Application of Endogenous Growth Model to the Economy of Pakistan: A Cointegration Approach

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Abstract

During the last few decades, governments of developing countries have increasingly viewed foreign direct investment (FDIs) as a catalyst for economic growth. This study investigates the impact of FDI on economic growth of Pakistan by using Endogenous Growth Model. Out of a number of variables affecting economic growth, few have been taken into our model e.g. Foreign Direct Investment (FDI), Domestic Savings, Employed Labour Force, Capital Formation, Human Capital Index and Balance of Trade. The study examines the causality among economic Growth and all variables mentioned above over the period 1972-2005 using Johansen's maximum likelihood co-integration test and multivariate Granger causality test developed by Yamamoto and Toda (1995). The results of Granger causality indicated that in the short run, economic growth is caused by FDIs, domestic savings, human capital index, employed labour force and balance of trade.

Keywords: Foreign Direct Investment, Economic Growth, Causality, Human Capital Index.

1. Introduction

During the recent decades, Foreign Direct Investment (FDI) as a growth-enhancing component has received great attention in developing countries generally and in less developed countries particularly. It has been a matter of great concern for many economists that how FDI affects economic growth of host countries. In a closed economy, with no access to foreign savings, investment is financed solely from domestic savings. However, in an open economy investment is financed both by domestic savings and foreign capital inflows, including FDI. FDI enables investment-receiving countries to achieve investment levels beyond their capacity to save.

Most developing countries now consider FDI as an important source of development, but its economic effects are almost impossible to either predict or measure with precision. However, many empirical studies have shown significant role of FDI in economic growth of host developing countries, through its contribution to human resource development, technological transfers, capital formation and international trade.

During early 1980s, the government in Pakistan has initiated market-based economic reform policies. These reforms began developing in 1988, and since then the government gradually liberalized its trade and investment regime by providing generous trade and fiscal incentives to foreign investors through number of tax concessions, credit facilities, and tariff reduction and also eased foreign exchange controls (Khan and Kim, 1999).

The mobility of domestic and foreign savings is an important prerequisite for capital formation. However, the role of FDI in economic development is an issue that has evoked continuous debate. FDI makes the optimum resources available to the host country, but its impact on economic development is controversial both on theoretical and empirical grounds in economic literature.

2. Literature Review

It is noteworthy that the inflow of FDI gives birth to the process of minute and careful planning. According to the economic theory and empirical testimony, FDI flows run from the lower-profit to higher-profit regions, making the future profit anticipation (profit seeking) one of the key motivations for undertaking investment activity (Carbaugh, 2000). Though it manifests that the high future profits play a significant role in the progression of FDI inflows, yet there are various other factors that should be considered prudently. Other factors that manipulate the decision to invest into a foreign country may be divided into two large groups of factors- "company-specific" and "country-specific" factors. Company-specific factors mainly belong to the cost and demand along with motivations, activities, aptitude and objectives of a particular multinational corporation

(MNC). These factors are at variance among different foreign companies, of the same or similar industry, with regard to a specific country.

By demand factors it is taken that a company may observe FDI activity as a means of its market expansion (De Mello, 1997). The stronger the demand for the product of a particular firm and the more profitable the goods in that country, the greater the scope of FDI would be there. Cost factors are those that motivate a particular corporation in earning high profits by applying low costs. Whenever the costs of labour, resources and final goods transportation are comparatively low in a developing country, then the parent company may shift the part of or even whole production to that country (Carbaugh, 2000).

Country specific factors can be highlighted from the salient institutional features of the recipient country (De Mello, 1997). These institutional features include deep-rooted democracy, firm legislation, the protection of intellectual property rights, political stability, the degree of government intervention into economy, influential network of bureaucracy, promulgation of laws in the enforcement of contracts, proper and speedy system of taxation and tax incentives and the environmental laws etc.

FDI can boost economic growth in several modes. It is assumed that by means of capital stock FDI becomes a growth enhancing element as more new feedbacks are introduced in production (Buckley et al, 2002). Likewise, a larger range of intermediate goods in FDI related production may also result in output growth (Feenstra and Markusen, 1994). Secondly, FDI is taken as an integral root towards technological revolution and human capital growth (Buckley et al, 2002). Capital goods and human capital growth; for instance out-put-enhancing employment training, alternative modern management practices, attainment of fresh skills and organizational innovations, create technological revolution.

In addition, local corporations enhance their productivity through FDI. Generally, the productivity of firms in the host economy is believed to be improved in direct and indirect ways. Both stocks of education and investment enhance economic growth (Krueger and Lindahl, 2001). Romer (1986) presents his views that the stock of well-literate workers, who tend to invent modern technology, helps in raising growth. Technological discoveries that spill over into the economy are imitated, causing externalities. No diminishing returns to human capital produce limitless growth. In Nelson and Phelps (1966), the human capital stock affects the speed of adopting new technology. The study follows the endogenous growth research that observes that the rate of investment in education, rather than its stock, enhances growth rates.

In the long run, economic growth requires investments in physical and human capital alike. These investments are to be financed mainly from domestic savings, though savings of other countries can also support a country's investment. It is also fair to say that savings without productive investments and their appropriate operation cannot guarantee economic growth. Hence, strictly speaking, domestic savings are neither necessary nor sufficient condition for growth, but it is certainly expected to enhance growth. High savings and investment rates are important in view of their strong and positive association with the GDP growth rate as suggested by endogenous growth theory (see e.g., Romer 1986; Lucas, 1988)[1].

Different researchers, being not contented with a narrow and short-run impact elucidation of the character of FDI, have ultimately endeavored to join other channels through which FDI affects growth in both short and long run. They do so within the outline of endogenous models. Whenever growth is endogenised, there are many other channels through which FDI influences growth perpetually. As proposed by Campos and Giovannoni (2002), it is convenient to think about these various effects by specifying how FDI affects each variable in the production function. As it was discussed in the previous section, FDI can affect output first of all by means of augmenting capital stock. Foreign and domestic capital may be viewed in this respect as either substitute or complimentary. If they are treated as compliments, the final impact of FDI on output is expected to be larger as a result of externalities. Second, FDI can affect labour efficiency, being an important source of human capital augmentation and technological change. Even if FDI does not add to the capital stock significantly, it promotes knowledge transfers and provides specific productivity-increasing skills, which are the most important mechanisms of promoting growth (De Mello, 1999). Furthermore, through knowledge transfers and imitation by domestic firms, FDI also enhances productivity of domestic research and development (R&D) activities. Finally, in endogenous growth models, policy actions are also treated leading to permanent increases in the rate

[1] The neoclassical growth theories (see e.g. Solow, 1956) assume that marginal product of capital eventually falls to zero so that equilibrium growth eventually stops, irrespective of the level of the savings or investment rates. But even in the neoclassical model, the long run level of income per capita is higher the higher the savings or investment rate. Further, Srinivasan and Raut (1993) shows that if the assumption that marginal product of capital eventually falls to zero is replaced by the assumption that it eventually falls to a certain minimum but positive level, than even the neoclassical model has implications similar to those of the endogenous growth theories.

of output growth, and both success and failures of FDI-promoting policies are, therefore, long-lived (De Mello, 1999).

Romer (1986) model presented by them which displays technological progress regarding an increased variety of capital goods available as a result of "capital deepening". The scholar's research finds that FDI ought to be regarded and considered in a different way from that of domestic capital by means of magnifying the variety of intermediate goods and capital equipment, as a result of which, the productivity of the host country starts growing. In the same way, the findings of Buckley et al (2002) as compared to Campos and Giovannoni (2002) are based on the fact that no evidence regarding a threshold level of human capital is found after which FDI acquires more effectiveness.

3. Model, Methodology and results

The development of endogenous growth theory stimulated research of the long-run impact of FDI on economic growth. It is conventional in the contemporary economic literature to derive the estimating equation from a basic augmented production function in human capital index (H_t) and total factor productivity (A_t) enter as factor inputs.

Based on the above discussion, the model to investigate the interaction of FDI and domestic savings in economic growth is derived using endogenous growth model:

$$Y_t = f(A_t, L_t, K_t, H_t) \tag{1}$$

t=1,2,3……

Where Y_t is GDP, L_t is employed labour force, K_t is physical capital stock, and H_t is human capital index. The variable A_t captures the total factor productivity effect on economic growth in gross domestic product not accounted for by increasing in factor inputs (L_t, K_t, H_t). According to the new endogenous growth theory, A_t is endogenously determined by economic factors. Instead of measuring the effect of FDI on domestic investment, this study implicitly assumed that the effect of FDI, domestic savings and balance of trade on economic growth operates through A_t. Significantly, the effect of FDI on A_t also depends on the balance of trade and domestic savings. So proxy variables for A_t are:

$$A_t = g(FDI_t, DS_t, BOT_t) \tag{2}$$

Substituting Eq (2) in Eq (1)

$$Y_t = F(L_t, K_t, H_t, FDI_t, DS_t, BOT_t) \tag{3}$$

Where FDI_t is foreign direct investment, DS_t domestic savings and BOT_t is balance of trade.

The estimated equation is:

$$Y_t = \beta_0 + \beta_1 L_t + \beta_2 K_t + \beta_3 H_t + \beta_4 FDI_t + \beta_5 DS_t + \beta_6 BOT_t + u_{1t} \tag{4}$$

$$\beta_0 > 0, \beta_1 > 0, \beta_2 > 0, \beta_3 > 0, \beta_4 > 0, \beta_5 > 0, \beta_6 > 0$$

t=1,2,3…

The coefficients $\beta_0, \beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6$ show that how much economic growth responds to the changes in the employed labour force, physical capital stock, human development index, foreign direct investment, domestic savings and balance of trade, t is time subscript and u_{1t} is stochastic error term.

3.1 Sources of Data

For this study, the data has been taken from unpublished thesis of Iqbal (2006), Pakistan Statistical Year Book (1970, 1975, 1985, 1995, 2005) and Economic Survey of Pakistan (1970, 1975, 1985, 1995, 2005), Federal Bureau of statistics, Pakistan. Data is time series data, covering the period 1972-2005.

3.2 Methodology

The econometric applications are necessarily driven by economic theories, which give rise to econometric relations of a structural type. Since most of the Macroeconomic time series variables are non-stationary, it is now quite well known that the traditional structural equations portray spurious correlations and erroneous conclusions (Granger and Newbold, 1974; Phillips, 1986). As a precondition for co-integration, the individual series are tested for a common order of integration and then the appropriate co-integration is applied to find the long run equilibrium co-integrating vectors.

3.3 Testing for Stationarity

Here we will examine the individual series using graphical evidence to demonstrate the normality of the data density function and we test for the integrated properties of each series with Augmented Dickey Fuller (ADF) tests develop by Dickey et al. (1986) for existence of unit roots. The essence of the ADF tests is the null hypothesis of non-stationarity, the rejection of which requires a negative and significant test statistic. ADF test is based on regression equation which may take the following forms.

With out trend and intercept

$$\Delta X_t = \delta X_{t-1} + \sum_{j=2}^{q} \delta_j \Delta X_{t-j+1} + \varepsilon_t \tag{5}$$

With intercept

$$\Delta X_t = \alpha + \delta X_{t-1} + \sum_{j=2}^{q} \delta_j \Delta X_{t-j+1} + \varepsilon_t \tag{6}$$

With trend and intercept

$$\Delta X_t = \alpha + \beta t + \delta X_{t-1} + \sum_{j=2}^{q} \delta_j \Delta X_{t-j+1} + \varepsilon_t \tag{7}$$

Here Δ is the first difference operator, ε_t is a white noise disturbance term with variance, σ^2, and t = 1,… is an index of time. The ΔX_{t-j+1} terms on the right hand side of equations (5), (6) and (7) allow for serial correlation and ensure that the disturbance term is white noise.

3.4 Johansen's Maximum Likelihood Co-integration Test

Johansen (1991, 1995) provides a unified approach to analyze cointegration within VAR models. For co-integration the original variables in the system must be integrated at same level. To test for cointegration this procedure uses two test statistics. The first is called the Maximum Eigenvalue Test, which tests the null hypothesis that there are r co-integration vectors versus the alternative hypothesis that there is r+1 co-integrating vectors. The second is called the trace test, which employs the null hypothesis that there are r co-integration vectors versus the alternative hypothesis that there is r+1 co-integrating vectors. Both tests are used to determine the number of co-integrating vectors (r).

The test for the number of characteristic roots that are insignificantly different from unity can be conducted using the following two test statistics:

With Trace Value Statistics

$$\lambda_{trace(r)} = -T \sum_{i=r+1}^{n} \ln(1-\hat{\lambda}_i) \tag{8}$$

With Maximum Eigen Value Statistics

$$\lambda_{\max}(r, r+1) = -T \ln(1-\hat{\lambda}_{r+1}) \tag{9}$$

Where

$\hat{\lambda}_i$ = the estimated values of the characteristic roots (also called eigen values) obtained from the estimated matrix

T = the number of usable observations

According to Enders (1995), When the appropriate values of r are clear, these statistics are simply referred to as λ_{trace} and $\lambda_{\max}$. The first statistic tests the null hypothesis that the number of distinct co-integration vectors is less than or equal to r against a general alternative. The λ_{trace} equal zero when all λ_i =0. The further the estimated characteristic roots are from zero, the more negative is in (1- $\hat{\lambda}_i$) and the larger is the λ_{trace}

statistic. The second statistic tests the null that the number of co-integrating vectors is r against the alternate of r+1 co-integrating vectors. Again, if the estimated value of the characteristic root is closed to zero, the $\lambda_{\max}$ will be small.

3.5 Test for Granger Causality

Here we apply the Multivariate Granger Causality, methodology developed by Toda and Yamamoto (1995), to test the causality among the variables in this study. Toda and Yamamoto's technique of testing for Granger Causality has advantage because of its simplicity and the ability to overcome many shortcomings of alternative econometric procedures.

Toda and Yamamoto (1995) proposed a simple procedure requiring the estimation of an 'augmented' VAR, even when there is co-integration, which guarantees the asymptotic distribution of the Modified Wald statistic. All one needs to do is to determine the maximal order of integration $d_{\max}$ (where $d_{\max}$ is maximal order of integration suspected to occur in the system), which we expect to occur in the model and construct a VAR in their levels with a total of (k + $d_{\max}$) lags. Toda and Yamamoto point out that, for d=1, the lag selection procedure is always valid, at least asymptotically, since k>=1=d. If d=2, then the procedure is valid unless k=1. Moreover, according to Toda and Yamamoto, the Modified Wald statistic is valid regardless whether a series is I (0), I (1) or I (2), non co-integrated or co-integrated of an arbitrary order.

In order to clarify the principle, consider the simple example of a bi-variate model, with one lag (k=1). That is:

$$x_{1t} = A_{10} + A_{11} x_{1t-1} + A_{12} x_{2t-1} + \varepsilon_{1t} \qquad (10)$$
$$x_{2t} = A_{20} + A_{21} x_{1t-1} + A_{22} x_{2t-1} + \varepsilon_{2t} \qquad (11)$$

Here A_{i0} are the parameters representing intercept terms and $\varepsilon_{it} = (\varepsilon_{1t}, \varepsilon_{2t})$ is n independently and identically distributed bi-variate white noise process with zero mean and non-singular covariance matrix.

To test that x_{2t-1} does not Granger cause x_{1t}, we will test the parameter restriction A_{12}=0, if now we assume that x_{1t} and x_{2t} are I (1), a standard t-test is not valid. We test A_{12}=0 by constructing the usual Wald test based on least squares estimated in the augmented modal:

$$x_{1t} = A_{10} + A_{11} x_{1t-1} + A_{12} x_{2t-1} + A_{11} x_{1t-2} + A_{12} x_{2t-2} + \varepsilon_{1t} \qquad (12)$$
$$x_{2t} = A_{20} + A_{21} x_{1t-1} + A_{22} x_{2t-1} + A_{21} x_{1t-2} + A_{22} x_{2t-2} + \varepsilon_{2t} \qquad (13)$$

The Wald statistic will be asymptotically distributed as a Chi-square (χ^2), with degrees of freedom equal to the number of "zero restrictions", irrespective of I(0), I(1) or I(2), non co-integrated of an arbitrary order.

The results of the Augmented Dickey Fuller (ADF) test and Phillips-Perron test with constant, with constant & trend, and without constant & trend are given. Table 1 and Table 2 show, all variables are stationary at first difference or integrated of order one, I (1).

Table1 Unit Root Test (ADF) at 1st Difference

ADF Test with Schwarz Info Criterion			
1st Difference Variables	**Constant**	**Constant & Trend**	**Without Constant & Trend**
Y_t	-3.334876**(0)	-3.832393**(0)	-2.129831**(0)
K_t	-4.2984***(5)	-4.0224**(5)	-4.4243***(6)
FDI_t	-5.056646***(0)	-4.341177***(0)	-4.796218***(0)
H_t	-4.564222***(0)	-571520***(0)	-3.998527***(0)
L_t	-5.318378***(0)	-5.550094***(0)	-2.675184***(0)
DS_t	-7.928073***(0)	-8.443111***(0)	-6.626429***(0)
BOT_t	-3.681417***(1)	-3.238352*(0)	-3.545764***(1)

Source: Author's Calculations

Notes:***, ** and * indicate significance at 1%,5% and 10% level, respectively; numbers reported in the table are *t*-values and the ADF unit root test is based on lag length given in brackets

Table2: Unit Root Test (PP) at 1st Difference

Phillips-Perron Test			
1st Difference Variable	**Constant**	**Constant & Trend**	**Without Constant & Trend**
Y_t	-3.352232**(1)	-3.741950**(3)	-2.129831**(0)
K_t	-4.6210***(7)	-4.7514***(7)	-3.6876***(1)
FDI_t	-4.368340***(0)	-5.373633***(1)	-4.798302***(1)
H_t	-4.440155***(9)	-4.449508***(10)	-3.958008***(4)
L_t	-5.333000***(7)	-6.257242***(15)	-2.497547**(2)
DS_t	-7.949617***(3)	-8.443111***(0)	-6.572544***(4)
BOT_t	-3.1408209**(4)	-3.090550**(4)	-3.0545623***(4)

Source: Author's Calculations

Notes:***, ** and * indicate significance at 1%,5% and 10% level, respectively; numbers reported in the table are *t*-values and the ADF unit root test is based on lag length given in brackets

3.6 Johansen's Co-Integration Test

To test for co-integration this procedure uses two test statistics. The first is called the Maximum Eigenvalue Test, which tests the null hypothesis that there are r co-integration vectors versus the alternative hypothesis that there is r+1 co-integrating vectors. The second, labeled the trace test, is employed to test the hypothesis that there are at most r co-integrating vectors. Both tests are used to determine the number of co-integrating vectors (r).

The results for Johansen co-integration tests are presented in Table 3. Various hypotheses to be tested, from no co-integration (i.e., r =0) to a higher number of co-integration vectors, are reported in the first two columns of the table 3. The eigen-values associated with the combination of I(1) levels of the Z_t vector are in the third column, with the statistics ordered from highest to lowest. The critical values at the 5 percent level of significance and 'p' values are reported in the last two columns of the table 3. Starting with the null hypothesis of no co-integration (i.e., r =0, r =1, r =2, r =3 and r =4) among the variables, the Trace Statistic are 294.53, 192.98, 128.16, 75.76 and 30.84 which exceeds the 5 percent critical value of 125.62, 95.75, 69.82, 47.86 and 29.80 respectively. However, the Trace Statistic when r = 5 and r = 6 are less than the 5 percent critical value. Thus, the results of trace statistic test conclude that there are five co-integrating vectors among Y_t, BOT_t, K_t, L_t and FDI_t. Meanwhile, table 4 shows that Maximum Eigenvalue Test Statistic (101.55, 64.82, 52.40 and 44.93) for the null hypothesis of no co-integration (r = 0, r =1, r=2, r=3) exceeds the 5 percent critical value of 52.36, 46.23, 40.07 and 33.88 respectively, while the trace statistic when r = 4, r =5, and r =6 are less than the 5 percent critical value. Thus, the results of the Maximum Eigenvalue Test conclude that there are four co-integration vectors among Y_t, BOT_t, K_t, and L_t.

Table 3: Johansen's Test for Cointegration Vectors

Trace Value Test Vector [Y_t, BOT_t, K_t, L_t, FDI_t, H_t, DS_t]			
Ho	**Ha**	**Trace Value**	**5% Critical Value**
r = 0	**r > 1**	**294.53**	**125.62**
r ≤ 1	**r > 2**	**192.98**	**95.75**
r ≤ 2	**r > 3**	**128.16**	**69.82**
r ≤ 3	**r > 4**	**75.76**	**47.86**
r ≤ 4	**r > 5**	**30.84**	**29.80**
r ≤ 5	r > 6	11.10	15.49
r ≤ 6	r > 7	0.26	3.84

Source: Author's Calculations

Table 4: Johansen's Test for Cointegration Vectors

Maximum Eigenvalue Test			
Ho	**Ha**	**Trace Value**	**5% Critical Value**
r = 0	r > 1	101.55	52.36
r ≤ 1	r > 2	64.82	46.23
R≤ 2	r > 3	52.40	40.07
r ≤ 3	r > 4	44.93	33.88
r ≤ 4	r > 5	19.74	27.58
r ≤ 5	r > 6	10.84	21.13
r ≤ 6	r > 7	0.26	3.84

Source: Author's Calculations

3.7 Granger Causality Test (based on Toda and Yamamoto)

The causality test was based on fitting an eight variable VAR estimated using the procedure developed by Toda and Yamamoto (1995). The results from Granger causality tests for Y_t, FDI_t, DS_t, H_t, L_t, K_t and BOT_t have been presented in Table 5. The modified-Wald tests for the hypothesis that the coefficients of the lagged values of each of the variables are jointly equal to zero, are performed. The results show in table that the economic growth is caused by FDI, domestic savings, human capital index, employed labour force and balance of trade. Employed labour force is caused by FDI and human capital index. Balance of trade is caused by human capital index. Physical capital stock is caused by economic growth, domestic savings, human capital index and employed labour force.

Table 5: Granger Causality Tests
(based on Toda and Yamamoto)

	Y_t	FDI_t	DS_t	H_t	L_t	K_t	BOT_t
Dependent Variables	Modified Wald Statistics						
Y_t	--	7.0399 (0.0434)	14.4333 (0.0024)	10.5881 (0.0142)	11.201 (0.0106)	1.2717 (0.7358)	8.1308 (0.0434)
FDI_t	5.3598 (0.1743)	--	0.6750 (0.8791)	1.3539 (0.7164)	0.9902 (0.8036)	3.0196 (0.3886)	0.3168 (0.9568)
DS_t	5.3487 (0.1480)	7.6654 (.0535)	--	0.7632 (0.8582)	7.6092 (0.0548)	2.3594 (0.5012)	2.7491 (0.4320)
H_t	2.2682 (0.5186)	6.0393 (0.1097)	3.1865 (0.3638)	--	3.1907 (0.3632)	6.6457 (0.0841)	1.5138 (0.6791)
L_t	0.9918 (0.8032)	11.6324 (0.0088)	4.5585 (0.2071)	10.0220 (0.0184)	--	1.1093 (0.7748)	1.9244 (0.5882)
K_t	10.9242 (0.0121)	6.0225 (0.1105)	10.3122 (0.0161)	7.9789 (0.0464)	11.0074 (0.0117)	--	4.8664 (0.1818)
BOT_t	2.8906 (0.4088)	5.8915 (0.1170)	5.3911 (0.1453)	14.2265 (0.0026)	3.8345 (0.2788)	2.1014 (0.5516)	--

Source: Author's Calculations

Notes: The [k+d(max)]th order level VAR was estimated with d(max)=1 since order of integration is 1. Lag length selection of k=2 was based on Schwarz information criteria test results. Reported estimates are asymptotic Wald statistics. Values in parentheses are p-values.

4. Conclusions

This study is based on Granger causality tests across a variety of specifications within a VAR framework. The main contribution of the study has been to identify causal links among factors affecting and affected by economic growth in Pakistan, including the investigation of the foreign direct investment, domestic savings, human capital index, employed labour force, physical capital stock and balance of trade, using annual data over the period 1972 to 2005.

The empirical analysis has involved (after testing the integration and co-integration properties of the data) investigation of causality links between pairs of variables as well as among sub-sets of variables in a multivariate setting. Overall, the model shows strong co-integration in long run by using Johansen co-integration technique. The study quantified that FDI inflow and domestic savings have strong effect on economic growth in the long run.

Toda and Yamamoto (1995) proposed a simple procedure requiring the estimation of an 'augmented' VAR, even when there is co-integration, which guarantees the asymptotic distribution of the Modified Wald statistic. The results of this technique are considered to be the most reliable in the current literature. Hence, the study puts more focus on the results of that technique. The study finds the factors, which directly and indirectly cause the economic growth. Results show that economic growth is caused by foreign direct investment, domestic savings, human capital index, employed labour force and balance of trade. Employed labour force is caused by FDI and human capital index. Balance of trade is caused by human capital index. Physical capital stock is caused by economic growth, domestic savings, human capital index and employed labour force.

The study also revealed that FDI & human capital index cause employed labour force, these two variables again cause the economic growth, though indirectly. Keeping this result in view, the growth objective may be achieved, if government makes easy fiscal and monetary policies in order to promote the FDI inflows and should invest in human capital through education, health and training like facilities. At the same time, human capital index is also causing the balance of trade. Also, investment in human capital is helpful in removing the balance of payment deficit as it is likely to be affecting balance of trade.

Further more, the study has also indicated that physical capital stock is caused by economic growth, domestic savings, human capital index and employed labour force. Therefore, there is a need to improve the banking system in Pakistan, which will be helpful in mobilizing the domestic savings to physical capital stock. Along with, investment in human capital and establishing the job banks can also be helpful for human capital in Pakistan.

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