



Remittances, Employment rate, Literacy rate, Foreign Direct Investment and Economic Growth in Pakistan: An ARDL Co-Integration Analysis

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ARTICLE DETAILS	ABSTRACT
History Revised format: Nov, 2018 Available Online: Dec, 2018 Keywords Remittances, Economic Growth, Employment Rate, Literacy Rate, Foreign Direct Investment, Domestic Investment, Pakistan.	The key concern of this study is to examine the effect of remittances on Pakistan's economic growth between 1985 and 2017. The study examined the relationship between remittances and economic growth with the influence of employment rate, literacy rate and foreign direct investment on the interaction between them. Result of the long run co-integration indicates that the domestic investment and employment rate have significant and positive relationship with GDP in Pakistan. On the other hand, CUSUM plots remains within the bounds 5% level of significant and remains closer to the standard line that means the model that we used is structurally stable. Results of granger causality show the bi-directional relationship between domestic investment and FDI. This study suggested that the government should focus to increase the level of remittances, because remittances are the main determinants of economic growth in developing countries.

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1. Introduction

A remarkable increase can be seen in workers' remittances over previous decade in Pakistan. Remittances are considered as the lever of economic development especially in developing countries such as Pakistan because senders may be looking to invest some of their remittances in home countries for when they return in home. Remittances inflows by migrants to developing countries are huge part than aids and foreign direct investment (World Bank, 2013). Remittances play an important role in the life of their payee particularly in emerging countries where resources are forced and real output growth is often negative. Payee used remittances to improve their living standard by paying for a charge such as household consumption and education. The impact of remittances on economic growth can be significantly positive

or negative because it depends on the use of remittances. If payee used remittances for productive investments it has a positive impact and if used in consumption than a negative impact on economic development. The large flow of remittances comparative to other exterior flows and to GDP in many countries has a macroeconomic effect and critical importance in the country's economy (Sharma, 2010). Study contended effect of remittances on economic development is notable that implies remittances inflows prompts higher utilization. Observational proof demonstrates that remittances impact financial development decidedly and fundamentally. Moreover, the investigation additionally finds that remittances have a solid and factually huge effect on neediness lessening subsequently recommending that here is generous prospective compensation connected with the universal movement for needy persons in creating nation similar to Pakistan (Javid, Arif & Qayyum, 2012). The long-term effect of remittances on poverty depends on a variety of factors, including the distribution of wages, savings and investment, and job incentives (Pant, 2006). Remittances inflow got from abroad Pakistani has a positive on the economic development of Pakistan after control for other essential determinants of monetary development like family unit financial utilization, budgetary advancement; sparing and current record adjusts (Khan, Tufail & Amjad, 2013). The experimental writing assessing the effect of remittances on the receiving nation has recognized various financial advantages that can be inferred. The examination reports that remittances can assume a key job in moderating the impact of unfriendly yield stuns however apply no huge impact on consumption and investment, (Jackman, Craigwel & Moore, 2009). The effect of remittances could be affected by the advanced level of the getting nations. Results demonstrated that by and large remittances positively affect long-run economic development, yet the effect contrasts in light of the nation's financial advancement stage with the plenitude of remittances in the financial system (Matuzeviciute & Butkus, 2016).

2. Literature Review

There are many studies on the relationship between economic growth and remittances for developing and underdeveloped countries. Remittances inflow promotes economic growth and welfare of poor family units. Remittances straightforwardly enhance the wage of needy individuals and smooth family unit's consumption. Ferdaous (2016) cited Impact of Remittances and FDI on Economic Growth. The examination has discovered a positive and factually huge effect of FDI on the financial development for the creating nations in the test. The outcome recommends that FDI has the capability of enhancing financial development for creating nations in the test. The result shows that most remittance revenues are not used to productive uses and the reason for remitting to the home country economies is mostly altruistic rather than profit driven. Javid et al. (2012) imply that the connection between workers' remittances, economic growth, and poverty. To use the ARDL approach to analyse the impact of remittances inflow on GDP and poverty in Pakistan for the period 1973-2010. Remittances have a beneficial outcome on monetary development yet the solid and measurably noteworthy effect on neediness diminishment and financial development of Pakistan. Koyame-Marsh (2012) cited the impact of Workers' Remittances on Economic Growth. Here used time series data for 1976-2007. Results found that specialists' remittances have a fundamentally negative effect on real yield development of Benin as it were. Specialists' remittances don't appear to fortify monetary development in any of the ten nations. Worker's remittances speak to a standout amongst the most imperative wellsprings of outer streams of capital for some creating nations. Shah, Bakar, and Azam (2016) depicted the effect of Pakistan's foreign direct investment, economic development, and terrorism. The study results revealed that there is a negative correlation between FDI, the Elementary School Enrolment Index (EEI) and economic development. The results of Granger causality analysis identified that terrorism is Granger cause with economic growth. The results indicate that, through appropriate economic policies, foreign investment must be increased. Pant (2006) depicted Remittance Inflows to Nepal and the Economic Impact and Policy Options. The result of the study shows that remittances play a vital role in the country's economic development by calming the foreign exchange compulsion and strengthen the balance of payments.

Sharma (2010) explained the influence of remittances on economic ambiguity. The cause of simplifying household consumption and lowering the level of poverty is remittances. The results indicate that remittances have a longer-term effect on poverty, depending on a range of factors, such income distribution, savings and investment, and incentives to work. Matuzeviciute and Butkus (2016) explored the value of remittances from employees and its consequences for economic development. An unbalanced panel of data over the period a sample of 116 countries with varying stages of development over the 1990-2014 period was used here. Results have shown that remittances have an immense positive effect on long-term economic growth, but the impact varies depending on the degree of economic development of the country and the large number of remittances in the financial sector. Docquier, Rapoport, and Salomone (2012) claimed that Remittances migrants' education and migration policy. The model predicts that the connection between remittances and vagrants' training is vague and relies upon the migration approach directed at goal. The impact of instruction is bound to be certain when the movement approach is progressively prohibitive and less ability particular.

3. Methodology

The data used from 1985 to 2017 in this study and the data collection source is the World Bank. Here used an ARDL Co-integration term for the data analysis. An ARDL Co-integration used to check the dependent variable and independent variables relationship. A wide range of studies was carried out to investigate the impact of remittances and economic growth. This study has focused on developing countries like Pakistan and this study is secondary data based. The following are estimated variables and their impact on model explained:

Model: $GDP = \alpha_0 + \alpha_1 REM + \alpha_2 EMR + \alpha_3 LITR + \alpha_4 FDI + \alpha_5 REM \times EMR + \alpha_6 REM \times LITR + \alpha_7 REM \times FDI + \alpha_8 DI + \epsilon$

Where:

GDP= Gross Domestic Product (current US\$ in Millions)

REM= Remittances (REM US\$ in Millions)

EMR= Employment Rate (Current US\$ in Millions)

LITR= Literacy Rate (Annual %)

FDI= Foreign Direct Investment, net inflow (Current US\$ in Millions)

DI= Domestic Investment (Current US\$ in Millions)

ϵ = Error Term

4. Theory

Poirine (1997) represents A Theory of Remittances as an Implicit Family Loan Arrangement which explains the main variable of research named as Remittances. Remittances are determined by the variable, like repayment of the loan and the implicit family rate of interest. Remittances are consumed on the repayment of loan and education of children. In Pakistan remittance are treated as a source of income. So, remittances should be no different than total income.

Table: Variables Measurement

Variables		Measurements
Dependent	Variable	
Gross Domestic Product	Domestic	GDP at the price of the buyer is the amount of the total value added by all value added by all resident, plus all taxes on products and minus any subsidies which are not included in the value of the items.

Independent Variables		Personal remittances cover workers' personal transfers and benefits.
Remittances		
Foreign Investment	Direct	FDI in the reporting economy relates to direct investment equity flows. It is the amount of equity capital, earnings reinvestment, and other capital.
Domestic Investment		Gross domestic investment consists of spending on additions to the economy's fixed assets, plus net improvements in inventory levels.
Employment Rate		The percentage of the population of a nation that is working is the employment to population ratio. Employment is defined as a person of working age who have engaged in some operation during a short time span for the production of goods or for the provision of services for pay or benefit, whether at work during the time span.
Literacy Rate		The fully established literacy rate is the right of individuals aged 15 and over who can both read and write a brief, simple account of their everyday lives with consideration.

Source: World Bank, 2018

5. Results and Discussion

Unit Root Test

A test of stationarity (or nonstationarity) that has become widely popular over the past several years is the unit root test. An important assumption of the ADF test is that the error terms are independently and identically distributed. Phillips and Perron use nonparametric statistical methods to take care of the serial correlation in the error terms without adding lagged difference terms. Since the asymptotic distribution of the PP test is the same as the ADF test statistic (Gujarati, 2004). Matching and freely distribution in data is the basic assumption of Augmented Dickey Fuller Tests. Additional assumption is that the value of variance should be constant. In addition, stationarity was tested at the stage, but the result was non-stationary, achieving the necessary results for stationarity after taking the first difference. (Gujarati, 2004)

Table 1: Unit Root Test

		Level		First Difference	
Variables		Statistics	Probability	Statistics	Probability
GDP	ADF	0.508366	0.9844	-5.22635	0.0002
FDI	ADF	-1.28593	0.6238	-4.53237	0.0011
DI	ADF	-0.08659	0.9427	-4.64647	0.0008
EMR	ADF	-0.9693	0.7521	-3.8112	0.0069
REM	ADF	0.509164	0.9844	-4.34974	0.0018
<u>LITR</u>	<u>ADF</u>	<u>-3.65649</u>	<u>0.0099</u>		

Source: Software E-Views 9

All the variables are stationary at the first difference in the unit root test in this model expect the literacy rate. So, we move further towards ADRL analysis in this situation.

ARDL

When all variables are not stationary at same level we move towards ARDL test. At the first we discussed the relationship between domestic investment and GDP. In this research work DI checked out as an independent variable.

Table: 2

GDP(-1)	0.269839	0.137992	1.955475	0.0646
GDP(-2)	-0.070379	0.116037	-0.60652	0.551
GDP(-3)	0.379031	0.095679	3.961468	0.0008
FDI	0.023562	0.017734	1.328627	0.1989
DI	0.560712	0.064818	8.650568	0.000
DI(-1)	-0.286313	0.0885	-3.235175	0.0041
EMP	0.468545	0.154728	3.028173	0.0066
LTR	-0.100401	0.099581	-1.008239	0.3254
<u>REM</u>	<u>0.015168</u>	<u>0.020502</u>	<u>0.739836</u>	<u>0.468</u>
R-squared	0.998897	Durbin-Watson stat		2.10439
Adjusted Rsquared	0.9984			

<u>Variable</u>	<u>Coefficient</u>	<u>Std. Error</u>	<u>t-Statistic</u>	<u>Prob.*</u>
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Source: Software

E-Views 9

Here value of coefficient is 0.560712 and P-Value is 0. Its means when DI has positive but miner change. So, the result shows DI has positive but significant impact on GDP. The other variable is employment rate and the value of coefficient is 0.468545 and p-value is 0.0066. So, the result shows EMP has positive but significant impact on GDP.

Table 3: The F-test for Co-integration (ARDL Bound Test)

Model	F -statistic
GDP,REM,EMR,LITR,FDI,DI	5.178416

10%	2.26	3.35
5%	2.62	3.79
2.5%	2.96	4.18
<u>1%</u>	<u>3.41</u>	<u>4.68</u>

Source: Software E-

Views 9

Significance I0 Bound I1 Bound

We check the value of upper and lower bounds at dissimilar levels of significance. For the model the value of F-statistics is 5.178416. That shows the value of the upper and lower bounds are less than the value of F-statistics. That's mean we can move towards ARDL Bounds test for short run and long run.

Table 4: ARDL Co-integrating and Short Run Form

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(GDP(-1))	-0.308652	0.085652	-3.603544	0.0018
D(GDP(-2))	-0.379031	0.095679	-3.961468	0.0008
D(FDI)	0.023562	0.017734	1.328627	0.1989
D(DI)	0.560712	0.064818	8.650568	0
D(EMP)	0.468545	0.154728	3.028173	0.0066
D(LTR)	-0.100401	0.099581	-1.008239	0.3254
D(REM)	0.015168	0.020502	0.739836	0.468
CointEq(-1)	-0.421508	0.10565	-3.989673	
CointEq = GDP - (0.0559*FDI + 0.6510*DI + 1.1116*EMP - 0.2382*LTR + 0.0360*REM + 0.6540)				<u>0.0007</u>

Source: Software E-Views 9

The above table examined the period of the short run parameters for the period of the long run relationship through equation of co-integration. The value of coefficient of error correction model is negative and significant. The estimated value of error correction coefficient is -0.421508 percent. Error correction model indicate the slow adjustment speed from previous year to the equilibrium of long run. The result of DI (domestic investment) and economic growth in the short run are significantly and positively associated with each other. Here the term “D” represents the variable first difference and the value of the coefficient is 0.560712. This value shows that increase in GDP is 0.560712 due to 1 percent increase in domestic investment. The result of another independent variable EMR (employment rate) is positive and significant. The value of the coefficient is 0.468545. This value shows that increase in GDP is 0.468545 due to 1 percent increase in employment rate. Result shows that domestic investment and employment rate have positive effect on economic growth. If the value of any variable coefficient is negative then after taking the first difference, they become positive.

Long Run Estimating Results

After applying the Wald test to estimate the long run association among the variables. Now we are able to estimate the coefficients of long period through ARDL technique by measured the impact of remittances on economic growth.

Table 5: ARDL Co-integrating and Long Run Form

Variable	Coefficient	Std. Error	t-Statistic	Prob.
FDI	0.055899	0.051957	1.075861	0.2948
DI	0.650993	0.131957	4.933371	0.0001
EMP	1.11159	0.340414	3.265411	0.0039

LTR	-0.238195	0.251537	-0.946956	0.355
REM	0.035986	0.049021	0.734079	0.4714
<u>C</u>	<u>0.653961</u>	<u>0.257228</u>	<u>2.542343</u>	<u>0.0194</u>

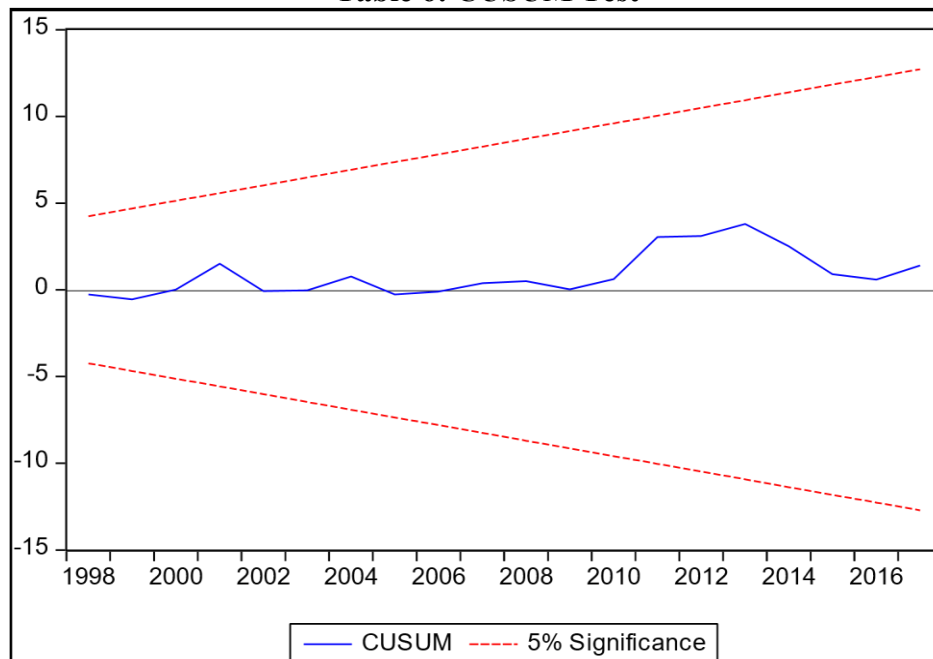
Source: Software E-Views 9

In this model there are five variables like, foreign direct investment, domestic investment, employment rate, literacy rate and remittances. First we discuss the impact of foreign direct investment on GDP and FDI coefficient value is 0.05 and p-value 0.29. The result of FDI and GDP in the long run are insignificantly and positively associated with each other. The result shows that domestic investment and the value of coefficient is 0.650993 and p-value is 0.0001 that indicate the significant and positive relationship with GDP in Pakistan. Similarly, these results are consistent with other researches results like; (Konings, 2000; Agosin & Machado 2005) stated that domestic investment has positive impact on economic growth. Similarly the value of coefficient of employment rate is 1.11159 and p-value is 0.0039 that shows the positive and significant impact on GDP. Our results are consistent with other studies like, (Frenkel, 2004; Chung, & Oorschot, 2011) stated that employment rate has positive and significant effect on economic growth in Argentina, Brazil, Chile and Mexico. Literacy rate is negatively and insignificantly associated with GDP while, remittances are also positively but insignificantly associated with GDP in Pakistan.

CUSUM Test

To test the randomness of a set of zeros and ones, the CUSUM test is used. This test based on the maximum distance from zero of a random walk defined by a cumulative sum of sequence.

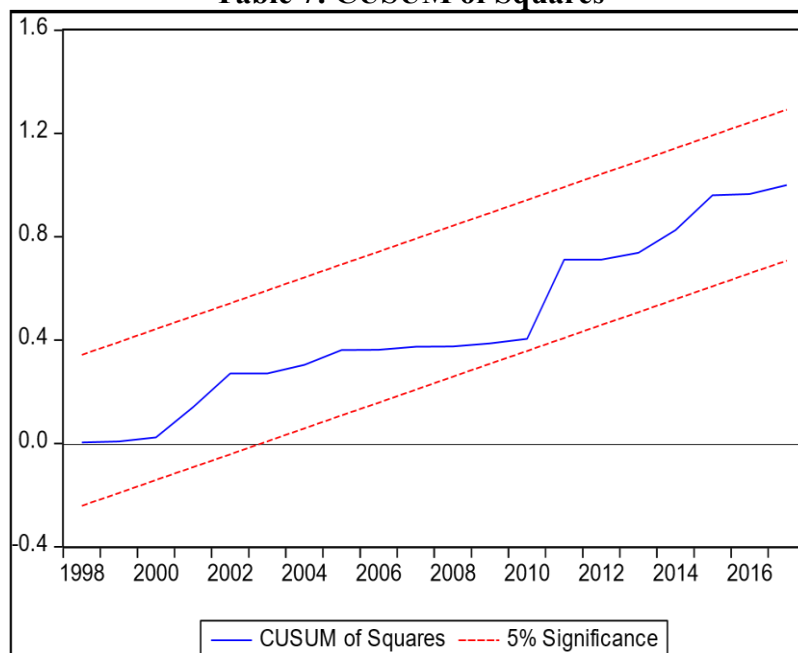
Table 6: CUSUM Test



CUSUM plots remains within the bounds 5% level of significant and remains closer to the standard line that means the model that we used is structurally stable.

CUSUM of Squares

This test used the stability of coefficients in a model to be evaluated. It is relatively simple to compute and only makes use of the OLS residuals from the estimation of the co-integration regression, and exploits their information content s consistent estimators of the regression error.

Table 7: CUSUM of Squares

CUSUMQ plots remains within the bounds 5% level of significant and remains closer to the standard line that means the model that we used is structurally stable.

Table 8: Pairwise Granger Causality Tests

Null Hypothesis:	Obs	Statistic	Prob.
FDI does not Granger Cause GDP	31	2.05964	0.1478
GDP does not Granger Cause FDI		2.17552	0.1338
EMP does not Granger Cause GDP	31	2.65491	0.0893
GDP does not Granger Cause EMP		0.36437	0.6981
DI does not Granger Cause GDP	31	0.21997	0.804
GDP does not Granger Cause DI		2.71323	0.0851
LTR does not Granger Cause GDP	31	0.42983	0.6552
GDP does not Granger Cause LTR		2.00062	0.1555
REM does not Granger Cause GDP	31	1.17802	0.3238
GDP does not Granger Cause REM		3.56072	0.043
EMP does not Granger Cause FDI	31	1.09819	0.3485

FDI does not Granger Cause EMP		2.37566	0.1128
DI does not Granger Cause FDI	31	4.21588	0.026
FDI does not Granger Cause DI		3.38843	0.0492
LTR does not Granger Cause FDI	31	1.56377	0.2284
FDI does not Granger Cause LTR		0.02141	0.9788
REM does not Granger Cause FDI	31	0.94225	0.4027
FDI does not Granger Cause REM		0.70342	0.5041
DI does not Granger Cause EMP	31	1.22583	0.3099
EMP does not Granger Cause DI		2.87328	0.0746
LTR does not Granger Cause EMP	31	1.97473	0.1591
EMP does not Granger Cause LTR		1.67646	0.2066
REM does not Granger Cause EMP	31	0.14148	0.8687
EMP does not Granger Cause REM		3.85369	0.0342
LTR does not Granger Cause DI	31	0.37843	0.6886
DI does not Granger Cause LTR		0.34403	0.7121
REM does not Granger Cause DI	31	1.2738	0.2967
DI does not Granger Cause REM		3.49094	0.0454
REM does not Granger Cause LTR	31	1.14501	0.3338
LTR does not Granger Cause REM		2.93128	0.0711

Source: Software E-Views 9

The first column displays the Null hypothesis at various significance levels for potential rejection, while the second and third columns show F statistics and probability, respectively. The probability values listed in the table are based on them. As the null hypothesis, the argument having a probability value lower than or equal to 0.1 can be rejected. We may reject a null hypothesis based on the probability value, i.e. employment rate does not Granger cause GDP, implying that employment rate enhances the economic growth. Due to high employment rate, the income of the people increase and their living standard also improved which ultimately expand the economic growth. There is unidirectional relationship between employment rate and GDP. The P.value for the null hypothesis, i.e. domestic investment does not granger cause GDP is 0.804. It depicts that domestic investment have no any influence on gross domestic product. The Probability value for the null hypothesis, i.e. GDP does not Granger cause remittances are 0.08. It

shows that GDP does granger cause gross domestic investment. This shows that there is unidirectional relationship between GDP and domestic investment. The Probability value for the null hypothesis, i.e. remittances does not granger cause GDP is 0.32. It depicts that remittances have no any influence on GDP. The P.value for the null hypothesis, i.e. GDP does not Granger cause remittances are 0.04. It shows that GDP does granger cause gross remittances. The result shows that there is unidirectional relationship between GDP and remittances. Domestic investment does granger cause FDI is 0.02, suggests that domestic investment does granger cause FDI. On the other hand, FDI does granger cause domestic investment and p.value is 0.04. There is bidirectional relationship between domestic investment and FDI in Pakistan. The high level of domestic investment in an economy becomes the cause of high growth rate. Employment rate does granger cause DI is 0.07. There is unidirectional relationship between employment rate and DI in Pakistan. The p.value for the null hypothesis, i.e. employment rate does not granger cause remittances is 0.03, suggests that employment rate does granger cause remittances rate in Pakistan. The Probability value for the null hypothesis, i.e. remittances does not granger cause DI is 0.29. It depicts that remittances have no any influence on DI. The P.value for the null hypothesis, i.e. DI does not Granger cause remittances are 0.04. It shows that DI does granger cause gross remittances. This shows that there is unidirectional relationship between DI and remittances. The P.value for the null hypothesis, i.e. remittances does not granger cause LTR is 0.33. It depicts that remittances have no any influence on LTR. The P.value for the null hypothesis, i.e. LTR does not Granger cause remittances are 0.07. It shows that LTR does granger cause gross remittances. This shows that there is unidirectional relationship between LTR and remittances. The main findings of the study show that remittances have positive and significant effect on economic growth in Pakistan. This finding similar with the findings of (Asad, Hashmi & Yousaf, 2016; Cooray, 2012; Olusuyi, Adedayo, Agbolade & Ebun, 2017).

6. Conclusion and Future Work

The core objective of the article was to study of the impact of remittances on economic growth in Pakistan from 1985 to 2017. The study finds that remittances favorably affect the economic growth in Pakistan. The flow of remittances in developing countries becomes a source of development. Another reason of this positive relationship of remittances and economic growth in Pakistan may be that remittances considered as the level of economic development especially in developing countries such because senders may be looking to invest some of their remittances in home countries for when they return in the home. The findings of the article show that remittances (REM) have positive and significant linked with economic growth. This result of the current study is consistent with the theory named as “A theory of remittances as an implicit family loan arrangement” the conduct of family consumption is influenced by the economic prospects in the host nation (Poirine, 1997). It is concluded that the result of ARDL Co-integration shows that domestic investment and employment rate are positively and significantly related with GDP. The result of Granger causality displays that there is bi-directional association between domestic investment and FDI in Pakistan. Similarly, as employment rate, literacy rate and remittances have a uni-directional relationship with FDI and GDP.

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