Impact of Public Investment on Economic Growth

Rabnawaz, Ambar and Jafar, Rana Muhammad Sohail

University Of Sargodha, Pakistan, Fujian Agriculture and Forestry University, China

2015

Impact of Public Investment on Economic Growth

Ambar Rabnawaz[1] and Rana Muhammad Sohail Jafar[2]

[1] Department of Economics, Faculty of Management & Administrative Sciences, University Of Sargodha, 40100 Pakistan
[2] College of Economics, Fujian Agriculture and Forestry University, Fuzhou-35002 China

Corresponding author's email: awanambar0@gmail.com

ABSTRACT

The study examines the relationship between Gross domestic product and public investment. Time series data for empirical investigation covers the period 1980-2009. The data has collected from Pakistan bureau of Statistics, State bank of Pakistan (SBP) and Stockholm International Peace Research Institute (SIPRI). Empirical results show, there is a positive relationship between GDP and public investment in short run. The increase in GDP causes a rapid increase in public investment. Granger causality test apply to check the causality. Results of test show that bi-causal relationship exists between GDP and public investment. Causality runs from GDP to public investment and similarly, from public investment to GDP.

Keywords: Public investment, economic growth, GDP

Introduction

Public investment is refers as consumption good that reduce the saving and capital investment of an economy. The study reexamines the effect of public investment on economic growth. The impact of public investment on economic growth is specific to country which means every country has different scenario regarding their public investment. The study explains different channels through which economic growth is affected from public investment. Public investment has dual effect on economic growth; it may have a positive or may be a negative effect. Initially, public investment cause increase in production which as a result help to increase output of any country along with its employment level and at the end economic growth of country start to move towards boost. Based on Keynesian view point, public investment is a government instrument which causes production to increase at a specific level. Public investment helps to increase in output which is added in aggregate demand and from resultant, employment increase with increasing in aggregate demand. Public investment raises aggregate demand and has a multiplier effect on output (Blinder, 2008).

Based on Neo-classical views, that at the expense of private spending the public investment increase because resources are shifted from private sector to public sector. This shifting cause negative effect on economic growth and create a crowding-out effect in both private and public sector which retard growth of an economy (Sandler and Hartley, 1995). The modern view about public investment and economic growth seems to be differed from Keynesian and Neo-classical views. According to them, public investment which when use as a government instrument, they do not create multiplier effect in order to boost up economic growth but actually it has multiplier effect on economic growth that is in negative sense. It means that output not increase with increase in military spending, and there is reduction in overall productivity (Smaldone, 2006; Dunne, 2012; Musayev, 2013). The modern views refer that when government increase public investment, there is reduction of amount from GDP as a result of which the spending on other sectors of economy reduces especially creates negative effect on education sector and other sectors of economy. Due to public investment, the raw material is

purchase from other countries which cause reduction in foreign currency reserves (Mshana, 2009). This FCR reduction decreases the supply of money as well as creates the situation of low investment on other sectors of economy. As a result, employment opportunities are not more available to individuals of particular economy. When human capital reduces due to less employment opportunities, the output of the country move towards diminishing situation and generates unemployment in the economy. At the end economy serves with great retarding situation which may result to create possibility of depression in country. The modern view about private sector is conflicted from other views, as they consider private sector is much more productive and dynamic then government sector. Public investment and uses of resources in investment is inefficient because they are not concern with the reduction in cost as firms. When resources are use in civilian economy firms instead of military firms, then this shifting of resources faster the economic growth by improving efficiency and increasing the capital formulation (Feng, 2001; Gupta *et al.*, 2004; Mitra, 2006; Gupta *et al.*, 2010).

The (Ram, 1995) seminal work shows increasing attention towards economy effect due to public investment. This work shows that the findings are inconclusive and mixed, depends upon the countries or sample of countries and time period use for estimation. The infrastructure also develop with public investment and it create positive effect when technical skills and labor force is acquire (MacNair *et al.*, 1995).

Public Investment and Macro-Economic Factors

Public investment is a problem for low income countries because they spend their scarce resources on the purchasing of raw material rather than on infrastructure, and other economic factors. In the low income countries Indonesia has great importance in which major of income portion spend for public investment. The public investment also cause inequality behavior in an economy .The de-unionization cause inequality when public investment increase and employment reduce which create situation of wage inequality. The mechanism by which economic growth and inequality related is simply straightforward. The labor that is use in industries are to be paid higher wages as compare to Govt. firms labor due to which inter-industry depression of wages arise. Comparably, the wages of industrial worker are high that create conflicts in economy. In developing countries, public investment, economic capacity and conflicts are interrelating with the economic growth. The developing countries continuously increase their public investment due to internal and external threats as; African countries today have little public investment and burden (Collier, 2007).

The important issue that is aim here is to identify problem which in fact we observe when economic growth and public investment change and they as a result affect GDP. There exist a positive relationship between output and when economic determinants of growth keep constant. On the other hand, if threats remain constant and economic variables try to change then positive relationship exist between economic growth, output and public investment (Smith, 2000). All of the channels by which we analyze the effect of public investment and economic growth are change with the change in country under study. For example, one of the advance country such as America try to identify its industrial development impact while the poor country like Africa try to solve the problems of public investment. The 102 studies for to investigate the economic effects of military spending, report and explain that almost 39% of the cross-country studies and 35% of the case studies explore a positive relation of public investment on economic growth. Only about 20% found positive for both types of studies (Dunne and Uye, 2009). The share of public investment in GDP is low in developing countries as compare to other components of GDP.

Public Investment, Economic Growth and Pakistan

The study explains the relationship between economic growth, development and public investment for the case of Pakistan. One of the questions that arise here is: what is the effect on the development and economic growth by public investment in the developing countries like Pakistan? The literature argues and shows that national defense for any country is like consumption good which cause to reduce saving and capital investment (Tahir, 1995). There is also the trade-off situation in Pakistan between public investment and other economic factors like education and health but major importance has given to public investment due to which Pakistan GDP to debt ratio is approximately about 60%. The effect of public investment on economic growth for the scenario of Pakistan has two special effects (Husain, 2009). Initially when government try to increase the public investment they must reduce their investment for the sake of other spending .The circulation of money in economy reduce if central authority do not decide to publish more money, which as result cause low employment opportunities for individuals. Ultimately, aggregate demand reduces, the output also decreases, income gap and investment gap starting to create and economic move towards depress situation (Ames *et al.*, 2001). Secondly, when governments try to remove these gaps they have to depend upon foreign aid which increase the GDP-debt ratio and decrease the Pakistan foreign currency reserves when governments pay these loans. So, overall increase in public investment in Pakistan not only effect economic growth but also creates hurdles in the pace of development. In the case of Pakistan the public investment has great effect on economic growth, the provision of public investment raises the GDP (Ghani and Din, 2006).

Public Investment, Govt. Revenue and Gross Domestic Product

When a country increases its GDP, it has to rely upon foreign countries. Such as, for growth purpose the real exchange rate and other investment related instruments are purchase from foreign countries and for their payments the foreign currency reserves has used. The FCR has great importance for development of any country so when payments are made, the expenditures on other sectors of economy has not been made in a proper way due to reduction in FCR. Moreover, the balance of payments goes in deficit that reflects the behavior of imports>exports. When imports are greater than exports, the trade cycle disturb that cause to reduce GDP of economy and due to this reduction development expenditures also reduce.

So, public investment →increase the imports →reduce GDP →reduce expenditures for development →increase rely on foreign countries in the form of loans →decrease FCR when pay these loans →cause the deficit in BOP.

Literature Review

Relationship between economic growth and public investment

De Gregorio and Guidotti (1995) investigated the realistic relationship between financial development and long-run growth through the ratio of bank credit to the private sector to GDP as the indicator of financial development, which depends upon primary school enrollment and secondary school enrollment GDP per capita, revolutions and coups per year, Government spending, Literacy rate, foreign investment and inflation. Dependent variable is average GDP per capita growth in six year periods. Standard errors were computed using White's robust procedure and the estimations were done using panel data with random effects. TCREDIT corresponds to the ratio between domestic credit to the private sector and GDP. The rest of the variables see De Gregorio (1992) t-

statistics in parentheses. The methodology, which we use in it, is cross section regression of Barro (1991). We did not include dummies for each continent as explanatory and PPP investment deflator deviations with respect to the mean. Since their presence did not affect the results, they were dropped in order to simplify the exposition. The basic specification follows Barro, which includes as explanatory variables measures of human capital accumulation based on primary and secondary school enrollment ratios in 1960, GDP per capita in 1960, the average level of government spending over GDP, and Barro's proxies for political instability. We did not include dummies for each continent as explanatory and PPP investment deflator deviations with respect to the mean. The estimations were carried out using ordinary least squares (OLS), and the standard errors were computed using White's robust procedure. The review of the literature and our empirical findings suggest that, by and large, financial development leads to improved growth performance. Our findings also strongly propose that the main channel of broadcast from financial development to growth is the effect on the efficiency of investment, rather than its level. Furthermore, as the Latin American experience of the 1970s and 1980s, there may be instances where unregulated financial liberalization and expectations of government bailouts can lead to a negative relationship between the degree of financial intermediation and growth.

Yakita (2001) explored the effect of monetary expansion on capital accumulation and economic growth in an overlapping generation model with the growth engine of human capital accumulation via inflation, economic growth, consumer, production, government, equilibrium. In this overlapping generation model, we analyze the money policy effects on economic growth dimensions. For our determination we concentrate our attention on the balanced-growth effects of policy changes. We consider an increase in the money growth rate, while keeping the government consumption/human capital ratio constant. Thus, given an increase in life anticipation, it not only makes the real effect of monetary expansion smaller but also may introduce a negative bias in the relationship between inflation and economic growth. We assumed that money appears in the utility function with a constant elasticity of substitution between consumption and real money holdings. Though this assumption is also adopted by Van der Ploeg and Alogoskoufis (1994) and Mino and Shibata (1995), it is critical for our argument. AK model we used in it as the post estimation of the model. Our study extends the results obtained in the AK models and shows that a positive growth effect is still obtained with a growth-driving force of human capital accumulation. The inflation tax through monetary expansion may induce individuals to reduce vacation or consumption, and this will affect the balanced-growth path. The positive growth effect of monetary expansion is immune to changes from physical to human capital as the growth engine.

Khan and Reinhart (1990) examined the cabins some light on this significant issue by formulating a simple growth model that separates the effects of public sector and private sector investment. Dependent variable is the level of output and independent variables is stock of physical capital, labor force, and vector including other influences affecting growth. The variable measures factor productivity, which is generally assumed to grow at an exogenous rate. Having estimated the relevant growth coefficients and elasticities, one can describe the relative contributions of the various factors of production, as well as that of productivity. Methodology used in this is the growth model. Most growth models specified for developing countries suggestion their roots back to the neoclassical framework of (Solow, 1956). This framework takes as its starting point an aggregate production function relating output to factor inputs and a variable usually referred to as total factor productivity the results show that private investment has a larger direct effect on growth than does public investment. The conclusion of this study is that private investment and public investment do appear to have different effects on the long-run rate of economic growth. One could, therefore, say that the

proposition that private investment should be favored in development and adjustment strategies has some empirical support.

Objective of Study

The Pakistan economy has suffered from low saving and investment pattern which cause deficit in the Balance of payments. This low saving and investment cause due to extra expenditures which Pakistan government spend for other purposes. The other expenditures cause hindrance in the development of country, as a result of which standard of living is always low in Pakistan. The previous literature shows relationship between economic growth and public investment. For this purpose they use different economic and political indicators. In this study I also examine the relationship between public investment and economic growth by introduce GDP in place of economic growth and some other factors that capture the effect on economy when public investment has made by government.

The objective of study

- Is to reexamine the relationship between public investment and economic growth for case of Pakistan.
- To captures the effect of public investment on economic growth, the channels of development expenditures and Balance of payments are introduced.
- To check the causality: Whether there is uni-directional or bi-directional causality exists in GDP and public expenditure.

In order to achieve the above objectives, the methodology and desired data will use which provide with the basic empirical estimation that help out to achieve the major objectives of study.

Data

The objective of study is achieved by using the data which provide with basic results. In order to get mathematical relation and econometric parameters the Data has collected from different sources. Data on Pakistan for variables is collected from Pakistan bureau of Statistics, State bank of Pakistan (SBP) and Stockholm International Peace Research Institute (SIPRI). The data period covers from 1980-2009. The data on variables is in Million Rupees. Description of every variable and the sources of collecting data are as below.

Variable Description:

The variables uses for estimation are public investment, GDP, Revenue and IRR. (Mankiw *et al.*, 1992) used economic growth as a share of GDP. Due to lack of data on economic growth, Gross domestic product (GDP) is use as a proxy of economic growth that helps to identify public investment burden on economic growth of Pakistan. The data of GDP is taken from Federal bureau of statistics in million rupees. Caselli *et al.* (1996) used Military expenditures for analysis. Similarly, Revenue and IRR are using in estimation, because public investment cause them to reduce. The variables descriptions are given in the table.

Table. A

Variables	Description	Sources
IRR	Real Interest Rate	SIPRI

GDP	Gross Domestic Product as proxy	FBS,SBP
R	Revenue	FBS
INV	Investment	FBS

Where, Pakistan federal bureau of Statistics (FBS), State bank of Pakistan (SBP) and Stockholm International Peace Research Institute (SIPRI) are the sources from where data has collected. So, the estimation for country Pakistan of 32 years is carried out with above variables by apply Methodology discuss below and the study purpose is twofold, to see the effect between public investment and economic growth. The second is to check causality between the variables.

Methodology

The econometric model is estimated by applying specific technique that helps out the finding of parameters. This section describes the econometric model and the appropriate technique. The time series data is use in the present analysis that covers span of period 1980-2009. We can determine the parameters with the help of model as below:

$$Y=\alpha_0+\alpha_1X1+\alpha_2X2+\alpha_3X3+\varepsilon_1$$

Here Y is use for dependent variables and X1, X2, X3 describe the presence of independent variables while ε is use for error term. The present analysis use variables ME, GDP, DPE, BOP and now the model become

$$GDP=\alpha_0+\alpha_1 (R) +\alpha_2 (INV) +\alpha_3 (IRR) +\varepsilon_1$$

Where,
GDP=Gross domestic product.
R = Revenue
INV=investment.
IRR=Real Interest Rate.
ε_1=Error Term.

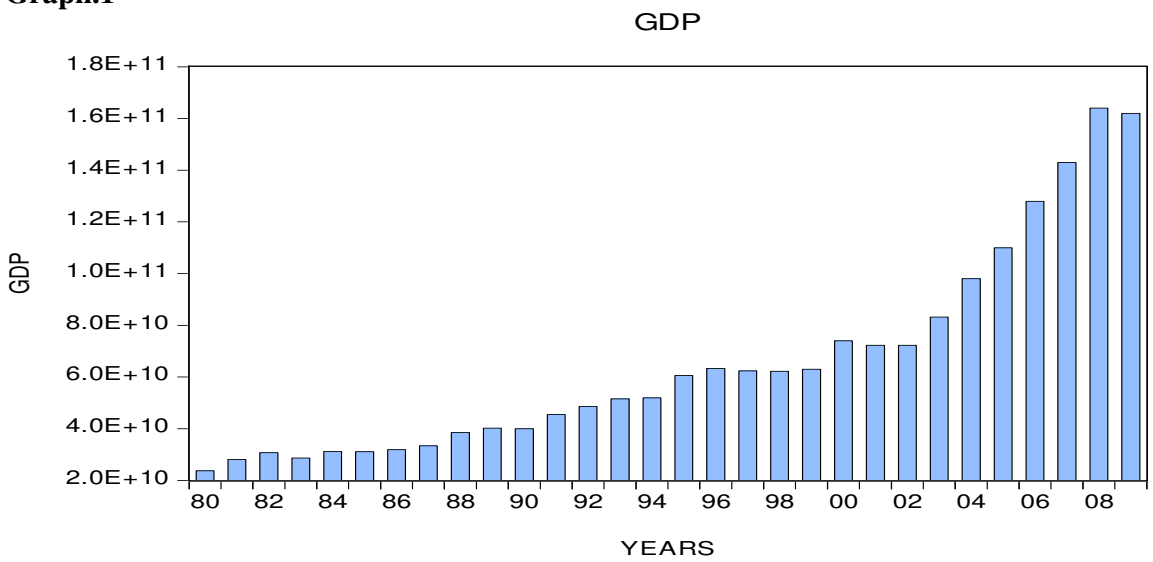
This model is the first step to investigate the relation. Now, the second basic purpose is applying some appropriate technique. The study analyzes the time series and in order to find relationship between variables simple OLS (Ordinary Least Square Method) with Iterative process use for empirical results. The main advantage of OLS is that, it is appropriate to find values in time series analysis and the empirical results provide by OLS method are unbiased. The purpose of Iterative process with OLS is to solve the lagged problems in variables and among error terms.

Graphical Representation

Our analysis include Gross domestic product as a dependent variable and GDP is the Function of revenue, investment and IRR. The trend of variables values corresponding to number of observations is show through graph. In other words, the relation among variables is shown through following graphs.

The graph 1 shows trend behavior of GDP variable corresponding to number of Observations. The line in the graph show that over the period GDP of Pakistan increases with continues behavior and there is no diminishing trend in GDP across the observations.

Graph.1



Results

The value of revenue coefficient is 52021.98 that show the increase in GDP by 52021.98 RS due to 1RS increase in Revenue. The T-statistic is about 3.508422 which describe the significance relationship exists between GDP and Revenue as well as increase in revenue cause increase in GDP. The investment coefficient is 24988.91 which show the increase in GDP is 24988.91Rs by 1Rs increases in investment. The T-statistic (2.613163) shows significance of Investment variable. The IRR coefficient is 5.37E+08 that show decrease in GDP is 5.37E+08RS by 1Rs increase in IRR and T-statistic show insignificance IRR variable. The F-value is 717.3772 and it show that overall model is significant. The Durbin-Watson statistics of Model is 1.210919.

Table. B

Basic Regression

Dependent Variable: GDP
Method: Least Squares
Date: 06/23/14 Time: 23:41
Sample: 1980 2009
Included observations: 30

Variable	Coefficient	SD. Error	t-Statistic	Prob.
C	2.37E+10	3.61E+09	6.575032	0.0000
Revenue	52021.98	14827.74	3.508422	0.0017
Investment	24988.91	9562.706	2.613163	0.0147
IRR	5.37E+08	3.83E+08	1.402856	0.1725
R-squared	0.986791	Mean dependent var		6.57E+10
Adjusted R-squared	0.985267	S.D. dependent var		3.97E+10

S.E. of regression	4.82E+09	Akaike info criterion	47.55263
Sum squared resid	6.04E+20	Schwarz criterion	47.73946
Log likelihood	-709.2895	F-statistic	647.4753
Durbin-Watson stat	1.215824	Prob (F-statistic)	0.000000

Detection of Autocorrelation

The study initially use OLS method for estimating empirical results without use any type of method that solve the problem of autocorrelation. The autocorrelation is major problem that cause misestimating of variables. The value of Durbin-Watson statistics in Table (B) is 1.210919 that reflects the presence of autocorrelation in the Model. The value of D-W statistics should be 2(p=0) while the model have 1.21 D.W statistics that show the existing of autocorrelation. The problem of autocorrelation leads to undesirable results and interpretation of variables is also un-specified. The p>0 or p<0 describe the positive and negative autocorrelation. If value of D-W statistics is 0 then it shows no autocorrelation. The value of D-W statistics equal -1 show strong negative autocorrelation and the value equal to 0 show strong positive autocorrelation. So, the presence of autocorrelation also point out with help of following formula.

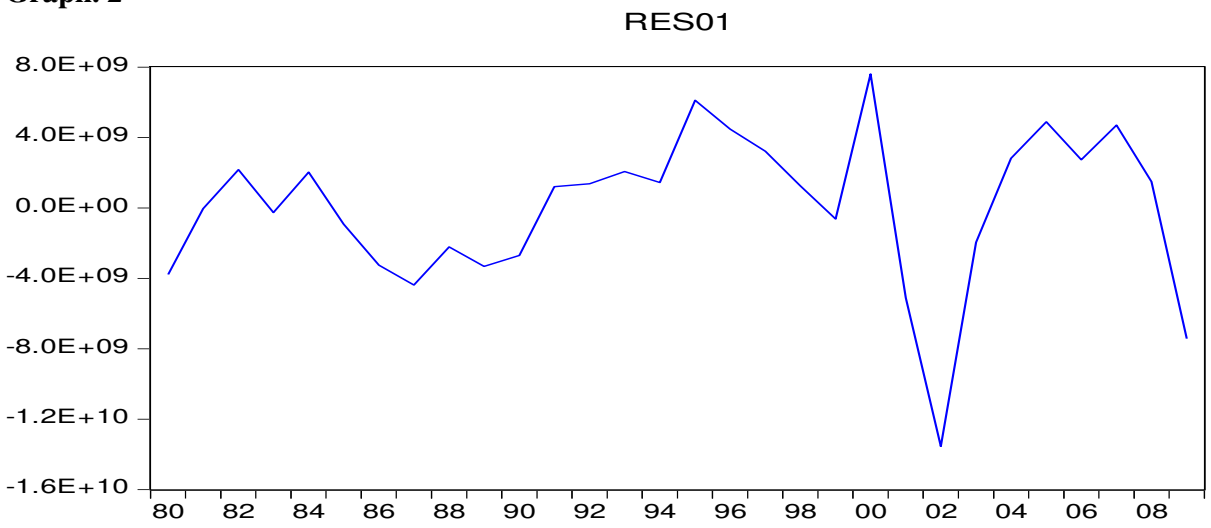
$$\text{Durbin-Watson Statistics}=2(1-p)$$

As, D-W statistics of model is 1.210919.So,

$$1.210919=2-2p$$
$$1.210919+2p=2$$
$$2p=2-1.210919$$
$$p=0.789081/2$$
$$p=0.3945405$$

Here, p show the autocorrelation and its value show that about 39% autocorrelation present in the model. The GRAPH 6 shows the graphical detection of autocorrelation.

Graph. 2



Residual graphto show autocorrelation
Residual are serial correlated and particulary weak positive autocorrelation

Resolving of Autocorrelation

The results require the resolving of autocorrelation otherwise, the model is not interpreted in best way. There are different methods to solve problem of autocorrelation but the most acceptable methods are generalized differencing approach, The Cochrane-Orcutt iterative procedure and The Hildreth-Lu search procedure. The study use The Cochrane-Orcutt iterative procedure and The Hildreth-Lu search procedure to solve autocorrelation.

a) The Cochrane-Orcutt iterative procedure:

The study utilizes Cochrane-Orcutt iterative procedure to solve autocorrelation. Cochrane and Orcutt developed a procedure of iterative that can present through the following steps (Cochrane and Orcutt, 1949).

- Initially, simple OLS procedure applies on model and finds residuals (u_t).
- Find out the first-order serial correlation coefficient p by apply OLS from the equation: $u_t = pu_{t-1}+\varepsilon_t$.
- Original variables are transform as: $Y^*_t = Y_t - pY_{t-1}$, $\beta^*_t = \beta_1(1-p)$ and $X^*_{it} = (X_{it} - pX_{it-1})$for $t=2,\ldots,n$.
- Run the regression by using the transformed variables and find out the residuals of this regression.

Basically, this procedure is use to estimate generalized differencing results by utilization of Iterative non-linear method with AR (1) (Autoregressive errors of order 1) errors in the presence of serial correlation. The process is actually iterative and it requires number of repetitions in order to find convergence.

b) The Hildreth-Lu search procedure:

The Hildreth-Lu search procedure provide with AR(1),AR(2),AR(3),… and MA(1),MA(2),…

Hildreth and Lu developed an alternative method to Cochrane-Orcutt iterative procedure that has following steps (Hildreth and Lu, 1960).

- Initially choose value of p(say p_1), and transform the model for this value and estimate OLS.
- By apply OLS, obtain residuals and residual sum of square (RSS (p_1).
- Choose different values of p (say p_2) and repeat above steps.
- By taking the range of p from-1 to +1 we get series of values of(RSS(p_i)) and now (RSS(p_i)) be minimized and we get optimal solution.

The method also requires lot of repetitions to get optimal solution.

Unit Root Test

a) Testing for the order of integration:

The testing of order of integration is basically the test for the number of unit roots and it fellows the steps described below (Dolado *et al.*, 1990).

- Test Y_t to see if it is stationary. If yes then Y_t=I(0); if no then Y_t=I(N).
- If data is not stationary at level, then take first or second difference.

b) Augmented Dickey-Fuller test:

The study use AD-Fuller test to check the unit root (Mushtaq, 2011). In this, we develop the hypothesis

H_0=Data is not Stationary (Null Hypothesis)

H_1=Data is stationary (Alternative Hypothesis)

The description of variables after apply AD-Fuller test is given in table C

Table. C: AD-Fuller unit Root Test:

Variables	T-Statistics	Prob.	Level of significance	Stationarity Level	Hypothesis
GDP	3.106550	1.000	5%	At Level with intercept	$T_c>T_t$ (We reject H_0,which mean data is stationary)
Revenue	5.549094	1.000	1%	At first difference with intercept	$T_c>T_t$ (We reject H_0,which mean data is stationary)
Investment	3.731447	1.000	1%	At Level with intercept	$T_c>T_t$ (We reject H_0,which mean data is stationary)
IRR	-5.738317	0.0001	1%	At first difference with intercept	$T_c>T_t$ (We reject H_0,which mean data is stationary)

The GDP coefficient T-value show that it is significant and it became stationary at level with intercept. We reject null hypothesis because $T_{cal}>T_{tab}$ which show the data of GDP is Stationary. The coefficient of public investment reflecting significant relationship and it is stationary at level with intercept. We reject null hypothesis that show data of public investment is stationary. Similarly, the value of revenue show significance of variable and it is stationary at level with intercept. But the T-value of IRR show insignificance of variable and it is stationary at level with intercept. The null hypothesis has rejected for Development Expenditures and IRR variable and they are stationary at level with intercept.

Main Findings and Interpretation

Table (D) shows the coefficient values of variables along with their T-statistic values and Standard Error. The coefficient of revenue is 52021.98 and T-value shows that variable has a significant effect. The increase in public investment by 1RS pushes the GDP to increase by 52021.98Rs in short run. The investment value is 24988.91 which show that increase in investment by 1Rs cause to increase GDP by 24988.91Rs. The effect of investment on GDP is significant and T-value that is 2.613163 also supports it. The variable IRR has 5.37E+08 coefficient values which show if IRR increase by 1MillionRS then GDP increase by 5.37E+08 Million RS but the T-value reflects that this relationship is insignificant. The share effect of IRR on GDP has very low and it somehow supported theory that if IRR of any country is in deficit then it has less effect on GDP means GDP doesn't increase with increase in deficit.

The R-squared show that about 99% variations have cause by independent variables on dependent variables. The F-Value 717.377 also shows that overall model is significant. The problem of autocorrelation is now removed by using Iterative process and D.W Statistic is 2 which show there is no autocorrelation present in model (ρ=0).

Table. D (Main Findings)
Dependent Variable=GDP
Method=Least Square
Convergence Achieved After 34 Iterations

Variable	Coefficient	SD. Error	T-Statistics	Prob.
C	3.30 E+10	1.95E+09	1.691718	0.1048
Revenue	24964.07	16990.13	1.469328	0.1559
Investment	34041.97	9705.381	3.507535	0.0020
IRR	1.07E+09	3.97E+08	2.688797	0.0134
AR(1)	0.115165	0.296852	0.387954	0.7018
AR(4)	0.706099	0.275048	2.567185	0.0176

R-Squared	0.991226	Mean dependent variable	6.86E+10
Adjusted R-Squ	0.989231	S.D Dependent variable	3.96E+10
S.E of Regression	4.11E+09	Akaike Info criterion	47.29689
Log likelihood	-656.1565	Schwarz criterion	47.58236
F-Statistics	497.0617	Hannan-Quinn criteria	47.38416
Prob(F-Statistics)	0.000000	Durbin-Watson Stat	2.000967
Inverted AR Roots	.90	-.78	

By considering the values of AR and MA in Table we easily identified the Iterative method. The value of AR (1) is 0.115165 that show the reduction in autocorrelation is about0. 07% when we take first order autoregressive. The model show the AR (4) value 0.706099 which reflect after apply 4th order autoregressive the reduction in autocorrelation is about 21%. The AR(1) and AR(4) show that in model the values of independent variables correlate with their preceding values and by apply First and 4th autoregressive order , the problem of correlation remove

a) Correlation Matrix:

The table E shows the correlation matrix. The entries on the main diagonal (those running from upper left-hand corner to the lower right-hand corner) give the correlation of one variable with itself, which is always 1. The variable GDP has correlation with itself, Revenue, Investment and IRR. Similarly, every variable in the table show correlation with its corresponding variables.

The Granger causality test applies at 2 lag specification to check causality between two main variables (Table. F). The *P*- value for first hypothesis is <0.05 that show Military expenditures create causality on GDP. Similarly, P-value for second hypothesis is <0.05 that describe GDP also create cause on Military expenditures. So, there is bi-causal relationship exist between the variables.

Table. E

	GDP	Revenue	Investment	IRR
GDP	1.000000	0.990469	0.990121	0.203230
Revenue	0.990469	1.000000	0.989649	0.157431
Investment	0.990121	0.989649	1.000000	0.191294
IRR	0.203230	0.157431	0.191294	1.000000

b) Causality Testing:

Pairwise Granger Causality Tests
Date: 06/24/14 Time: 06:20
Sample: 1980 2009
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
Revenue does not Granger Cause GDP	28	2.86036	0.0777
GDP does not Granger Cause Revenue		3.29745	0.0551
Investment does not Granger Cause GDP	28	0.07009	0.9325
GDP does not Granger Cause Investment		1.77282	0.1923
IRR does not Granger Cause GDP	28	11.8392	0.0003
GDP does not Granger Cause IRR		3.80828	0.0373
Investment does not Granger Cause Revenue	28	12.3002	0.0002
Revenue does not Granger Cause Investment		2.64950	0.0922
IRR does not Granger Cause Revenue	28	0.33549	0.7184
Revenue does not Granger Cause IRR		0.53795	0.5911
IRR does not Granger Cause Investment	28	6.20815	0.0070
Investment does not Granger Cause IRR		0.78287	0.4689

Conclusion

Economic theory predicts that are associated with static efficiencies and as well as with dynamic stability of the accumulation of human and physical capital. The economy enjoy high output levels and growth rates, if revenue made by Government. Revenue cause a rapid increase in GDP of any country in short run. For Pakistan, the results shows revenue has statistically positive impact on economic growth. Revenue allows economy to spend some part of GDP on public investment activities, which as a result provide employment to workers and increase the income level in economy.

The empirical results identify a positive relationship between GDP and Revenue. In short run, Revenue creates a push up effect on GDP to increase at rapid rate and empirical results show the same behavior. Causality between these variables is Bi-casual that is running from GDP to revenue and from revenue to GDP.

Government should focus that the share of GDP which is spend for revenue purpose should be minimum, as only in short run revenue cause the increase in GDP and theory support that in long run, revenue cause decrease in GDP.

References

Ames, B., Brown, W., Devarajan, S., Izquierdo, A., 2001. Macroeconomic policy and poverty reduction. International Monetary Fund Washington, DC.

Barro, R.J., 1991. A cross-country study of growth, saving, and government. National saving and economic performance. University of Chicago Press, pp. 271-304.

Blinder, A.S., 2008. Keynesian economics. The concise encyclopedia of economics 2, 1-12.

Caselli, F., Esquivel, G., Lefort, F., 1996. Reopening the convergence debate: a new look at cross-country growth empirics. Journal of Economic Growth 1, 363-389.

Cochrane, D., Orcutt, G.H., 1949. Application of least squares regression to relationships containing auto-correlated error terms. Journal of the American Statistical Association 44, 32-61.

Collier, P., 2007. The Bottom Billion: Why the Poorest Countries are Failing and What Can Be Done About It. The Wiley-Blackwell Encyclopedia of Globalization. pp. 224.

De Gregorio, J., 1992. Economic Growth in Latin America. Journal of Development Economics 39, 59-84.

De Gregorio, J., Guidotti, P.E., 1995. Financial development and economic growth. World development 23, 433-448.

Dolado, J.J., Jenkinson, T., Sosvilla-Rivero, S., 1990. Cointegration and unit roots. Journal of Economic Surveys 4, 249-273.

Dunne, J.P., 2012. Military spending, growth, development and conflict. Defence and Peace Economics 23, 549-557.

Dunne, J.P., Uye, M., 2009. Military spending and development. The global arms trade, 293-305.

Feng, Y., 2001. Political freedom, political instability, and policy uncertainty: A study of political institutions and private investment in developing countries. International Studies Quarterly 45, 271-294.

Ghani, E., Din, M.-U., 2006. The impact of public investment on economic growth in Pakistan. The Pakistan Development Review, 45, 87-98.

Gupta, R., Kabundi, A., Ziramba, E., 2010. The effect of defense spending on US output: a factor augmented vector autoregression (favar) approach. Defence and Peace Economics 21, 135-147.

Gupta, V., MacMillan, I.C., Surie, G., 2004. Entrepreneurial leadership: developing and measuring a cross-cultural construct. Journal of Business Venturing 19, 241-260.

Hildreth, C., Lu, J., 1960. Demand Relations with Auto-correlated Disturbances, Michigan State University, Agricultural Experimental Station. Technical Bulletin 276, 185.

Husain, I., 2009. The role of politics in Pakistan's Economy. Journal of International Affairs 63, 1-18.

Khan, M.S., Reinhart, C.M., 1990. Private investment and economic growth in developing countries. World Development 18, 19-27.

MacNair, E.S., Murdoch, J.C., Pi, C.-R., Sandler, T., 1995. Growth and defense: pooled estimates for the NATO alliance, 1951-1988. Southern Economic Journal, 61, 846-860.

Mankiw, N.G., Romer, D., Weil, D.N., 1992. A contribution to the empirics of economic growth. The Quarterly Journal of Economics, 107, 407-437

Mino, K., Shibata, A., 1995. Monetary policy, overlapping generations, and patterns of growth. Economica, 62, 179-194.

Mitra, P., 2006. Has government investment crowded out private investment in India? The American Economic Review, 96, 337-341.

Mshana, R.R., 2009. The current economic crisis: Its causes, its impact and possible alternatives. Speech delivered at the 33rd Assembly of the United Congregational Church of South Africa in Botswana.

Musayev, V., 2013. Military Spending and Growth: An Empirical Exploration of Contingent Relationships. Munich Personal RePEc Archive. 1-27.
Mushtaq, R., 2011. Augmented Dickey Fuller Test, Testing Time Series Data For Stationarity. pp. 1-19.
Ram, R., 1995. Defense expenditure and economic growth. Handbook of Defense Economics 1, 251-274.
Sandler, T., Hartley, K., 1995. The economics of defense. Cambridge University Press.
Smaldone, J.P., 2006. African military spending: Defence versus development? African Security Studies 15, 17-32.
Smith, K., 2000. What is the'knowledge economy'? Knowledge-intensive industries and distributed knowledge bases. AEGIS, University of Western Sydney.
Solow, R.M., 1956. A contribution to the theory of economic growth. The Quarterly Journal of Economics, 70, 65-94.
Tahir, R., 1995. Defence spending and economic growth: Re-examining the issue of causality for Pakistan and India. The Pakistan Development Review, 1109-1117.
Van der Ploeg, F., Alogoskoufis, G.S., 1994. Money and endogenous growth. Journal of Money, Credit and Banking, 771-791.
Yakita, A., 2001. Taxation in an overlapping generations model with human capital. International Tax and Public Finance 8, 775-792.