Empirical analysis of relationship between investment, good governance and GDP growth rate in Pakistan (1996-2016)

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Abstract. Progress and prosperity of the nations, directly or indirectly depend on economic growth of the country. High and stable GDP growth rate indicate economic strength of the nation, which depend on various economic and non-economic factors. Investment (i.e. both private and public) provides significant contribution to the economic growth and development in a country. On the other hand, non-economic factors also play an important role in developing productive environment and enhancing productive capacity of the economy. Pakistan is a developing country and its weak and unstable economy demands high and stable GDP growth rate while it is subsisting on low and unstable GDP growth rate. Therefore, it is required to explore major economic and non-economic factors that hinder the GDP growth rate in Pakistan. In order to find out empirical impact of economic and non-economic factors on GDP growth rate in Pakistan, ARDL approach was applied on time series data during the period of 1996 to 2016. Empirical results confirmed the existence of log run relationship between dependent and independent variables. In addition, the speed of adjustment was not found to be very high (i.e. -0.35362). On the basis of study results, therefore, it is suggested that there is a need of economic reforms and implementation of effective policies that can make economy of Pakistan strong and stable, which in turn enable the country's economy to grow faster and to compete in international market.
Keywords. Private investment, Gross Domestic Product, Political stability, Corruption, Economic growth, Time series data, Pakistan.
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1. Introduction

The GDP growth rate is supposed to be the key indicator to determine the economic health of the country. The GDP growth rate calculates how speedy the economy of any country is growing. The weak and unstable economy of Pakistan demands speedy and high growth in GDP. Figure 1 shows the trends of GDP growth rate in Pakistan from 1996 to 2016. The trends shows low and unstable GDP growth rate in Pakistan during the past two decades.

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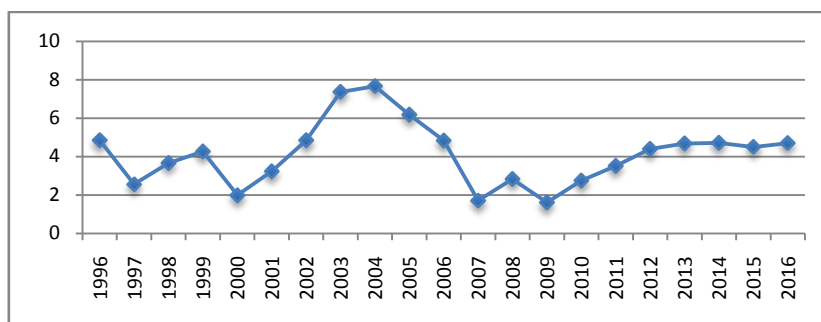☎ . +92 22 9213 191 - 90
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Figure 1. *Trends of GDP Growth Rate in Pakistan n=20 Years*
Data Source: Economic Survey of Pakistan (various issues)

Investment has its own contribution to the growth process of an economy. Private investment plays a very important role in creating employment opportunities and increasing productive capacity of the economy. Whereas, public investment contributes positively to economic growth through enhancing the productivity of private investment (Ang, 2009). It is argued that economies led by the private sector achieve better economic performance than the ones led by the state. Pakistan has a very slow-moving growth in both public and private sector, which is a major cause of slow economic growth in the country. On other hand, non-economic factors such as political instability and existence of corruption exert negative impact on the productive capacity of the economy. Various efforts over the past years have been made to develop institutional mechanisms to address these problems however, problem still persist. Therefore, this research has been focused to determine the empirical impact of public and private investment on the GDP growth rate in Pakistan and to find out the extent to which political instability and corruption affect GDP growth rate in the country.

2. Literature review

Economic growth can be defined as the growth rate of per capital GDP over some period Khan & Kumar (1997). The trend of growth of real GDP can be considered as sustainable economic growth, while the short-run fluctuations of growth over the trend can be thought of as business cycles Khan & Reinhart (1990). The concept of economic growth is very old. There were various classical and new classical economists (such as Adam Smith, Robert Malthus, Ricardo and Marx) who worked on the GDP growth rate. Besides, there is lots of research studies focused on determinants of GDP growth rate in a country. GDP growth rate can be determined by various economic and non-economic factors such as investment, human capital, institutional factors and other macro-economic indicators. Private and public investment both plays a significant role in GDP growth rate. Therefore, various researches have been focused to empirically analyze the impact of public and private investment on GDP growth rate. However, there exists a particular relationship between public and private investment. Such as public investment may have crowd-in or crowd-out impact on private investment, which in turn might put positive or negative impact on GDP growth rate of any economy. Basic infrastructure is important to the growth of the economy of a country whereas, public investment can play major role to provide the infrastructure to the productive sectors of any economy. In this regard Nikolaos in 1987 suggested that "public investment is the major source to provide the basic physical infrastructure like roads, bridges, transport facilities, equal distribution of resources for increasing the capital stock of country". According to Khan & Reinhart (1990), if available recourses in a country are scare and public sector utilizes these resources, it will affect the availability of financial and physical resource for private sector during production process. This leads to crowd-out impact of public investment on private investment. On the other hand, if public sector produces huge output and competes with private sector, this may put

JEL, 5(3), E.K.Z. Shaikh, N.A. Shaikh, & I.A. Pirzada, p.211-220.

212

negative impact on private investment. In addition, there are various sources such as issuance of debt, burden of taxes and rate of inflation which lower the resources available to the private sector and thus depress private investment and increase wastage of private sector resources. If public sector focuses on investing in creation of physical facilities, production of public goods and creating favorable investment environment for private sector, this may work in favor of private investment, resulting in increase in GDP growth rate. In this context many endogenous growth models have stressed the role of private firms in driving the growth process. In this connection it is stated that increased and direct involvement of government in output production may negatively affect the production efficiency of any economy. Therefore, many economists have tried to empirically analyze the relationship between the size of the public sector investment (e.g. government expenditure to GDP) and economic growth.

Ghali (1998) applied Co-integrated Vector Autoregressive model during the particular period of time (i.e. 1963 to 1993) and found that private investment had very significant impact on GDP growth rate in Tunisia. Badawi (2005) also found that public investment and private investment both have significantly positive impact on economic growth. In Sudan however, private investment had more prominent impact on economic growth as compared with public investment. Ghura (1997) also found that in Cameroon the positive impact of private investment on the GDP growth rate is higher as compared with the impact of public investment. Khan & Kumar (1997) in their research study used pooled time series cross section data (i.e. from 1970 to 1990) of ninety five developing countries. The study results showed significant and positive impact of private investment on GDP growth rate. In addition, the impact of private investment was found to be much larger as compared with public investment, particularly, during the period of 1980s. Erden & Randall (2005) in their empirical analysis also found the same results (i.e. smaller coefficient for public investment whereas, greater coefficient for private investment and). Naqvi (2002) investigated the relationship of economic growth, public investment and private investment by applying the co-integrating VAR Technique. This study is based on annual time series data covering the period of 37 years with special focused on Pakistan. The results indicate that public investment has a positively significant impact on private investment in Pakistan. Furthermore, private investment and public investment both are determined by the economic growth. According to Sajawal & Khan (2007) in Pakistan the public investment crowds out the private investment. This shows the under utilization of natural resources by public sector. This research study also argues that in Pakistan traditional factors and poor quality of institutions is supposed to be responsible for unsatisfactory trend of GDP growth rate in the country.

Directly or indirectly, non-economic factors also have an enormous role in economic growth of a country. Corruption is supposed to be the major obstacle in any economy. Busse *et al.,* (1996) defines corruption as: "The abuse of public office for private gain. It involves the seeking or extracting of promise or receipt of a gift or any other advantage by a public servant in consideration of the performance or omission of an act, in violation of the duties required of the office". Corruption is widely observed at all levels in Pakistan and hinders the faster economic growth in the country. During past decades various initiatives have been taken to develop institutional mechanisms to overcome the problem of corruption in the state. However, corruption still persist in the economy of Pakistan. According to Javaid, (2010) there are many types of corruption in Pakistan, for example family based relationship, using the power in cabinet for friends or family, illegal payment (bribe) to facilitate the works, payment to obtain permission for import and export. Cartier (2000) states that in developing countries, corruption has negative impact on economic growth of a country. Another study conducted by Todaro, & Smith, (2003) indicates that corruption is depressingly associated with economic freedom which in turn affects the economic growth in a country.

JEL, 5(3), E.K.Z. Shaikh, N.A. Shaikh, & I.A. Pirzada, p.211-220.

213

Political instability leads to the macro-economic volatility and it is also considered as another obstacle that has negative impact on the economic growth in any country's economy. It may also create volatility and thus, negatively affect macroeconomic performance of the state. Safdar Ullah Khan (2008) "The standard definition of political instability is the propensity of a government to collapse either because of conflicts or rampant competition between various political parties. Also, the occurrence of a government change increases the likelihood of subsequent changes."

Aisen & Veiga (2006) found that the political instability have significantly negative impact on growth and fiscal policies of country. According to Grindle (2004) unstable political system is harmful for savings in country because it decreases the private investment that negatively affects GDP growth rate. Rani & Batool (2016) conducted the research on the political instability in Pakistan. He explored that political instability reduces the economic growth, creates unemployment and poverty in country. Another study (Shaikh *et al.,* 2014) has been instrumental in reviewing the literature on GDP and found household consumption as the most important factor in maintaining growth. The authors have used consumption multiplier approach.

To sum up, GDP growth rate of any developed or under developed country has been affected by various economic and non economic factors. Pakistan is a developing country of the world. Its weak and unstable economy has been affected by slow and unstable GDP growth rate. This opens the area to investigate and find out major economic and noneconomic factors supposed to be responsible for slow and unstable GDP growth rate in the Pakistan. Therefore this study is focused to identify empirical impact of Investment (i.e. both private & public) governance indicator (i.e. political instability & corruption) on GDP growth rate in the Pakistan.

3. Methodology and data sources

The primary objective of this study is to determine the impact of economic and non-economic factor on GDP growth rate in Pakistan. This study has taken time series annual data of 20 years from 1996 to 2016. Data on economic variables such as GDP growth rate, public investment (i.e. in % of GDP growth rate) and private investment (i.e. in % of GDP growth rate) is taken from various issues of Economic survey of Pakistan whereas, data on Governance indicators (i.e. Corruption[1] and Political Instability) taken from The World Bank, Worldwide Governance Indicators (WGI) project (i.e. in percentile rank). E-views 9 and MS-Excel were used to analyze the data and to present the findings.

The time series properties of data were examined by using Augmented Dickey Fuller (ADF) unit root test, and the order of integration of all the variables was determined. On the basis of ADF test results Auto Regressive Distributed Lag (ARDL) was used as suitable estimation technique which is also known as bound testing approach. The ARDL bound test does not require variables to be integrated of the same order, that is, they can be either I (0) or I (1) and in same estimation both long run and short run co integration analysis can be done (Pesaran, Shin, and R. Smith (2001). Therefore, this approach was used to test for both long run and short run dynamics of GDP growth rate. Before estimating ARDL model, bound testing procedure was applied to check the long run relationship between the variables. Calculated value of F-statistics was greater than upper bound values and confirmed that the variables had a long run co-integration therefore, ARDL was applied for estimation.

To check the validity and specification of the model, different diagnostic tests are applied, which are Lagrange Multiplier (LM) test for serial co relation, White

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[1] *This variable measures the effectiveness of government in controlling corruption in the public sector. **This variable measures the likelihood of political instability and/or politically-motivated violence, including terrorism.

JEL, 5(3), E.K.Z. Shaikh, N.A. Shaikh, & I.A. Pirzada, p.211-220.

214

([1980](#)) test to check the hetroskedasticity, Jaruqe Bera for normal distribution of residuals and Cumulative Sum (CUSUM) test for specification of model.

4. Empirical findings

Results of unit root test presented in table 1, indicate that the variable GDP growth and public investment rate become stationary at Level 1(0) while, private investment, corruption and political instability becomes stationary at first difference 1(1).

Table 1. *Augmented Dickey Fuller (ADF) Test Results*

Variables	At Level		At First Difference	
	Constant	Constant & Trend	Constant	Constant & Trend
GDP	-4.182199* (0.0021)	-5.003094* (0.0012)	-	-
PUBI	-4.169646* (0.0021)	-4.232283* (0.0092)	-	-
PI	1.461122 (0.9989)	-0.668020 (0.9687)	--6.600082* (0.000)	-7.976413* (0.000)
CC	-3.270725 (0.0313) *	-3.147892 (0.1241)	-4.222398 (0.0044) *	-4.184760 (0.0194) *
PS	-1.233298 (0.6386)	-1.039391 (0.9147)	-3.764815 (0.0115) *	-3.887870 (0.0338) *

Note: Values in parentheses ( ) Indicates probabilities and * indicates probability is < 5%. Lag lengths are determined by the Akakike Information Criterion with maximum number of 2 lags. Variables used are defined as: GDP= Gross Domestic Product annual growth rate, PUBI = Public Investment, PI= private investment, CC= Corruption and PS=Political Instability.

Bound test is used to verify the existence of long run relationship between variables. Table 2 presents bound testing results. Test results indicate that the value of F-statistics (i.e. 12.488) is higher than upper and lower bound critical values, which confirms the existence of long run relationship or co-integration between variables in equations.

Table 2. *Bound Testing Results*

F-Statistics	Significant level	Bound Critical Values	
		Lower Bound	Upper Bound
12.48728	10 %	2.45	3.52
	5%	2.86	4.01
	2.5%	3.25	4.49
	1%	3.74	5.06

Table 3 shows results of long run analysis. The value of R-squared (i.e. 0.970) implies that about 97 percent of the variations in GDP growth rate is explained by the selected independent variables. Furthermore, Value of R^2 also indicates that the model is a good fit. Whereas, significant value of F-Statistics (i.e. 16.70136) indicates that the equation as whole is statistically significant.

Table 3. *Summary of ARDL Long Run Model*

Statistical Measures	Results
R-Square	0.970
Adjusted R^2	0.913
F-Statistics	16.70136 (0.001)

The long run co-integration result presented in table 4 reveals that, Corruption and public investment have significantly positive impact on GDP growth rate in long run whereas, Private investment has significantly negative impact on GDP growth rate in long run. Results also show that political instability has insignificant impact on GDP growth rate in long run in Pakistan.

JEL, 5(3), E.K.Z. Shaikh, N.A. Shaikh, & I.A. Pirzada, p.211-220.

215

Table 4. *Long Run Results*

Variable	Coefficient	Std. Error	t-Statistic	Prob.
CC	0.573743	0.213234	2.690676	0.036
PI	-0.64174	0.196868	-3.25974	0.0173
PS	0.106406	0.132935	0.800434	0.454
PUBI	1.297958	0.519553	2.498221	0.0466
C	-7.14708	5.115785	-1.39706	0.2119

Note: PUBI = Public Investment, PI= private investment, CC= Corruption and PS=Political Instability.

"The negative and significant value of co-integration equation confirms the existence of co integration and also reports the speed of adjustment from short run equilibrium to long run equilibrium" (Hassler, & Wolters, 2006). Short run results presented in table 5, showing negative and significant value of co-integration equation i.e. -0.35362 confirm the existence of co-integration and indicates that the adjustment process is very fast.

Table 5. *Short Run Results*

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(CC)	0.288096	0.070648	4.077918	0.0065
D(PI)	-0.16253	0.028938	-5.61652	0.0014
D(PI(-1))	0.027189	0.023263	1.168767	0.2868
D(PS)	-0.36944	0.102366	-3.60899	0.0112
D(PS(-1))	-0.12969	0.09112	-1.42324	0.2045
D(PUBI)	0.448878	0.112074	4.005179	0.0071
D(PUBI(-1))	0.201188	0.073171	2.749567	0.0333
CointEq(-1)	-0.35362	0.130187	-2.71625	0.0348

Note: PUBI = Public Investment, PI= private investment, CC= Corruption and PS=Political Instability.

Table 6 indicates the results of diagnostic tests. The insignificant values of White test and LM test prove the absence of heteroskedasticity and autocorrelation respectively, in this analysis. Furthermore, insignificant value of Jarque Bera test proves that residuals are normally distributed and the model is well-specified. Statistical value of Durbin-Watson (i.e. 2.0) indicates that the model fulfills the requirements of being good, without any numerical error.

Table 6. *Diagnostic Tests Results*

Diagnostic Tests	Results
Breusch-Godfrey Serial Correlation LM Test	4.690148 (0.0958)
Breusch-Pagan-Godfrey Heteroskedasticity Test	11.68833 (0.4710)
White Heteroskedasticity Test:	10.85611 (0.5413)
Jarque Bera	0.7619 (0.6832)
DW -Statistics	2.0

To test for model misspecification and for the stability of the ARDL model, cumulative sum (CUSUM) is used. If the plotted CUSUM line graph remains inside the 5 percent significance level then it is concluded that the model is correctly specified. Otherwise, the model is misspecified. Figure 2 clearly shows the evidence that the blue line lies within the 5 percent level of significance. This indicates that the model is stable.
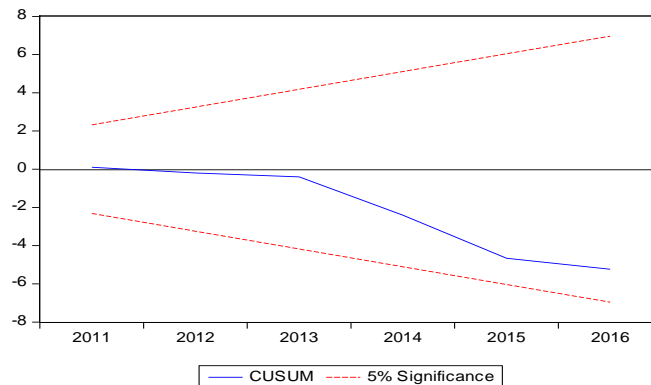
JEL, 5(3), E.K.Z. Shaikh, N.A. Shaikh, & I.A. Pirzada, p.211-220.

216

Figure 2. *Cumulative Sum of Recursive Residuals (CUSUM)*

5. Conclusions and recommendations

Economic and non economic factors are important for understanding the economic activity of any country. This research study examined the economic and non-economic determinants of GDP growth rate in Pakistan. The study used annual time series data covering the period of 20 years. ARDL approach was applied to determine the long run and short run relationship among dependent and independent variables. Stationarity or time series properties of all variables were examined by applying ADF test. Model stability was tested by applying diagnostic testing techniques. The results of bound test confirm the existence of long run relationship between GDP growth rate and economic and non-economic factors during selected period of time.

Empirical results show that private investment has significantly negative impact in both short run and long run on GDP Growth rate in Pakistan. It means 1% increase in private investment leads to -0.64 and -0.16 (i.e. in long run and in short run respectively) decrease in GDP growth rate in Pakistan. This indicates that during reported time period in Pakistan private investment has failed to produced required output. It also shows underutilization of productive resources. Whereas, Public investments have significantly positive impact in both short run and long run on GDP Growth rate in Pakistan. This indicates that public investment crowds out private investment in Pakistan during the reported period of time.

Empirical results show that corruption has significantly positive impact in both short run and long run on GDP Growth rate in Pakistan. On the other hand GDP growth rate trends (i.e. presented in figure 1) indicate that in Pakistan during past two decades GDP growth rate remained low and unstable. In fact, in Pakistan incompetent institutions and bureaucracy lead to corruption, such as use of public office for private gain. On the other side, through bribes, some peoples and productive firms are getting undue favors, which improve their production capacity and leave some positive impact on GDP growth. However, it harms the poor section in the society and degrades our cultural values in the state. It all means corruption has negative impact on economy of Pakistan and creates inequalities for less developed sectors. This directly slows economic growth. The study results show that political instability has insignificant impact in long run but it has significantly negative impact in short run on GDP Growth rate in Pakistan. Political instability reduces the confidence of the investors and public sector fails to provide favorable investment environment to private sector. This puts negative impact on GDP growth rate and creates unemployment and poverty in the state.

For achieving rapid and stable economic growth it is necessary to enhance both public and private investment. However, government should focus more on providing basic facilities and infrastructure for creating favorable productive environment and attracting private sector investment. High consumption-oriented society indicates misuse of resource. Therefore, more effective initiatives should be adopted to motivate society towards investment. There is need to transform local industries which in turn enables our firms to compete in international market.

JEL, 5(3), E.K.Z. Shaikh, N.A. Shaikh, & I.A. Pirzada, p.211-220.

217

There is need to develop the confidence of investors through political stability and to improve the transparency in all organizational systems. It is also required to develop the effective use of anti-corruption agencies. This research significantly contributes in literature; moreover, this research will help policy makers while making policy for achieving rapid economic growth.

JEL, 5(3), E.K.Z. Shaikh, N.A. Shaikh, & I.A. Pirzada, p.211-220.

218

Appendix
Raw Data

Year	GDP Growth Rate	Public Investment	Private investment	PS Political Stability and Absence of Violence/Terrorism: Percentile Rank	CC Control of Corruption: Percentile Rank
1996	4.846581284	1.1195	11.5	14.36	7.527
1997	2.550234295	1.0781	11.1	14.63	10.72
1998	3.660132744	7.7123	9.1	14.89	13.92
1999	4.260088012	1.0629	8.8	15.38	19.14
2000	1.982484032	1.3029	16.9	15.87	24.37
2001	3.224429973	1.249	14.3	11.11	22.79
2002	4.846320935	1.411	7.2	6.349	21.21
2003	7.368571359	9.1734	17.3	7.538	25.76
2004	7.667304271	8.0194	9.8	5.825	13.17
2005	6.177542036	7.432	13.1	5.34	14.15
2006	4.832817277	8.6326	38.3	2.899	21.95
2007	1.701405465	9.394	40.5	0.966	20.87
2008	2.831658519	8.683	11.5	0.962	18.93
2009	1.606691959	8.9347	15.3	1.422	14.83
2010	2.74840255	5.38156	1.4	0.474	13.81
2011	3.50703342	5.3352	1.25	0.474	14.69
2012	4.396456633	4.545	1.1	0.948	14.22
2013	4.674707981	5.0347	12.9	0.948	17.54
2014	4.712457804	6.225	12.8	3.333	22.12
2015	4.5	4.797	12.4	1.429	21.63
2016	4.7	5.4452	5.4	1.429	19.23

JEL, 5(3), E.K.Z. Shaikh, N.A. Shaikh, & I.A. Pirzada, p.211-220.

219

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JEL, 5(3), E.K.Z. Shaikh, N.A. Shaikh, & I.A. Pirzada, p.211-220.

220