Model

**Data Sources:** This study uses the variables of, per capita income, foreign direct investment, secondary school enrollment as proxy variable for human capital, population growth rate and remittances for empirical analysis for the period of 1981to 2011. Data of all the variables are taken from World Development Indicators online database by World Bank [27].

**Theoretical Model:** The model of this study includes five variables Worker Remittances (WR), Foreign Direct Investment (FDI), Per Capita Income (PC) and Population Growth Rate (POPG) as input factors of Human Capital Formation (HCF).

The general form of the model is as follows:

$$HCF_t = f(FDI_t, POPG_t, PC_t, WR_t)$$

and

$$HCF_t = \$_0 + \$_1 FDI_t + \$_2 POPG_t + \$_3 PC_t + \$_4 WR_t + g_t$$

where,

t = 1,2,3,.....31 (time period ranging from 1981-2011)

HCF<sub>t</sub> = Secondary School Enrollment at time t

FDI<sub>t</sub> = Foreign Direct Investment at time t

POPG<sub>t</sub> = Population Growth Rate at time t

PC<sub>t</sub> = Per Capita Income at time t

WR<sub>t</sub> = Worker Remittances at time t

$$HCF_t = A_t (FDI^{\alpha} t) (POPG^{\beta} t) (PC^{\gamma} t) (WR^{\delta} t)$$

where (α, β, γ, δ) are the elasticity coefficients.

Linear expression of above production function is:

$$\text{LogHCF}_t = \text{LogK}_0 + \alpha \text{LogFDI}_t + \beta \text{LogPOPG}_t + (\text{LogPC}_t + 2\text{LogWR}_t + g_t$$

or

$$\text{LogHCF}_t = X_0 + \alpha \text{LogFDI}_t + \beta \text{LogPOPG}_t + (\text{LogPC}_t + 2\text{LogWR}_t + g_t$$

where  $g_t$  is the white noise error term. The sign of all the elasticity coefficients are expected to be positive.

## MATERIALS AND METHODS

Non - stationary behavior is considered common characteristic of time series data due the presence of time trend in such data. Most of the time series data is non-stationary because of the existence of time trend in it. According to Granger and Newbold [28], regression analysis applied on such type of data may provide spurious estimates. Philips [29] further adds that the existence of co-integrating relationship among the time series in the long run is necessary to get reliable results from regression analysis. Ensuring the stationarity of time series is essential for testing co-integrating relationship among them. Thus the regression results obtained through Ordinary Least Square (OLS) method are reliable if the variables are stationary and cointegrated. Ordinary least square based regression in its simple form may give reliable estimates if time series included in it are stationary and have co-integration among them.

**Test of Unit Root:** Augmented Dickey-Fuller (ADF) test is used to check the problem of non-stationarity or unit root in the data by applying the regressions models given below:

$$\Delta X_t = a + d X_{t-1} + \sum_{j=1}^q g_j \Delta X_{t-j} + e_t$$

$$\Delta X_t = a + b_{t1} + d X_{t-1} + \sum_{j=1}^q g_j \Delta X_{t-j} + e_t$$

where

$$\Delta X_t = X_t - X_{t-1}$$

The presence of unit root problem or stationarity is accessed through the hypothesis given as under:

H0 :  $\alpha = 0$  (the time series  $X_t$  is Non-Stationary or have unit root)

H1 :  $\alpha < 0$  (the time series  $X_t$  is Stationary or does not have unit root).

**Bound Testing Approach to Co-Integration:** Test of cointegration is used to know about the presence of equilibrium relationship between the studied variables. Idea of cointegration was initially presented by Engle and Granger [30]. It was enhanced later on by Johansen and Juselius [31], Johansen [32] and Pesaran *et al.* [33]. Johansen and Juselius [31] and Pesaran *et al.* [33] approaches are used commonly to check the existence of cointegration among the variables involved. This thesis utilizes the well-known bound testing cointegration approach using Auto-Regressive Distributed Lag (ARDL) structure, introduced by Pesaran *et al.* [33].

Contrary to available contemporary approaches to test the presence of long run cointegrating relations, ARDL based approach of cointegration checks the same thing without considering order of integration that either the time series involved are  $I(0)$ ,  $I(1)$  or have mixed order of integration. This test uses UECM which is an abbreviation of Unrestricted vector Error Correction Mechanism and is considered to possess superior testing characteristics because it is not a residual based cointegration test to check short run coefficients and long-run cointegration through the error series as in the test of the Engle-Granger co-integration technique (Pattichis [34]). Use of ARDL is recommended test for checking co-integration for the small sample to avoid the small sampling error as advised and used by Mah [35]. Alam and Quazi [36] suggest that ARDL testing procedure may be utilized when the independent time series are endogenous.

For applying the ARDL bounds testing test of cointegration, it is mandatory to symbolize Equation (4.6) in a conditional ARDL model or UECM as given below:

$$\Delta \ln HCF_t = a_1 + a_2 \ln HCF_{t-1} + a_3 \ln WR_{t-1} + a_4 \ln PC_{t-1} +$$

$$a_5 \ln FDI_{t-1} + a_6 \ln POPG_{t-1} + \sum_{i=1}^p b_i \Delta \ln HCF_{t-i} + \sum_{j=0}^p b_j \Delta \ln WR_{t-j} +$$

$$\sum_{k=0}^p b_k \Delta \ln PC_{t-k} + \sum_{l=0}^p b_l \Delta \ln FDI_{t-l} + \sum_{m=0}^p b_m \Delta \ln POPG_{t-m} + v_t$$

where variables used in the equation are already explained. The sign  $\Delta$  denotes the variation ( $\Delta X = X_t - X_{t-1}$  and is known difference of the  $X$ ) and  $v_t$  is the regression residual. ARDL method makes usages of Wald statistic which follows F statistics to verify the

existence of a cointegrating bond. F-statistics is used to test null hypothesis which states that there is no cointegrating relation and is tested by checking the combine significance of coefficients variables with lag of one period.

Keeping in view the equations mentioned above, our statistical hypotheses to test cointegration are given as under:

$$H_0: \alpha_2 = \alpha_3 = \alpha_4 = \alpha_5 = \alpha_6 = 0$$

(Cointegrating relationship of the variables does not exist)

$$H_0: \alpha_2 \dots \alpha_3 \dots \alpha_4 \dots \alpha_5 \dots \alpha_6 \dots 0$$

(There is cointegrating relation among the variables).

Pesaran *et al.*, (2001) provides statistical table values of F-Statistic to test the hypotheses above mentioned. When the estimated value of “F” statistic is lower than the value of lower bound or more than that of upper bound compatible with a suitable (99%, 95% or 90%) level of confidence, then a decisive conclusion is reached even having no earlier information regarding the integration level of independent variables. One may reject the null hypothesis which states the non-existence of co-integration, between the dependent and all independent time series included in the analysis under consideration, if the Wald based estimated F value proves higher than the critical value of upper critical bound. This indicates the existence of co-integration relationship in the variables that are studied. Final conclusion cannot be taken when the calculated F-value is inside the interval shaped by the values of lower critical bound and upper critical bound. It is the situation in which early knowledge of the integration level of independent variables becomes necessary before drawing any conclusion regarding the rejection or acceptance of null-hypothesis of no co-integration. In another situation while the calculated F-value is below table value for relevant critical lower bound, at specified level of significance, the null-hypothesis may not be rejected which states that co-integration does not exist [33].

When the co-integration is applied and the results confirm its existence for long span of time, then it is time to check for the possible short run co-integrating relationship and dynamics by using the VAR based Error Correction Mechanism (ECM). Based on equation the form of VECM which includes our concerned variables is as given below:

$$\Delta \ln HCF_t = a_1 + \sum_{i=1}^p b_i \Delta \ln HCF_{t-i} + \sum_{j=0}^p b_j \Delta \ln WR_{t-j} + \sum_{k=0}^p b_k \Delta \ln PC_{t-k} + \sum_{l=0}^p b_l \Delta \ln FDI_{t-l} + \sum_{m=0}^p b_m \ln POPG_{t-m} + \ln ECM_{t-1} + v_t$$

We have defined all the symbols and time series variables already excepting  $ECM_{t-1}$ , which is time lagged series of residual term which represents error correction. Size and sign of the slope co-efficient of this term “ $ECM_{t-1}$  (i.e. 8)” inform about the pace of converging or diverging from or to stable long term cointegrating path when the included variables face some shocks. The negative and significant coefficient of error term “8” will confirm the speed of adjustment towards long run stable equilibrium.

## RESULTS AND DISCUSSION

Empirical findings of the study are discussed and presented in this part of the study. The analysis which is presented in this part captures the expected consequences of worker’s remittances on Human Capital Formation in Pakistan for the short run and long run. This aim is possibly achieved by testing stationarity of the variables by utilizing Augmented Dickey Fuller [37] unit root test; the reason behind testing stationarity is to apply Co-Integration test for diagnosing long run relationship among the factors of the study. Therefore, Autoregressive Distributed Lag (ARDL) Model is used to see whether long run stable relation is present among Human Capital Formation; Worker’s Remittances, Per- Capita Income, Foreign Direct Investment and Population Growth.

**Unit Root Analysis:** ADF test is used to analyze and check for the problem of unit root or non-stationarity in the data. Here data is used in transformed form with natural logarithm. The Table 1 presents the results of unit root test based on ADF test. The results indicate that all the variables in the model are stationary at first difference.

**Test of Co-Integration:** ARDL test of co-integration is applied to test the long run relation among Human Capital Formation (HCF), Worker Remittances (WR), Foreign Direct Investment (FDI), Per Capita Income (PC) and Population Growth Rate (POPG). The estimates of bound tests of co-integration, drawing upon ARDL equation, are shown in Table 2. F-Statistics based on Wald test is employed to check the null-hypothesis which states that

Table 1: Results of Augmented Dickey-Fuller (ADF) Test for Unit Root

| ADT Test at Level |             |         | ADT Test at First Difference |             |         |
|-------------------|-------------|---------|------------------------------|-------------|---------|
| Variables         | t-Statistic | P-Value | Variables                    | t-Statistic | P-Value |
| $LHCF_t$          | -1.145576   | 0.6864  | $LHCF_t$                     | -5.107792   | 0.0002  |
| $LWR_t$           | -1.549492   | 0.4969  | $LWR_t$                      | -4.820049   | 0.0005  |
| $LPC_t$           | -1.096442   | 0.7035  | $LPC_t$                      | -4.213043   | 0.0027  |
| $LFDI_t$          | -1.456923   | 0.4578  | $LFDI_t$                     | -5.107782   | 0.0003  |
| $LPOPG_t$         | -0.870195   | 0.7820  | $LPOPG_t$                    | -5.107169   | 0.0004  |

Table 2: Results of ARDL Bound Testing Approach to Co-integration

| Test-statistic | Calculated-Value | Significance level | Bound Critical Values |      |
|----------------|------------------|--------------------|-----------------------|------|
|                |                  |                    | I(0)                  | I(1) |
| F-statistic    | 5.0125*          | 1%                 | 5.25                  | 6.36 |
|                |                  | 5%                 | 3.79                  | 4.85 |
|                |                  | 10%                | 3.17                  | 4.14 |

Table 3: Long Run Relationships

| Dependent Variable = $LHCF_t$ |             |                |             |               |
|-------------------------------|-------------|----------------|-------------|---------------|
| Variable                      | Coefficient | Standard Error | t-Statistic | Prob. - Value |
| C                             | -7.129166   | 2.175705       | -3.276716   | 0.0031        |
| $LWR_t$                       | -0.051661   | 0.022670       | -2.278786   | 0.0315        |
| $LPC_t$                       | 1.436609    | 0.191435       | 7.504425    | 0.0000        |
| $LFDI_t$                      | 0.102815    | 0.019395       | 5.301223    | 0.0000        |
| $LPOPG_t$                     | -0.055874   | 0.058483       | -0.955392   | 0.3485        |

there is no co-integration among human capital; worker's remittances, per capita income, foreign direct investment and population growth. The value of F-statistics is 5.0125\* and is larger than the value of upper bound, 4.85, given by Pesaran *et al.* [33] for 5% level of significance. So the null hypothesis of no co-integration among the factors of the study is rejected.

The results of co-integration test presented in Table 2 prove that Human Capital Formation (HCF); Worker's Remittances (WR), Per Capita Income (PC), Foreign Direct Investment (FDI) and Population Growth Rate (POPG) in Pakistan are cointegrated and are in equilibrium in the long run.

When cointegrated relationship is existed among the variables of study, in this way long run results of the study are reliable. The results symbolize long run elasticity's of Human Capital Formation (HCF), Worker Remittances (WR), Per Capita Income (PC), Foreign Direct Investment (FDI) and Population Growth Rate (POPG). The results of long run cointegration are presented in Table 3.

The results of Table 3 show that Worker's Remittances (WR), Per Capita Income (PC) and Foreign Direct Investment (FDI) have statistically significant impact on Human Capital Formation (HCF) in Pakistan. However, the impact of Population Growth Rate (POPG)

on Human Capital Formation (HCF) is negative and not significant in long run. Foreign Direct Investment (FDI) and Per Capita Income (PC) are significantly improving Human Capital Formation (HCF); whereas, the consequences of Worker's Remittances on Human Capital Formation (HCF) is significantly adverse. According to the literature, Worker Remittances and Human Capital Formation are negatively associated with each other in Pakistan. Our findings reveal that as inflow of worker's remittances increases by 1% then it will deteriorate the performance of human capital by about 0.052%. The adverse impact of worker's remittances is due the negligence of parental care to their young ones in case when they are living abroad; consequently, outside home activities of the children are being neglected which ultimately harm the health and education of the children and hence overall performance of the human capital deteriorates.

The results demonstrate that Per Capita Income is among the major determinants of Human Capital Formation in Pakistan and have the coefficient 1.4366. This implies that Human Capital Formation in Pakistan are highly elastic with Per Capita Income and 1 % increase in Per Capita Income leads to 1.4366 % increase in Human Capital Formation and this result is significant at five percent level. Also, it has found into this study that

Table 4: Short Run Estimates

| Dependent Variable: $\Delta LHCF_t$ |             |                |             |             |
|-------------------------------------|-------------|----------------|-------------|-------------|
| Variable                            | Coefficient | Standard Error | t-Statistic | Prob. Value |
| $\Delta LWR_t$                      | -0.060011   | 0.039467       | -1.520529   | 0.1420      |
| $\Delta LPC_t$                      | -0.763739   | 0.491203       | -1.554833   | 0.1336      |
| $\Delta LFDI_t$                     | 0.061324    | 0.022729       | 2.697998    | 0.0128      |
| $\Delta LPOPG_t$                    | 0.017474    | 0.127282       | 0.137287    | 0.8920      |
| $ECM_{t-1}$                         | -0.064717   | 0.025089       | -2.579465   | 0.0168      |
| Constant Term                       | 0.062943    | 0.017864       | 3.523346    | 0.0018      |

R - Squared = 0.424751

Adjusted R-squared = 0.299697

Durbin - Watson Statistic = 2.112685

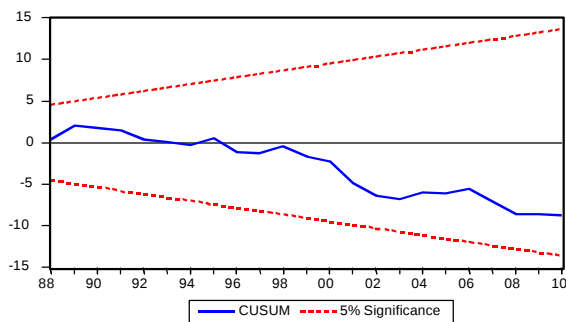


Fig. 1:

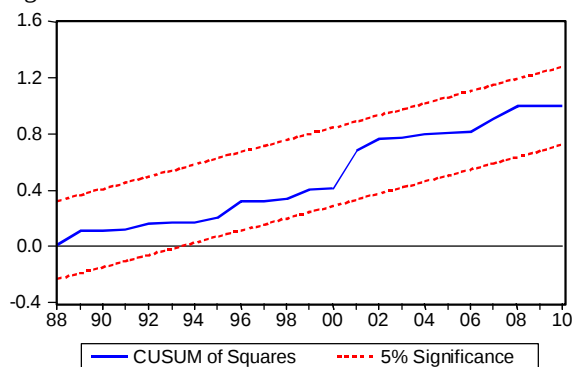


Fig. 2:

Foreign Direct Investment (FDI) is another important factor which may contribute to Human Capital Formation in Pakistan. Foreign Direct Investment positively and significantly impacts Human Capital Formation, its positive as well as significant coefficient is 0.102815 and it indicates that there will be 0.102815 percent increase in Human Capital Formation if inflow of Foreign Direct Investment increases by one percent.

**Short Run Estimates:** Once Co-Integrating relationship among the factors of the study is established, the next step is to apply vector error correction mechanism (VECM) in order to investigate short run dynamics. Table 4 explains the short run dynamics of variables. According to Table 4, Foreign Direct Investment (FDI)

has significant and positive effect on Human Capital Formation (HCF) in short run. However, rest of the other factors of the study remain insignificant into short run.

The one period lagged ECM is significant and negative. It is the verification of existence of long run relationship of variables. Foreign direct investment has positive coefficient of 0.061324 and is statistically significant in short run.

In order to examine the consistency of the coefficients of our model the cumulative sum (CUSUM) and the cumulative sum of squares (CUSUMsq) were used. The geometrical demonstration of both tests is presented in Fig. 1 and Figure 2. The null-hypothesis of these tests which states that model is specified correctly may not be rejected as line graph of these test statistics lies inside the critical limits at 5% level of significance. Both figures show that the line graphs of both tests statistics are inside the critical limits so the model used in the study is correctly specified.

## CONCLUSION AND RECOMMENDATIONS

The purpose of the study is to investigate the in-depth consequences of worker's remittances on human capital formation in Pakistan. ARDL bounds testing approach to co-integration is used to analyze the long run relationship of worker's remittances and human capital formation along with some other control variables such as per capita income; foreign direct investment and population growth. Empirical results based on ARDL bound testing approach to co-integration show that there exists a long run equilibrium relationship between worker's remittances and human capital formation in Pakistan.

Worker's Remittances have marginally and significantly adverse impact on the human capital formation. It means that the positive impact of worker's remittances in the form of inflow of income is offset by the negative impact of the parental absence. Particularly the

absence of father or any other close relative from home leads to situations where there can be no checks on the outside home activities of the children. Also, the cultural constraints in the country of study restrict mothers or any other female member of the household to go outside to look after their children's activities. Based on these arguments it is concluded that the human capital formation is demonstrating adverse performance in response to the inflow of income through worker's remittances in Pakistan.

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