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Foreign Capital and Investment in Pakistan:
A Cointegration and Causality Analysis

[1]Sharafat Ali, [2]Hamid Waqas, [1]Muhammad Asghar, Raheel Abbas Kalroo[3], Muhammad Ayaz[4], Mukhtyar Khan[5]

[1]Assistant Professor, Department of Economics, Government Postgraduate College Kot Sultan, Layyah, Pakistan, 31650
[2]Muhammad Ali Jinnah University Islamabad, Pakistan
[3]Lecturer Economics, Layyah Campus, Bahauddin Zakariya University Multan
[4]Lecturer Economics, University of Baluchistan Quetta, Pakistan
[5]Lecturer Economics, Government Degree College Kabal, Sawat, Pakistan

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ABSTRACT

Present study is focused to examine the effects of foreign capital flows on domestic investment in Pakistan economy for the period of 1972-2013. Time series econometric techniques like unit root test, Johansen cointegration and Granger causality methods have been used for the data analysis. Long run cointegration relationship has been found between domestic investment and foreign capital flow variables. Unidirectional causality running from external debt stock, remittances and domestic saving to domestic investment has been found. The causality between external debt servicing and investment is bidirectional. Bidirectional causality is also observed between foreign direct investment and domestic investment but causality between investment and inflation is confirmed in neither direction. The results are statistically robust and the estimated model is stable. The study suggests some policy recommendations.

KEY WORDS: External Debt, Debt Servicing, Investment, Remittances, Domestic Saving, Cointegration, Granger Causality, Pakistan.
JEL Codes:C32, E31, F21, R53

1: INTRODUCTION

Foreign capital flows such as external debt, external debt servicing, foreign direct investment and remittances play critical role in setting up investment and growth trajectory of the economy. Pakistan is one of those underdeveloped economies that have received a massive amount of funds as external debt, foreign aid, foreign direct investment and remittances. Investment is important for the economic growth of an economy. It plays dual role; increases aggregate demand and productive capacity of the economy. Aggregate demand significantly effects aggregate output through multiplier process. On the other hand, increase in investment increases the productive capacity of the economy by increasing the capital stock(Harrod,1939; Domar,1957).The attainment of the prime objectives of economic development such as poverty alleviation, equal distribution of wealth and high level of employment is impossible without higher and sustained levels of investment and growth.

Pakistan economy is characterized with the lack of financial resources, low GDP growth rate, low tax to GDP ratio and low savings-investment rate. The saving rate of the Pakistan is low even as compared to regional economies like Sri Lanka, Bangladesh and India. Pakistan finances the savings-investment gap through foreign capital inflows. Investment solely depends on financial resources available to the economy. These resources may be in the form of external debt, foreign direct investment, remittances or any other development project aid. Besides these, domestic savings of the economy are also a fundamental source for investment. Given the capital-output ratio of the economy, growth rate of the economy is positively associated with the saving rate of the economy. Low levels of domestic savings will result low levels of investment and output growth rate in the economy.

Developing country like Pakistan is characterized with low levels of income, saving and investment. External debt flows has positive impacts on the recipient economy. Positive impact of externally borrowed money in Pakistan might have made possible the economy to invest beyond the levels that would have not possible without borrowing. Foreign debt and aid has helped the Pakistan economy to fulfill the saving-investment gap. External debt provides the financial resources in financing the development of infrastructure of the economy. Establishment of heavy and basic industries, research institutes, dams, bridges, highways, motorways and strengthening of institutions requires a huge amount of resources. External finances make possible the creation of conducive investment environment in the economy.

Foreign capital inflows such as foreign direct investment and workers' remittances also play critical role in stimulating domestic investment and growth. Present study is attempt to explore the impacts of external debt,

***Corresponding Author:** Sharafat Ali, Department of Economics, Government Postgraduate College Kot Sultan, Pakistan. Email: sharafat.ali.rana@gmail.com

external debt service, foreign direct investment, workers' remittances, inflation and financial development on domestic investment in Pakistan. The major objective was to find how foreign inflows fulfill the savings-investment gap and how much domestic investment is stimulated by these inflows. Whether they cause crowding out and capital flight in terms of distortionary taxes? The author used the time series econometric techniques of cointegration and causality analysis for the period of 1972-2013 in Pakistan economy.

2: LITERATURE REVIEW

Chenery and Strout (1966) developed the "dual-gap" model and argued that foreign financial resources help the recipient economy to fulfill the savings-investment gap. It was assumed in dual-gap models that externally borrowed money goes one to one in investment and productive projects. Foreign capital raises the investment level of the economy side by side of domestic investment. Weisskopf (1972) agreed with Chenery and Strout (1966) that foreign capital increases the supply of desired resources into the economy. These inflows increase potential size of aggregate expenditure of the economy. The model developed by Weisskopf (1972) was criticized by Stoneman (1975). Stoneman (1975) tested the effects of foreign capital on growth of 22 poor economies and concluded that these flows hampers the export promotion, changes in capital-output ratio, variation in distribution of income and several incentives to different sectors of the economy.

External debt servicing warrants transfer of financial resources from private to public sector in the economy. Government may levy taxes on private sector to service the debt obligations. Increase in the taxes causes net returns to fall on investment. As a result investment declines in the economy (Sachs, 1986). Krugman (1988) argued that excessive debt repayments lead to distortionary taxes. If the expected present value of the country's future transfers becomes less than current face value of economy's debt the economy faces the problem of debt overhang. This results in an increase in the tax burden on investors in the future. In this way, it becomes a disincentive for domestic and foreign investors. Sachs (1989) attempted to examine the debt crises situation in context of debt overhang hypothesis for the first time. He found that countries were unable to gain economic recovery due to debt servicing. A share of returns to investment is taxed away from economy in the shape of debt servicing. Bauerfreund (1989) used a computable general equilibrium model and fond that debt servicing reduces the investment in Turkish economy.

Foreign aid, in the form of grants, showed modest impact on public investment in Pakistan. But foreign economic assistance in the form of loans showed strong effect on public investment (Chishti, Salim and Hasan, 1992). Cohen (1993) found the little impact of external debt stock on investment. The author also explored crowding out impact of debt servicing on investment. The study was focused on the assessment of impact of external debt on investment in less developed countries during the decade of 1980s. Boone (1996) fueled the debate on aid effectiveness by analyzing the panel data of 91 economies during the period of 1971-1990. In this study the impact of external aid on investment, consumption and some indicators of welfare were analyzed. The author found positive impact of aid on government consumption rather in stimulating impact on investment. There was a nonlinear impact of external debt on growth (Pattillo, Poirson and Ricci, 2002). It was also concluded that higher debt levels lowered in the efficiency of investment. Pattillo, Poirson, and Ricci, 2004) examined the channels through which foreign debt affects the growth. The results were agreement with that of Pattillo, Poirson, and Ricci (2004) that higher levels of debt were strongly and negatively related to investment and total factor productivity.

Some of the empirical studies suggested policy lessons regarding the impacts of foreign capital on growth and investment. Debt overhang occurs when debt is more than 15-30 percent of GDP in the economies that have good institutions, suitable policy environment and easier accessibility to financial resources (Cordela, Ricci & Ruiz-Arranz, 2005). Javed and Sahinoz (2005) found inverse relationship between external debt and investment in Turkey. Mohey-ud-Din (2006) concluded that foreign capital may be helpful in stimulating growth of the economy in the regime of appropriate fiscal, monetary and trade policies in Pakistan. The author suggested the economic policies to induce foreign direct investment into the economy rather than official aid and foreign debt. Debt overhang hypothesis was supported by Hameed, Hammad & Chaudhary (2008). Pakistan economy performed better at lower levels of debt and economy performed poorly at higher level of debt (Gul, 2008). Chaudhry, Malik and Ramzan (2009) analyzed the impact of foreign debt on investment and saving in Pakistan. He concluded that foreign debt showed marginally significant effect on the investment.

Luka & Spatafora (2012) used cross-sectional and panel data methods and explored that decrease in global price of risk and domestic borrowing cost are important source of stimulation of domestic credit and net capital inflows. Domestic credit and net capital flows stimulates the investment. The analysis was focused on examining the determinants and associations between capital inflows, domestic credit and investment in less development economies for the period of 2001-07. Inflows as external debt increased investment but external debt servicing reduced the private investment in Pakistan (Ali, 2013a). Ali (2013b) found that external flows have positive impact on investment in Pakistan. Moreover, foreign direct investment and workers' remittances showed positive and significant effect on domestic investment in Pakistan. The review of several studies is

evident that external debt and external debt service have strong impacts on investment and growth of the economy. Criminal activities also hamper investment and growth in the economy (Ahmad et al. 2014). Ali (2014) concludes that foreign capital flows (foreign debt, FDI, worker's remittances) have no positive impact on economic growth in Pakistan.

3: METHODOLOGY AND DATA ISSUES

3.1:DataSources

Annual time series data for the period of 1972-2013 has been used for the analysis. Gross fixed capital formation has been used as a proxy variable of domestic investment. GDP deflator is taken as measure of inflation rate in Pakistan. Saving as percentage of GDP has been taken as financial development variable. Annual time series data for all of the variables has been taken from Pakistan Economic Survey (1990-91, 1998-99, 2002-03, 2009-10, 2012-13) published by Ministry of Finance Pakistan and World Development Indicators (WDI) (2012). All variables included in the model have been taken as the percentage of GDP.

3.2: Specification of the Model

The study conducted by Ali (2013b) used three variables; external debt stock, foreign direct investment and workers' remittances as explanatory variables and analyzed the data for the period of 1972-2007.In the present study external debt serviceas in (Bauerfreund, 1989), inflation rate following Friend (1981) and Ali (2013a, 2013c) and saving as financial development following Afzal (2007) is introduced in the model for more generalized analysis. The model to be estimated is as in equation-1:

$$I_t = \alpha_1 D_t + \alpha_2 E_t + \alpha_3 F_t + \alpha_4 R_t + \alpha_5 P_t + \alpha_6 S_t + \varepsilon_t \qquad (1)$$

Where $I_t$is the gross capital formation as percentage of GDP, D_t is the external debt as percentage of GDP, E_t is the external debt service as percentage of GDP, F_t is foreign direct investment as percentage of GDP, R_t is Workers' remittances as percentage of GDP, P_t is the GDP deflator used as a proxy for inflation rate, and S_t is the domestic saving as percentage of GDP.All the variables are in logarithmic form. Since the annual time series data is uses used for examination. The test of stationarity, cointegration and causality based on vector error correction has been applied.

3.3 TheTest forStationarity

Most of the time series variables are non-stationaryandregression on non-stationary time series may give spurious results (Nelson, and Plosser, 1982). The Dickey and Fuller(1979) unit root techniques are used to test the order of integration of the variables. The basic unit root theory considers the first order autoregressive process:

$$x_t = \rho x_{t-1} + \omega M_t' + \varsigma_t \qquad (2)$$

In this regression, M_t indicates optional exogenous variables. This may includedrift or a drift and trend. The parameters to be estimated are ρ and ω. $\varsigma_t$is the white noise error term. If$|\rho| \geq 1$, it implies that x variable is non-stationary and its variance increases with time and tends to infinity. If$|\rho| < 1$,x is considered to be (trend)stationary. If we subtract x_{t-1} on both side of the equation (2), we get the regression equation for DF unit root test:

$$\Delta x_t = \sigma x_{t-1} + M_t'\omega + \varsigma_t \qquad (3)$$

Where $\sigma = \rho - 1$, the null and alternative hypotheses in the DF test are: H_0 :$\sigma = 0$ and H_a: $\sigma < 0$. Under the H_0 of unit root this statistics do not follow the traditional t-statistic (Dickey and Fuller, 1979). So the Mackinnon (1996) critical values are used to test the null hypotheses. The DF test is applicable only if the series is an AR(1) process. The series may be correlated in higher order time lags. In this case the assumption of white noise for the error term ς_t is not fulfilled. A parametric construction is constructed, in higher order correlation, in Augment Dicky-Fuller (ADF) test with the assumption that $x$variable follow an AR(p) process. By adding the p lagged differences terms of$x$to the right side of the regression (3), we tested the regression:

$$\Delta x_t = \sigma x_{t-1} + z_t'\omega + \beta_1 \Delta x_{t-1} + \beta_2 \Delta x_{t-2} + \cdots + \beta_p \Delta x_{t-p} + v_t \qquad (4)$$

The ADF unit root test also tests the null hypothesis that $\sigma = 0$ against the alternative hypothesis that $\sigma < 0$. Now t-statistic can be used to test the null hypothesis. In the present study, the ADF unit root test was applied as a pretest of cointegration and causality tests. After testing the order of integration of each of the time series, the optimum lag length is selected. Cointegration methods are lag sensitive. The most commonly used measure of optimum lag length selectionis Akaike Information Criteria (AIC). The lag length with smaller value is preferred.

3.4Johansen MaximumLikelihood Test of Cointegration

Time series that are stationary at their first difference are cointegrated(Engle and Granger, 1987). Johansen method of cointegration can be applied on the first difference stationary time series to examine long run association between them. Johansen cointegration technique based on VAR, Johansen (1988, 1991, 1995) and

Johansen &Juselius(1990) is used to test the long run association between the I(1) time series. To summarize Johansen cointegration following VAR of order N is considered.

$$z_t = B_1 z_{t-1} + \cdots + B_N z_{t-N} + \Omega Q_t + e_t \quad (5)$$

Where $z_t$indicates ak-vector of I(1) time series variables, Q_t shows d-vector of deterministic time series, and e_t is vector of error terms. The VAR in (5) can be expressed as:

$$\Delta z_t = \pi z_{t-1} + \sum_{i=1}^{N-1} \varphi_i \Delta z_{t-i} + \Omega Q_t + e_t \quad (6)$$

In equation (6): $\pi = \sum_{i=1}^{N} B_i - I$, and $T_i = -\sum_{j=i+1}^{N} B_j$

Where, π is the coefficient matrix. If π has reduced rank $r < k$, then there would be $k \times r$ matrices τ andκ such that $\pi = \tau\kappa'$ and $\kappa' z_t$ is I(0). Here r is the number of cointegrating vector and columns of κ are cointegrating vectors. The elements in τ are adjustment parameters in vector error correction model. Two test statistics, the Trace and Max-eigenvalue statistics, are estimated in Johansen coinetgration technique.The trace test statistic is more reliable since shows consistency in small samples (Odhiambo, 2005).

3.5Vector Error Correction Mechanism

After finding the long run equilibrium relationship between the variablesthe causality between the variables is tested. The long run cointegrating association between the variablesimplies that there exists, at least, unidirectional causality (Granger, 1988). In this study, granger causality has been examined by vector error correction method. Vector error correction method is very useful technique to test presence of causality link between the variables since it provides information about both short run and long run causality. The vector error correction models estimated are as follows:

$$\Delta I_{1t} = a_{01} + \sum_{i=1}^{n} a_{11,i}\Delta D_{t-1} + \sum_{i=1}^{n} a_{21,i}\Delta E_{t-1} + \sum_{i=1}^{n} a_{31,i}\Delta F_{t-1} + \sum_{i=1}^{n} a_{41,i}\Delta R_{t-1} + \sum_{i=1}^{n} a_{51,i}\Delta P_{t-1} + \sum_{i=1}^{n} a_{61,i}\Delta S_{t-1} + \delta_1 ECM_{1,t-1} + v_1 \quad (7)$$

$$\Delta D_{2t} = a_{02} + \sum_{i=1}^{n} a_{12,i}\Delta I_{t-1} + \sum_{i=1}^{n} a_{22,i}\Delta E_{t-1} + \sum_{i=1}^{n} a_{32,i}\Delta F_{t-1} + \sum_{i=1}^{n} a_{42,i}\Delta R_{t-1} + \sum_{i=1}^{n} a_{52,i}\Delta P_{t-1} + \sum_{i=1}^{n} a_{62,i}\Delta S_{t-1} + \delta_2 ECM_{2,t-1} + v_2 \quad (8)$$

$$\Delta E_{3t} = a_{03} + \sum_{i=1}^{n} a_{13,i}\Delta I_{t-1} + \sum_{i=1}^{n} a_{23,i}\Delta D_{t-1} + \sum_{i=1}^{n} a_{33,i}\Delta F_{t-1} + \sum_{i=1}^{n} a_{43,i}\Delta R_{t-1} + \sum_{i=1}^{n} a_{53,i}\Delta P_{t-1} + \sum_{i=1}^{n} a_{63,i}\Delta S_{t-1} + \delta_3 ECM_{3,t-1} + v_3 \quad (9)$$

$$\Delta F_{4t} = a_{04} + \sum_{i=1}^{n} a_{14,i}\Delta I_{t-1} + \sum_{i=1}^{n} a_{24,i}\Delta D_{t-1} + \sum_{i=1}^{n} a_{34,i}\Delta E_{t-1} + \sum_{i=1}^{n} a_{44,i}\Delta R_{t-1} + \sum_{i=1}^{n} a_{54,i}\Delta P_{t-1} + \sum_{i=1}^{n} a_{64,i}\Delta S_{t-1} + \delta_4 ECM_{4,t-1} + v_4 \quad (10)$$

$$\Delta R_{5t} = a_{05} + \sum_{i=1}^{n} a_{15,i}\Delta I_{t-1} + \sum_{i=1}^{n} a_{25,i}\Delta D_{t-1} + \sum_{i=1}^{n} a_{35,i}\Delta E_{t-1} + \sum_{i=1}^{n} a_{45,i}\Delta F_{t-1} + \sum_{i=1}^{n} a_{55,i}\Delta P_{t-1} + \sum_{i=1}^{n} a_{65,i}\Delta S_{t-1} + \delta_5 ECM_{5,t-1} + v_5 \quad (11)$$

$$\Delta P_{6t} = a_{06} + \sum_{i=1}^{n} a_{16,i}\Delta I_{t-1} + \sum_{i=1}^{n} a_{26,i}\Delta D_{t-1} + \sum_{i=1}^{n} a_{36,i}\Delta E_{t-1} + \sum_{i=1}^{n} a_{46,i}\Delta F_{t-1} + \sum_{i=1}^{n} a_{56,i}\Delta R_{t-1} + \sum_{i=1}^{n} a_{66,i}\Delta S_{t-1} + \delta_6 ECM_{6,t-1} + v_6 \quad (12)$$

$$\Delta S_{7t} = a_{07} + \sum_{i=1}^{n} a_{17,i}\Delta I_{t-1} + \sum_{i=1}^{n} a_{27,i}\Delta D_{t-1} + \sum_{i=1}^{n} a_{37,i}\Delta E_{t-1} + \sum_{i=1}^{n} a_{47,i}\Delta F_{t-1} + \sum_{i=1}^{n} a_{57,i}\Delta R_{t-1} + \sum_{i=1}^{n} a_{67,i}\Delta P_{t-1} + \delta_7 ECM_{7,t-1} + v_7 \quad (13)$$

The error correction models, from model (7) to model (13), are estimated. If the coefficient of the error correction term becomes significant it confirms the long run causality from explanatory variables to explained variable. The*t-statistic* is used test the significance of the error correction term. The significance of the coefficients of lagged variables confirms the short run causality of the variables to explained variable. Joint significance is tested by χ^2-test. Diagnostic test is applied to test the validity of the model. After finding the errors terms to be multivariate normal, homoskedastic and serially uncorrelated. Block exogeneity test based on the vector error correction is applied to test the causality between the variables. The steadiness of the vector error correction model is test by checking the inverse roots of AR characteristic polynomial.The sprawl of characteristic roots of the variables within the circle shows the stability of the model (Lungu, Simwaka, and Chiumia, 2012).

4: RESULTS

As a prerequisite of application of cointegration on time series variables, ADF unit root test was applied on each of the variables controlled in the model. The results of the stationarity test are reported in Table 1.

Table 1: The Results of Stationarity Test

Variables		ADF Statistic			
		Level		1st Difference	
		t-Statistic	p-value+	t-Statistic	p-value+
I_t	None	-0.2926	0.5743	-5.2328*	0.0000
	C	-1.5723	0.4874	-5.1650*	0.0001
	C & T	-1.6578	0.7517	-5.6934*	0.0002
D_t	None	-0.9185	0.3126	-7.4029*	0.0000
	C	-0.5314	0.8745	-7.7871*	0.0000

	C & T	-1.5253	0.8044	-7.6534*	0.0000
E_t	None	-0.1961	0.6093	-10.553*	0.0000
	C	-3.1663**	0.0294	-10.4210*	0.0000
	C & T	-3.2045	0.0977	-10.2834*	0.0000
F_t	None	-1.7759	0.0721	-7.6277*	0.0000
	C	-1.7701	0.3896	-7.6571*	0.0000
	C & T	-3.3839	0.0676	-7.6349*	0.0000
R_t	None	0.3843	0.7904	-5.7822*	0.0000
	C	-1.0909	0.7104	-5.7989*	0.0000
	C & T	-1.0552	0.9244	-5.7837*	0.0001
P_t	None	-0.7970	0.3643	-7.4657*	0.0000
	C	-4.3772**	0.0012	-7.3758*	0.0000
	C & T	-4.3504*	0.0068	-7.3094*	0.0000
S_t	None	-0.5541	0.4710	-7.5884*	0.0000
	C & T	-1.1789	0.6744	-7.5382*	0.0000
	C & T	-2.0668	0.5483	-8.0761*	0.0000

Note: None = without drift & trend, C = with drift & no trend and C & T = Drift & Trend. + MacKinnon (1996) one-sided p-values.
**(**) significant at 0.01(0.05) level.*

Unit root test results show that Domestic investment, external debt, foreign direct investment, remittances and saving are non-stationary at their level but each of these variables is stationary at its first difference. Though the external debt servicing and inflation rate measured by GDP deflator is stationary at level but ADF statistic of these variables are more negative at first difference and highly significant so these variables are also concluded to be stationary at first difference. All of the variables are integrated of the same order. It implies that the variables are I(1). Variables stationary at their first difference means that these variables are cointegrated (Engle and Granger, 1987). The AIC criteria of optimum lag selection indicated lag length 3 to be the optimum lag length for cointegration analysis. The results of Johansen cointegration are displayed in Table 2.

Table 2: Johansen and JuseliusCointegration Test

Trace Statistic				
Null Hypothesis	**Alternative Hypothesis**	**Test Statistic**	**5% Critical value**	**p-Value***
H_0: r ≤ 0	H_1: r > 0	348.2766	111.7805**	0.0000
H_0: r ≤ 1	H_2: r > 1	222.3355	83.9371**	0.0000
H_0: r ≤ 2	H_3: r > 2	127.6451	60.0614**	0.0000
H_0: r ≤ 3	H_4: r > 3	74.4790	40.1749**	0.0000
H_0: r ≤ 4	H_5: r > 4	32.0274	24.2760**	0.0043
H_0: r ≤ 5	H_6: r > 5	12.6268	12.3209***	0.0444
H_0: r ≤ 6	H_7: r > 6	3.7535	4.1299	0.0625
Maximum Eigenvalue Statistics				
Null Hypothesis	**Alternative Hypothesis**	**Test Statistic**	**5% Critical value**	**p-Value***
H_0: r = 0	H_1: r > 0	125.9411	42.7722**	0.0000
H_0: r = 1	H_2: r > 1	94.6904	36.6302**	0.0000
H_0: r = 2	H_3: r > 2	53.1662	30.4396**	0.0000
H_0: r = 3	H_4: r > 3	42.4516	24.1592**	0.0001
H_0: r = 4	H_5: r > 4	19.4006	17.7973***	0.0285
H_0: r = 5	H_6: r > 5	8.8733	11.2248	0.1259
H_0: r = 6	H_7: r > 6	3.7535	4.1299	0.0625

**MacKinnon-Haug-Michelis (1999) p-values.*
*** (***) denotes the rejection of the hypothesis at 0.01(0.05) significance level.*
Note: Trace and Max-Eigenvalue point out 6 and 5cointegrating vectors at 0.05 levels respectively.

Johansen cointegration test results show that the trace statistic and maximum eigenvalue statistic suggest the presence of 6 and 5 cointegrating vectors, respectively. It implies thatdomestic investment , external debt stock, external debt servicing, foreign directinvestment, workers' remittances , inflation rate and saving are have long run association, that is, they arecointegrated. The coefficients, in the cointegrating vector, were normalized with respect to domestic investment. The cointegration matrix is given in Table 3.

Table 3: Normalized CointegratingCoefficients

I_t	D_t	E_t	F_t	R_t	P_t	S_t
1.0000	-0.5973	0.2630	-0.0551	-0.0964	0.0083	-0.2966
S. E.	0.0308	0.0247	0.0064	0.0088	0.0181	0.0218
t-value	-19.3925*	10.6356*	-8.6579*	-11.0038*	0.4561	-13.5975*

**significant at 0.01 level. S. E. means standard error*

Since all of the explained and explanatory variables appear on the left side of the equation so the signs of the coefficients are reversed while interpreting the cointegrating coefficients (Johnston &Dinardo, 1997). The estimated equations can be written as:

$$I_t = 0.5973D_t - 0.2630E_t + 0.0551F_t + 0.0964R_t - 0.0083P_t + 0.2966S_t \qquad (14)$$

The equation (14) has the coefficients with the reversed signs. All the estimated coefficients are interpreted as elasticity because all of the variables are in natural logarithms. External debt stock as percentage of GDP is positively and significantly associated with the domesticinvestment in Pakistan in long run. External debt service elasticity of domestic investment has the negative sign and statistically significant. Moreover, the foreign direct investment and workers' remittances positive sign showing investment stimulating impact in the economy. Financial development variable, saving as percentage of GDP, is also concluded to have positive impact on domestic investment in Pakistan over long run period. All of the estimated elasticity's are statistically significant at 99 percent confidence level except inflation rate. Inflation rate negatively and insignificantly affects domestic investment in the economy.

Table 3: Granger Causality Results Based on VECM

Variable	D(I)	D(D)	D(E)	D(F)	D(R)	D(P)	D(S)
D(I)	-	4.2696 [0.2338]	6.4290*** [0.0925]	6.6305*** [0.0847]	2.3598 [0.5012]	2.3240 [0.5079]	5.5751 [0.1342]
D(D)	24.6892* [0.0000]	-	8.9644** [0.0298]	3.2535 [0.3542]	4.0143 [0.2599]	2.9630 [0.3974]	5.5222 [0.1373]
D(E)	21.4699* [0.0001]	1.0503 [0.7891]	-	8.2578** [0.0410]	3.4109 [0.3325]	3.8043 [0.2834]	1.0677 [0.7849]
D(F)	13.8729* [0.0031]	1.2720 [0.7358]	2.7712 [0.4293]	-	2.0764 [0.5567]	1.6553 [0.6469]	2.1687 [0.5381]
D(R)	45.3285* [0.0000]	3.5391 [0.3157]	2.0324 [0.5657]	6.5952*** [0.0860]	-	6.5738*** [0.0868]	1.6413 [0.6501]
D(P)	5.4253 [0.1432]	1.5827 [0.6633]	0.1525 [0.9849]	8.5398** [0.0361]	0.9095 [0.8231]	-	4.4667 [0.2153]
D(S)	19.2058* [0.0002]	0.8094 [0.8472]	12.6353* [0.0055]	5.8099 .[0.1212]	4.4538 [0.2164]	2.3777 [0.4978]	-
$\Sigma\chi^2$ (df 18)	226.9379* [0.0000]	19.3970 [0.3678]	61.4465* [0.0000]	32.6322** [0.0185]	19.4238 [0.3662]	24.1271 [0.1509]	30.2834*** [0.0348]
ECT(-1)	-0.5895** (-3.0344)	0.5952 (1.1422]	1.8019 (1.4531)	7.3854** (2.5344)	2.4604 (1.2911)	-1.5283 (0.5549)	-0.0387 (0.0418)

Note: the values in ( ) & [ ] are t-values and p-values respectively.
significant at 0.01 level, **significant at 0.05 level and * significant at 0.10 level.*

When time series variables are cointegrated then relationship between these variables can be expressed as error correction mechanism (Granger, 1988). Error correction models (6)-(13) were estimated to examine the short run dynamics of the variables. Diagnostic tests were applied to test the normality, autocorrelation and heteroskedasticity of the error terms in error correction models. After finding the error terms multivariate normal, serially uncorrelated and having constant variance the Granger causality test based on VECM/block exogeneity tests were applied to test the causality links between the variables. The results of the VECM based Granger causality test are given in the Table 3. The significance of each of the error correction term and differenced lagged coefficients is tested by the *t*-statistic and chi-squared statistic. Significance of the error correction term in the model D (I_t) shows that there is long run causality from the external debt stock, external debt service, foreign direct investment, remittances, inflation rate and domestic saving to domestic investment. The coefficient of the error correction term in the equation of domestic investment has the negative sign. It shows that 59 percent of disturbance occurred, in the previous period, from the long run path would be adjusted in the current time period. The speed of adjustment is high and implies that the model is stable.

The coefficients of error correction term in equation of D(D_t), D(E_t), D(F_t) and D(R_t) have positive sign. Whereas the error corrected terms for D (P_t) and D(S_t) has right sign but insignificant. Causality test shows that there is unidirectional causality running from external debt stock to domestic investment in Pakistan. However, the causality between external debt servicing and domestic investment is bidirectional. Bidirectional causality is also concluded between foreign direct investment and domestic investment. There is no causality between inflation rate and investment in Pakistan. The causality test results suggest causality running from domestic saving to investment but reverse causality is not observed. The significance of joint chi-square statistic with 18 degree of freedom confirms the long run causality running from explanatory variables to dependent variable.

5: DISCUSSION

The results of the present analysis are consistent with the results in Chaudhry, Malik and Ramzan (2009) and Ali (2013b). The inflow of borrowed money is not much important. Better and productive utilization makes the role of external finance more important. A good, sound and effective macroeconomic policy set up is a prerequisite

for the best utilization of foreign capital. External debt has growth stimulating impact under a sound policy framework (Burnside and Dollar, 2000). Utilization of foreign aid and debt can be sustainable and potential factor for the development of the economy if the external aid is used productively (Kemal, 2001). Borrowed money, if not utilized in productive ways, becomes a burden for the future. Servicing of the external debt has its negative consequences on the economy. Since the externally borrowed money is more expensive than the domestically borrowed money so foreign resources must be utilized for desired and in productive purposes (Rais and Anwar, 2012). External debt service crowds out private investment in Pakistan (Ali, 2013a). Increased external debt servicing has negative impacts on growth and investment of the economy (Jafri and Habib, 2012; Ali, 2013a). Negative impact of external debt on domestic investment is also supported in (Sheikh, Faridi and Tariq, 2010, Ali, 2014). Foreign aid might have not been used properly in Pakistan (Ali and Ahmad, 2013).

Positive impact of foreign direct investment on domestic investment in Pakistan may be due the fact that FDI flows fulfill the resource gap. Moreover, the FDI inflows make possible the import of modern knowledge and skill, transfer of new and innovative technology, in recipient economy. Foreign firms train the domestic labor force and have spillover effects in the host economy. The results of the study are supported by the conclusion in number of empirical studies (Shah, Hasnat and Jiang 2012; Ali, 2013a, 2013b). Workers' remittances are another source of foreign capital into the economy. Inflows of the remittances through proper channels have more effective and prospective impacts on the economy. Moreover, the recipient families utilize the remitted money for the better education and training, and better healthcare facilities of their family members. Contribution of remittances in the development of human capital is another positive sign for the economy. Therefore, these positive impacts have investment stimulating impact in the economy (Burki, 1991; Adams, 1998; Yasmeen, Anjum, Ambreen and Twakal, 2011; Ahmad, Ahmad and Ali, 2013; Ali, Mustafa &Shahbazi, 2013, Ali, 2013b).Remittances have minor impact on investment (Gheeraert, Mata and Traca, 2010). The authors argue that remittance may increase the deposits at banks. Increased bank deposits increase the availability of finances for investment.More available loanable funds have interest rate lessening impact and increase the incentives and motivations for investment.

Inflation is concluded to have negative impact on investment. This impact of inflation is steady with the economic theory and conclusions of empirical studies that high volatility in general price level shatters the confidence of the investors by increasing the uncertainty in the returns and profitability on investment. Higher inflation may cause increase in the prices of raw material, capital goods and wages in the economy (Friend, 1981; Ali, 2013a, 2013c, Ali, 2014a). Inflation has negative impact on economic growth in Pakistan (Ahmad, Ahmad and Ali, 2013). Higher levels of inflation have negative effects on investment. Whereas, lower levels of inflation have positive impacts on investment (Ayyoub, Chaudhary and Farooq, 2011). Domestic savings has positive impact on the economy's domestic investment. Higher domestic savings in the economy means more available financial resources for investment. Domestic saving stimulates domestic investment (Nasir and Khalid, 2004; Esso and Keho, 2010). There is a causality running from domestic saving to investment. The causality from saving to investment is also confirmed in (Afzal, 2007).

6: CONCLUSION

Foreign capital flows in terms of external debt, FDI and workers' remittances has contributed in the economic growth and development of the capital deficient economies of the globe. Pakistan is one of the economies of the world that have been receiving a huge amount of foreign capital. Foreign capital has its importance in fulfilling the saving-investment and foreign exchange gap in the economy. Lower levelsper capita income in Pakistan economycaused domestic financialresources to fall short for investment. In the recent times, researches to assess the role of the foreign capital in the setting the growth trajectory of the recipient economy has fueled the debate on the impact of foreign capital on investment and growth of the economy. The present study is an attempt to examine the impacts of foreign capital on domestic investment in Pakistan. Foreign capital variables used in the model were external debt stock as percentage of GDP, external debt servicing as percentage of GDP, foreign direct investment as percentage of GDP and workers' remittances as percentage of GDP. Financial sector play very critical role in stimulating investment in the economyso domestic saving as percentage of GDP, as a proxy variable for financial development, is included in the model as explanatory variable.

Annual time series data from 1972 to 2013 has been used for the analysis. Unit root test, as prerequisite for cointegration analysis, was applied to find each of the time series to be I (1). After finding the variables integrated of the same order Johansen cointegration and Granger causality test based on the VECM were applied to scrutinize the long run and short run dynamics of the variables respectively.A long run association between domestic investment and explanatory variables is found. External debt stock, FDI and workers' remittances are concluded to have a strong and significant investment stimulating impact in the long run. External debt service showed investment crowding out impact. Inflation showed negative but insignificant brunt on investment. Financial development variable, domestic saving, significantly and positively affects investment in Pakistan over the long run period.There is a unidirectional causality running from external debt stock, remittances, and saving to domestic investment. There is bidirectional causality between external debt service and investment,

and FDI and domestic investment but there is no causality, in either way, between inflation and investment. The error correction terms is significant and has the correct sign. The speed of investment is very high.

Positive impact of external debt stock on domestic investment implies that the externally borrowed money should be utilized efficiently on productive investment projects. The spending of borrowed money on development of infrastructure such as establishment of universities and research centers, building of dams and electricity producing units, construction of roads and highways, and rehabilitation of railways would help create better and favorable environment for domestic and foreign investment in the economy. Borrowed money either from external or internal resources is to be paid back. External debt servicing is the tax on domestic resources, returns on investment and investment expenditures to be made. Increase in external debt servicing reduces the financial resources for desired investments in the economy. Reliance on externally borrowed money should be decreased. A suitable macroeconomic framework focused on the reductions of budget deficits and lower levels of inflation would be fruitful to avail the financial resources for investment. Low levels of inflation would decrease the uncertainty in the economy. A favorable macroeconomic framework to control inflation and improvement in financial sector can be helpful in increasing the domestic saving. The mobilization of domestic financial resources would make available the increased supply of loanable funds. Increased domestic saving would result in increased levels of domestic investment in the economy.

7: REFERENCES

Adams, Richard H. (1998). Remittances, Investment, and Rural Assets Accumulation in Pakistan. *Economic Development and Cultural Change*, 47: 155-173.

Afzal, M. (2007). Saving and Investment in Development Countries: Granger Causality Test. *The Philippine Review of Economics*, XLIV (2): 99-110.

Ahmad, A., Ahmad, N. & Ali, S. (2013). Exchange Rate and Economic Growth in Pakistan (1975-2011). *Journal of Basic and Applied Scientific Research*, 3(8): 740-746.

Ahmad, A., Ali, S. & Ahmad, N. (2014). Crime and Economic Growth in Developing Countires: Evidence from Pakistan. *Journal of Basic and Applied Scientific Research*, 4(4): 31-41.

Ali, S. (2014). Foreign Capital Flows and Economic Growth in Pakistan: An Empirical Analysis. *World Applied Sciences Journal*, 29(2): 193-201, DOI:10.5829/idosi.wasj.2014.29.2.1372

Ali, S. (2014a). Inflation, Income Inequality and Economic Growth in Pakistan: A Cointegration *Analysis. International Journal of Economic Practices and Theories*, 4(1): 33-42.

Ali, S., Mustafa, M. Q., & Shahbazi, I. A. (2013). Agriculture Value Added and Income Inequality in Pakistan: A Time Series Analysis. *Research Journal of Economics, Business and ICT*, 8(2): 25-33.

Ali, Sharafat & Ahmad, Najid (2013). A Time Series Analysis of Foreign Aid and income Inequality in Pakistan. *Global Journal of Management and Business Research Economics and Commerce*, 13(5): 10-19.

Ali, Sharafat (2013a). A Cointegration Approach to Estimate Private Domestic Investment Demand Function of Pakistan. *Asian Journal of Research in Business Economics and Management*, 3(9):1-13.

Ali, Sharafat (2013b). External Debt and Domestic Investment in Pakistan: A Cointegration Analysis. *Journal of Managerial Sciences*, 7(2): 179-191.

Ali, Sharafat (2013c). The Small and Medium Enterprises and Poverty in Pakistan: An Empirical Analysis. *European Journal of Business and Economics*, 8(2):25-30.

Ayyoub, M., I. S. Chaudhary and F. Farooq (2011). Does Inflation Affect Economic Growth? The Case of Pakistan. *Pakistan Journal of Social Sciences*, 31(1): 51-64.

Bauerfreund, O. (1989). External Debt and Economic Growth: A Computable General Equilibrium Case Study of Turkey 1985-1986. Duke University Ph. D.

Boone, P. (1996). Politics and the Effectiveness of Foreign Aid. *European Economic Review*, 40: 289-329.

Burki, Shahid. J. (1991). Migration from Pakistan to Middle East in D. G. Papademitriou and P. L. Martian (Ed). The Unsettled Relationship: Labor Migration and Economic Development. London: Greenwood Press.

Burnside, C. and D. Dollar (2000). Aid, Policies and Growth. *American Economic Review*, 90: 847-868.

Chaudhry, Imran Sharif, S. Malik, and M. Ramzan (2009). Impact of Foreign Debt on Savings and Investment in Pakistan. *Journal of Quality and Technology Management*, 5(2): 101-115.

Chenery, H. B., and A. M. Strout (1966). Foreign Assistance and Economic Development. *American Economic Review*, 56(4): 679-733.

Chishti, Salim and M. Aynul Hasan (1992). Foreign Aid, Defense Expenditure and Public Investment in Pakistan. *The Pakistan Development Review*, 31(4): 895-908.

Cohen, D. (1993). Low Investment and Large LDC Debt in the 1980s. *The American Economic Review*, 83: 437-449.

Cordela, T., Ricci, L. A. & Ruiz-Arranz, M. (2005). Debt Overhang or Debt Irrelevance: Revisiting the Debt-Growth Link. IMF Working Paper No. 223, *International Monetary Fund*: Washington.

Dickey, D. A. and Fuller, W. A. (1979). Distribution of the Estimators for Autoregressive Time Series with a Unit Root. *Journal of the American Statistical Association*, 74: 427-431.

Domar, E. (1957). Essays in the Theory of Economic Growth. Oxford University Press.

Economic Survey, Pakistan (1990-91, 1998-99, 2002-03, 2009-10, 2012-13). Ministry of Finance, Government of Pakistan: Islamabad.

Engle, R. F. K, and Granger, C. W. F. (1987). Cointegration and Error Correction: Representation, Estimation and Testing, *Econometrica*, 55, 251-276.

Esso, L. J. & Y. Keho (2010). The Savings-Investment Relationship: Cointegration and Causality Evidence from Uemoa Countries. *International Journal of Economics and Finance*, 2(1): 174-181.

Friend, I. (1981). Effects of Inflation on Saving, Investment and Capital Markets. Working Paper No.11-81, Rodney L. White Center for Financial Research, University of Pennsylvania, the Wharton School: Philadelphia, PA 19104.

Gheeraert, L., R. S. Mata, and D. Traca (2010). Remittances and Domestic Investment in Developing Countries: An Analysis of the Role of Financial Sector Development. CEB Working Paper No. 10/013. *Solvay Brussels School of Economics and Management*: Belgium.

Granger, C. W. F. (1988). Some Recent Developments in a Concept of Causality. Journal of Econometrica, 39: 199-211.

Gul, Adnan (2008). In External Debt an Effective Way of Bringing Economic Reforms? MPRA Paper No. 10979. Retrieved from http://mpra.ub.uni-muenchen.de/10979

Hameed, A., Hammad, A. & Chaudhary, M. A. (2008). External Debt and Its Impact on Economic Growth and Business Growth in Pakistan. *International Research Journal of Finance and Economics*, Issue 20.

Harrod, F. R. (1939). An Essay in Dynamic Theory. *Economic Journal*, March 1939, pp. 14-33.

Jafri, M. K. and H. Habib (2012). Impact of External Debt Service Papyment on the Investment of Pakistan. Proceedings of 2nd International Conference on Business Management (ISBN: 978-969-9268-06-6), March 28-29, 2012, Lahore.

Javed, Z. H. & Sahinoz, A. (2005). External Debt: Some Experience from Turkish Economy. *Journal of Applied Sciences*, 5(2): 363-367.

Johansen , S. and Juselius K. (1990). "Maximum Likelihood Estimation and Inference on Cointegration – with Approach to the Demand for Money". *Bulletin*, Volume 52. pp. 169-210.

Johansen, S. (1988). "Statistical Analysis of Cointegration Vectors". *Journal of Economic Dynamics Control*, Vol. 12, pp. 231-54.

Johansen, S. (1991). Estimation and Hypothesis Testing of Cointegration Vectors in Gaussian Vector Autoregressive Models. *Econometrica*, 59: 1551-1580.

Johansen, S. (1995). Likelihood-based Inference in Cointegrated Vector Autoregressive Models. *Oxford: Oxford University Press.*

Johnston, J. & Dinardo, J. (1997). Econometric Methods. McGraw Hill Companies, Inc., 4th EditionL 244-286.

Kemal, A. R. (2001). Debt Accumulation and Its Implications for Growth and Poverty. *The Pakistan Development Review*, 40(4): 263-281.

Krugman, P. (1988). Financing vs. Forgiving a Debt Overhang. *Journal of Development Economics*, 29: 253-268.

Luka, O., and N. Spatafora (2012). Capital Inflows, Financial Development, and Domestic Investment: Determinants and Inter-Relationships. IMF Working Paper No. WP/12/120. *International Monetary Fund*.

Lungu, M., K. Simwaka, and A. Chiumia (2012). Money Demand Function for Malawi - Implications for Monetary Policy Conduct. *Banks and Bank Systems*, 7(1): 50-63.

MacKinnon, J. G. (1996). Numerical Distribution Functions for Unit Root and Cointegration Tests. *Journal of Applied Econometrics*, 11: 601-618.

Mohey-ud-din, Ghulam (2006). Impact of Foreign Capital Inflows on Economic Growth in Pakistan (1975-2004). *Journal of Independent Studies and Research*, 1(5): 24-29.

Nasir, S. & M. Khalid (2004). Saving-Investment Behaviour in Pakistan: An Empirical Investigation. *The Pakistan Development Review*, 43(3): 665-682.

Nelson, C., and C. Plosser (1982). Trends and Random Walks in Macroeconomic Time Series: Some Evidence and Implications. *Journal of Monetary Economics*, 10: 130-62.

Odhiambo, N. M. (2005). Financial Liberalization and Financial Deepening: Evidence from Three Sub-Saharan African Countries. *African Review of Money, Finance and Banking*, (Saving and Development Supplement, 2005), 5-23.

Pattillo, C., Poirson, H. and Ricci, L. (2002). External Debt and Growth. IMF Working Paper 02/69, *Internantional Monetary Fund*: Washington.

Pattillo, C., Poirson, H. and Ricci, L. (2004). What are the Channels Through Which External Debt Affects Growht? IMF Working Paper 04/15, *International Monetary Fund*: Washington.

Rais, S. I. and T. Anwar (2012). Public Debt and Economic Growth in Pakistan: A Time Series Analysis from 1972 to 2010. *Academic Research Journal*, 2(1): 535-544.

Sachs, J. (1986). Managing the LDC Debt Crisis, Brookings Papers on Economic Activity, 2: 397-431.

Sachs, J. (1989). The Debt Overhang of Developing Countries. In Ronal Findley, ed., Debt, Growth and Stabilization: Essays in Memory of Carlos Diaz Alejandro, Oxford, Blackwell: U.K.

Shah, S. H., H. Hasnat, and L. J. Jiang (2012). Does Foreign Capital Inflows Really Stimulate Domestic Investment: A Case Study of Pakistan? *International Research Journal of Finance and Economics*, 85: 78-86.

Sheikh, M. R., M. Z. Faridi and K. Tariq (2010). Domestic Debt and Economic Growth in Pakistan: An Empirical Analysis. *Pakistan Journal of Social Sciences*, 30(2): 373-387.

Stoneman, C. (1975). Foreign Capital and Economic Growth. *World Development*, 3(1): 11-26.

Weisskopf, T. E. (1972). The Impact of Foreign Capital Inflow on Domestic Savings in Under Developed Countries. *The Journal of International Economics*, 2(1): 25-38.

World Bank (2012). World Development Indicators, World Bank: Washington, D. C.

Yasmeen, K, A. Anjum, S. Ambreen, and S. Twakal (2011). The Impact of Worker's Remittances on Private Investment and Total Consumption in Pakistan. *International Journal of Accounting and Financial Reporting*, 1(1):173-77.