

# Role of Investment in the Course of Economic Growth in Pakistan

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**Abstract**—The present research was focused to investigate the role of investment in the course of economic growth with reference to Pakistan. The study analyzed the role of the public and private investment and impact of the political and macroeconomic uncertainty on economic growth of Pakistan by using the vector autoregressive approach (VAR). In long-run both public and private investment showed a positive impact on economic growth but the growth was largely driven by private investment as compared to public investment. Government consumption expenditure, economic uncertainty and political instability hampered the economic growth of Pakistan. In short-run the private investment positively influences the growth but there was negative and insignificant effect of the public investment and government consumption expenditure on the growth. There was a positive relationship found between economic uncertainty (proxy for inflation) and GDP in short run.

**Keywords**—Investment, Government Consumption, Growth, Co-integration, Pakistan.

## I. INTRODUCTION

ECONOMIC growth referred as the steady course of action through which the productive and fruitful capacity of an economy is improved in due course to bring about increasing levels of national output and income [25].

Economic growth, defined as increase in the number of the goods and services produced by any economy over time. Economic growth is usually related to growth of potential output, i.e., production at "full employment. Economic growth is the major foundation of enhancement in level of literacy, improvement in technology and increase in the capital stock.

In the process of investigating the economic performance of a country, key determinant of the economic growth is the investment rate. Most of those countries that grow swiftly, invest a considerable fraction of their GDP. On contrary the slowly developing countries are those who fail to invest. It makes clear that investment is a vital component of economic growth. On its back, humans have ridden from caves to skyscrapers.

Economists define the investment as the source of production of goods that will be used to produce other goods. It is a fact that economists have developed a common opinion about the constructive effect of investment on economic growth. Yet no consensus is built that either public investment has a superior impact on economic bustle or private investment. Empirical evidence from all over the globe proposes that private capital is more fruitful than public investment.

Pakistan's economy over the last 60 years has shown an average annual growth rate of 4 percent, with an 18 times larger economy than at the time of independence. High economic growth period were 1960-69, 1977-1988, and from 2001-07 [6]. The challenges to economic growth are fast growing population, low levels of savings, low levels of foreign direct investment, food and energy inflation, political and economic uncertainty and poor infrastructure both physical and institutional [24]. In the 2000 privatization of the banking sector helped the economy to perform high growth rate. In 2004-06 by the support of industrial and services sectors growth remained 6-8 per cent. In 2007 Pakistan sustained its momentum by growing 7 per cent as compared to 2006. Services and manufacturing contributed 8 and 8.4 percent share in GDP respectively. Investment in real stipulation was increased by over 20 per cent [9]. Political uncertainty, poor law and order condition, risky security environment and change in government curtailed investment during 2008 and resultantly economic growth remained 5.8 percent. Revenue shortfall and non-development expenditures of government caused fiscal deficit and it reduced public and private investment so the economic activities slow down [12].

## II. HISTORY OF INVESTMENT AND GROWTH IN PAKISTAN

Over the last 35 years Pakistan has experienced erratic real GDP growth rates. These have varied from decade to decade like in 1970 the growth rate was over 10 percent and 1997-98 saw a low GDP of just over 1 percent only. There was highest GDP growth rate in 1960 because this decade was considered as private sector friendly, so there was a boom and prosperity seen by the economy in 1960s. After the Nationalization policy of the Zulfikar Ali Bhutto's government the 1970s were subjugated by an increasing participation of government in investment bustle so at one time the government was investing double than the private investors. In 1980s the military government the reversed the process of nationalization and this act encouraged the private sector to invest. The 1990s, with a similar distribution of investment between the private

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and the public sector, saw the lowest growth rates because there was inconsistency in the policies of the government, government was changed four times in 1990s, cotton crop disease and imposition of international sanctions after nuclear test in 1998 so the government investment activity remained less than its trend level.

Pakistan bucks the development and distinct to the other South Asian and South East Asian countries, has an extra impulsive investment performance in the public sector than in the private sector so this situation point toward the need to observe the brunt of economic uncertainty on investment bustle. Additionally in 1990s Pakistan has the lowest investment-to-GDP share in the South Asian region.

After getting at record intensity of 22.9 percent total investment in GDP in 2006-07 but it remained bit low at 21.6 percent of GDP in 2007-08. In last FY fixed investment has decreased 1.32 percent. Total investment has enlarged 22.9 percent of GDP in 2006-07 from 16.9 percent of GDP in 2002-03 and in last five years it explained an increase of 6.0 percent of GDP. For the period of previous four years in real terms on average fixed investment raised by 13.2 percent and 25.9 percent in nominal terms. Throughout the same period in real terms Private investment increased by 12.5 percent per annum. For the period of the last three years the composition of investment has altered among private and public sector. Private sector investment grew by 9.7 percent this year as against 13.3 percent last year in nominal terms. Public sector investment has also increased by 15.7 percent per annum during the last four years and 9.7 percent during the current fiscal year in real terms. The development of infrastructure by public sector investment has shaped spillovers effects for private sector investment [24].

The present study investigates the questions related to role of investment in economic growth by using 35 years of annual data for Pakistan.

### III. REVIEW OF LITERATURE

The study focused on the issue of growth in Pakistan. Substantial research has been focused on the nature and determinants of public and private investment, macroeconomic uncertainty and their impact on GDP growth rate; some key themes are summarized below:

In the presence of an established belief that investment is the key to economic development and growth issues, a vast literature has focused on the empirical and theoretical study of the investment process [7, 8].

Aschauer (1989a, 1989b) analyzed and estimated the productivity of public capital inside an aggregate production function. Public capital was found to be a major and important determinant of economic growth. Whereas, some studies are of the view that public investment had a negative effect and private investment had a positive and significant impact on economic growth [10, 13, 26, 3].

In the context of Pakistan some studies explored the role of public capital in the economy both at national and sectoral levels. These research studies mapped out the bond between economic growth and productivity of public capital. It was revealed that public capital significantly and positively contributed in national product [4, 17, 18]. Relationship

between economic growth, public investment and private investment was also investigated in Pakistan. Results emphasized the importance of economic growth as source of investment [20, 21]. Character of public and private investment in economic growth of Pakistan was further explored. Private investment showed a significant positive impact on economic growth [11].

The linkage between inflation and GDP was investigated by [20] for South Asian countries. The analysis suggested that there was a positive relation between inflation and GDP in long-run and short-run. Regarding political and macroeconomic uncertainty in Pakistan, poor law and order situation, lack of political stability trained labor force, inconsistent macroeconomic policies combined with macroeconomic imbalances and inadequate infrastructure were found as main factors for low domestic and foreign direct investment [16, 17].

### IV. DATA AND METHODOLOGY

The VAR was followed for the analysis of the relationship between economic growth and investment. For two reasons VAR methodology was preferred the in this study. First, it captures the forward-looking nature of investment and it avoids any a priori restrictions on the variables appearing in the VAR. Secondly this methodology allows the study of both long run and short run dynamics inside a unified framework of co-integration and error-correction modeling [14].

The data consisted of variables of Public investment (IG), Private Investment (IP), Public consumption (CG), Gross Domestic Product (GDP), Macroeconomic uncertainty (derived by percentage change in annual inflation rate based on the consumer price index) and Dummy of Political shocks (DPS).

Data on these variables in real terms for the period from 1973 to 2008 were obtained from various issues of Economic Survey of Pakistan, Statistical handbook of State Bank of Pakistan and Planning and Development Division Federal Bureau of Statistics.

All the variables were converted into their log form and the stationary properties of time series data was investigated using tests for the existence of unit roots. Tests for co-integration were carried out by using the Johansen's testing procedure. This method proceeds with specification of the following VAR of order  $p$ :

$$y_t = A_1 y_{t-1} + A_2 y_{t-2} + \dots + A_p y_{t-p} + \epsilon_t \quad (1)$$

Where;  $Y_t$  was the  $k$ -dimensional vector of non-stationary variables and  $\epsilon_t$  was a vector of white noise residuals.

By using the first difference operator  $\Delta$ , the above VAR can be written as:

$$\Delta y_t = \Pi y_{t-1} + \sum_{i=1}^p T_i \Delta y_{t-i} + \epsilon_t \quad (2)$$

For testing the co-integration rank the Johansen developed two test statistics. The first, maximum Eigen value test examines the null hypothesis of  $p$  co-integrating vectors against the alternative of  $r + 1$  vector. This test utilizes the  $p + 1^{st}$  largest Eigen value in the following likelihood ratio:

$$\varphi_{max} = -T \ln (1 - \varphi_{p+1}) \tag{3}$$

The second **trace statistics** provides a test for a more general alternative hypothesis ( $p \leq n$ ) and it is computed as followings.

$$\varphi_{trace} = -T \sum_{i=p+1}^n \ln (1 - \varphi_i) \tag{4}$$

V. EMPIRICAL RESULTS

The results of the unit root tests of the log form of the series GDP, IP, IG, CG and UN are reported in Table 1. On the basis of the augmented Dickey-Fuller statistic these series were found non-stationary. On the basis of value of t greater than critical value of ADF; the null hypothesis was failed to be rejected. Thus existence of unit root was confirmed that the series were non-stationary.

TABLE I  
UNIT ROOT TESTS USING AUGMENTED DICKEY-FULLER METHOD

Variables	Without trend	With trend
GDP	-1.2516	-1.3861
IP	-78426	-2.0939
IG	-2.4203	-2.9968
CG	-1.8348	-1.5672
UN	-2.6749	-2.4902
ΔGDP	-3.9715	-4.1724
ΔIP	-4.4990	-4.4111
ΔIG	-4.1733	-3.9583
ΔCG	-3.6082	-3.7062
ΔUN	-5.1359	-5.3331

Critical value for the augmented Dickey-Fuller statistic with intercept and without trend was -2.95 (p = 0.05 per cent)  
Critical value for the augmented Dickey-Fuller statistic with intercept and trend was -3.55 (p = 0.05 per cent)

After differencing once each series the unit root test was applied and results were reported in Table 2. ΔGDP, ΔIP, ΔIG, ΔCG and ΔUN were found stationary on the basis of these results. It was confirmed that all the series were stationary after differencing once. Therefore, it was concluded that all series used in the analysis of this research study were of the same order i.e. I [1].

The estimation of the order of Vector Auto regression (VAR) model was important before the application of the Johansen’s co-integration tests. Therefore, the order of lags (denoted by p) of the Vector Auto regression (VAR) model were specified and estimated here in this section. It was important to find the order of Vector Auto regression (VAR) model before estimating the Johansen’s co-integration tests.

TABLE II  
SELECTING THE ORDER OF VAR FOR THE GROWTH MODEL

Order	AIC	SBC	Adjusted LR test
4	186.29	107.42	-----
3	161.12	100.18	29.12[.259]
2	162.91	119.89	42.60[.762]
1	142.08	116.99	69.21[.666]
0	19.96	12.79	154.64[.000]

Note: p – values in the parentheses.  
AIC=Akaike Information, Criterion,SBC= Schwarz Bayesian Criterion

VI. VECTOR OF CO-INTEGRATION

According to [15] the vector of co-integration represented a stationary linear combination of non-stationary variables. There might be more than one co-integrating vectors of the relevant variables used in the research. Therefore, it was necessary to test the presence of co-integration and to determine the number of co-integrating vectors among the series used in the growth model. The unrestricted intercept and no trend model were used to find the co-integrating vectors in the Johansen co-integration model. The results of the co-integration were provided in the Table 3. One co-integrating vector was selected on the foundation of the Eigen Value Test.

TABLE III  
GROWTH MODEL CO-INTEGRATION LR TEST BASED ON MAXIMAL EIGEN VALUE OF THE STOCHASTIC MATRIX

Variables	Null Hypothesis	Alternative Hypothesis	Eigen values	Critical values
GDP	r = 0	r = 1	59.70	34.40
IP	r <= 1	r = 2	27.10	28.27
IG	r <= 2	r = 3	14.15	22.04
CG	r <= 3	r = 4	9.81	15.87
UN	r <= 4	r = 5	8.64	9.16
DPS				

The critical values were given (p = 0.05 per cent) levels for Co-integration

The results of the co-integration based on Maximal Trace value of the Stochastic Matrix were given in Table 4. Two co-integrating vectors were selected on the basis of Trace Value Test. So finally on the basis of Trace Value Test the study considered that there existed two co-integrating vector in Growth model.

TABLE IV  
GROWTH MODEL CO-INTEGRATION LR TEST BASED ON TRACE OF THE STOCHASTIC MATRIX

Variables	Null Hypothesis	Alternative Hypothesis	Trace values	Critical values
GDP	r = 0	r >= 1	119.42	75.98
IP	r <= 1	r >= 2	59.71	53.48
IG	r <= 2	r >= 3	32.61	34.87
CG	r <= 3	r >= 4	18.45	20.18
UN	r <= 4	r >= 5	8.64	9.16
DPS				

The critical values were given (p = 0.05 per cent) levels for Co-integration.

VII. LONG RUN RELATIONSHIP

The variables included in the Growth model were found co-integrated demonstrating a long run relationship. The long run relationship between the variables was determined with the help of ordinary least square (OLS) method. The results of the OLS estimates for growth model were reported in Table 5.

The estimated econometric model was:

$$\ln GDP = 3.69 + 0.323IP + 0.198IG - 0.32CG - 0.047Un - 0.017DPS \tag{5}$$

The results explained that the gross domestic product (GDP) proxy for economic growth was positively related with the private and public investment spending in the Pakistan. The estimated coefficient of private investment (IP) was 0.323

and was found highly significant at 0.01 probability level. The result indicated that private investment was enormously beneficial for economic growth. The estimated coefficient of public investment was 0.198. It revealed that the positive influence of private investment upon economic growth was larger and dominant as compared to public investment. The growth was largely driven by private investment than public investment and the result of present research was in the line with [11].

TABLE V  
OLS RESULTS OF GROWTH MODEL

Variable	Coefficient	Std. Error	t-Statistic
C	3.69***	0.418	8.81
IP	0.323***	0.041	7.85
IG	0.198***	0.045	4.37
CG	-0.320***	0.067	-4.72
UN	-0.047***	0.019	-2.44
DPS <sup>a</sup>	-0.017	0.018	-0.959
R <sup>2</sup>	0.981		
Adjusted R <sup>2</sup>	0.974		
D-Watson	1.960		

\*\*\* Indicated that the coefficient was significantly different from zero at 0.01 probability level.

Political shocks in the economy were captured by dummy variables.

The impact of the government consumption expenditure upon the economic growth was also observed in the study. The government consumption expenditure was -0.320 and it showed the strong negative impact on economic growth in the country.

The economic uncertainty was an important and major issue in the growth of an economy. The problem of economic uncertainty was also addressed in this research study. The percentage change in the consumer price index (CPI) was used as a proxy for economic uncertainty. The estimated coefficient of uncertainty was -0.047 and was highly significant. The result indicated that economic uncertainty (inflation) was immensely harmful for economic growth. The political instability and poor law and order condition also a matter of concern and it also has a deep relation with economic growth and development of an economy. The results in table 5 explained that political instability negatively affected the GDP.

## VIII. ERROR CORRECTION MECHANISM

In the Growth model the shock showed the way to a short term departure from the co-integrating equilibrium path. The short run relationship among the variables was captured by taking the first difference of the variables included in the error correction mechanism. The results of the error correction mechanism were reported in Table 6.

The results of error correction mechanism revealed that the private investment spending was positively related with the economic growth in Pakistan in the short run period. The estimated coefficient of private investment was .079 and it was significant. The surprising result of the ECM was that the economic uncertainty was positively related with gross

domestic product. The estimated coefficient of economic uncertainty was .022 and it was significant. The role of the public investment toward GDP was found negative whereas GDP was positively related with government consumption expenditure in the short-run. But both the variables were not significant in the short-run. The effect of the political instability was also insignificant in the short run. The coefficients of both ECM (-1) and ECM (-2) stood for the short run adjustment speed of the dependent variables toward long run equilibrium position were reported in Table 6. The first error correction term ECM (-1) explained the first long run relationship. The estimated coefficient of error correction term was -0.215 and it revealed that 21 percent of the disequilibrium in the gross domestic product (GDP) will be corrected in one year. The estimated coefficient of the ECM (-2) was -0.39 and it exposed the speed of adjustment in the second long run relationship and suggested that 39 percent of the error or disequilibrium will be removed in one year.

TABLE VI  
ERROR CORRECTION MODEL OF GROSS DOMESTIC PRODUCT BASED ON CO-INTEGRATING VAR

Variables	Coefficients	Std. Error	t-Statistic
DGDP1	0.326*	0.182	1.78
DIP1	0.079***	0.034	2.33
DIG1	-0.027	0.027	-1.00
DCG1	-0.028	0.034	-0.817
DUN1	0.022***	0.009	2.54
Ecm1(-1)	-0.215*	0.124	1.73
Ecm2(-1)	-0.390***	0.121	-3.22
DPS	-0.005	0.0075	-0.715
R <sup>2</sup>	0.362		
Adjusted R <sup>2</sup>	0.345		
D-Watson	1.8192		

Coefficient is significantly different from zero at 0.10 probability level.

\*\* Coefficient was significantly different from zero at 0.05 probability level.

\*\*\* Coefficient was significantly different from zero at 0.01 probability level.

The stability of the estimated error correction function was established by using CUSUM and CUSUM of Squares tests for stability. The results of these tests were presented in the Figures 1 and 2 and it was observed from the figures, that all the movements were between the critical lines and there was no movement outside the critical lines in both tests and the graphs confirmed that the estimated coefficients were stable and there was no chance of instability in the model.

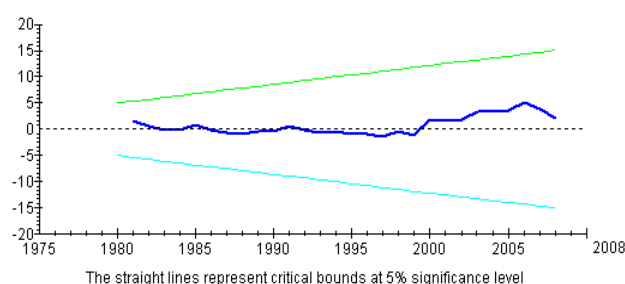


Fig. 1: CUSUM Test of Stability of ECM for Growth Model

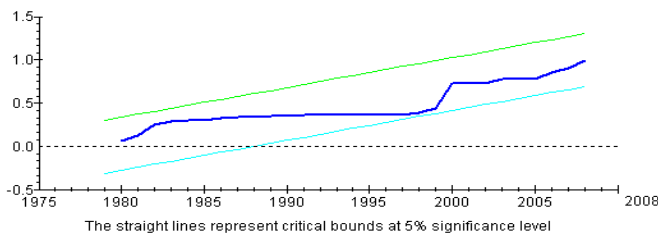


Fig. 2: CUSUM Square Test of Stability of ECM for Growth Model

### VIII. CONCLUSION AND POLICY IMPLICATIONS

The empirical results showed that in long-run both public and private investment have a positive impact on economic growth. The results indicated that growth was largely driven by private investment as compared to public investment. Government consumption expenditure, economic uncertainty and political instability hampered the economic growth of Pakistan. In short-run the private investment positively influences the growth but there was negative and insignificant effect of the public investment and government consumption expenditure on the growth. There was a positive relationship found between economic uncertainty (proxy for inflation) and GDP in short run.

The analysis undertaken in this study leads to the following policy implications

1) The major policy implication concern to the role of the public and private investment in the process of the growth. The findings of the study clearly suggest that there is an urgent need to redirect the public investment in a manner that produces high rates of return.

2) At the same time, such measures should be undertaken to stimulate the private investment. It means that government should provide infrastructural facilities to enhance private investment.

3) The overall environment like political stability, economic certainty in the country is necessary for high economic growth and it will promote the private investment at national level as well as in the different sectors of the economy.

4) Government should cut down its non-development expenditure because increase in this expenditure may increase budget deficit because it hinders the economic growth and private sector investment activities.

5) In the current scenario of political and economic uncertainty pump-priming approach by government can encourage the private investors.

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