

Impact of Infrastructure on Economic Growth in Pakistan: Moderating Role of Governance

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Abstract



In this study, the moderating effect of governance is examined in relation to the effect of infrastructure on economic growth in Pakistan. Governance quality, which includes factors like political stability, government effectiveness, the rule of law, and corruption control, can have an impact on how well infrastructure works to support economic growth. The study uses panel data from several dependable sources covering the years 1992-2018 and adopts a quantitative research methodology. Autoregressive Distributed Lags (ARDL) are used in the study to evaluate the association between infrastructure development, economic growth, and governance indicators. The infrastructure-led development theory is used as the theoretical foundation. The study's conclusions show a strong and positive correlation between infrastructure spending and Pakistan's economic expansion. The study also reveals that the association between infrastructure investment and economic growth is moderated by governance quality. For Pakistan's government and officials, these findings have significant policy consequences. The research concludes that it is essential to address governance concerns and enhance the entire standard of governance to maximize the advantages of infrastructure investment and support sustained economic growth.

Keywords: Economic Growth, Governance, Pakistan, ARDL

Introduction

The concept of a welfare state can only be realized if the country has enough resources to fulfill the needs of its people. A strong economy gives birth to a strong state. Economic growth is thus necessary for the development and progress of the entire nation. Economic growth refers to an expansion in the volume of an economy of produced goods and services, compared to previous years. Conventionally, gross domestic product (GDP) has always been used to measure aggregate economic growth. Infrastructure has always been considered a fundamental factor for development, but studies revealed that sometimes infrastructure growth is not balanced (Canning & Pedroni, 2008). Over time, things which remained unaddressed is the study of relationship of governance with country's GDP. For economic growth, efficient infrastructure plays a key role. It improves the capacity to produce and supports growth. Infrastructure includes the physical or organizationally structured natural, capital-intensive monopolies necessary for society to be operative and economic to function. Economic infrastructure includes Information technologies, transport, and communication facilities, while social infrastructure includes water and sewer lines, health centers and educational institutions. Most of the systems are government owned. In most of the developing and transitional economies infrastructural challenges are dearth of the visionary leaders, to build infrastructure, lack of adequate evaluation of needs of infrastructure, lack of social support, corruption, inadequate cost-benefit analysis, lack of adequate planning, and continuity of policies and programs of infrastructural projects. Besides all these, long-term investment funding has a major problem because of insufficient resources. This funding constraint is a major setback for economic growth and makes achieving the United Nations' Millennium Development Goals harder.

The factors like, public governance is considered an indispensable determinant of economic development. There is an absence of consent on the definition of governance, considering various definitions governance may be viewed as governing process, the institutions, rules and parameters through which authority and supremacy in a state is carried out. Therefore, governance incorporate (i) the procedures adopted by the citizens of the state to monitor and replace its government; (ii) the ability of the government is to generate and implement policies in sound as well as in efficient manners; and (iii) the reverence or the consideration of the people along with the state for the

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institutional bodies that administer or hold social and economic relationship between both state and citizen (Kaufmann, Kraay & Mastruzzi 2010). It is presumed that lack of good governance will not only hinder the flow of benefits reaped out from reforms to reach the poor but will also cause inefficient utilization of funds (Azmat & Coghill, 2005).

GDP is considered a relatively good indicator of development and wellbeing of people of a country. Over the period economists have always remained greatly concerned for determination and enhancement of GDP. Various factors such as infrastructure, human development and technology have been studied for determination of GDP but Governance, a recent concept as a determinant of GDP has not been given much importance. Not many studies have been carried out to develop a causative relation of infrastructural development along with governance on GDP. The nature of relationship and impact of infrastructure on economic growth where governance is playing the role of moderator is thus needed to be evaluated. Therefore, the need arises to study relationships and their strength among infrastructure, governance, and GDP of economy. In case a weak relationship amongst causative factors becomes evident, highlight issues responsible for it, to address them to ascertain desired rise in GDP.

The objectives of the study are:

- To investigate the impact of infrastructure on economic growth.
- To study the impact of governance on economic growth.
- To investigate the impact of infrastructural development on economic growth.
- To give recommendations to strengthen the relationship among infrastructure, governance, and economic growth.

This research is important as it tries to link infrastructure, governance, and economic growth. It will also shed some light on the challenges of public infrastructure management and sustainability. This study is of prodigious significance for policy makers including political leadership and bureaucrats not only to tackle the governance concerns but also assist in deciding for issue of investing in fresh infrastructural projects which are politically more attractive than improving or maintaining the completed projects.

To the Government of Pakistan, this research would provide evidence that can be used in the formulation of governance and infrastructure policies to enhance sustainable economic growth. The results from this study can also be used by the Governments to know the causative factors that enhance our contribution of governance and infrastructure to their sustainable economic growth. This study will provide scholars, researchers and other research-based organizations intending to pursue further research in this field with the background information about the depth, breadth, and strength of causative relationship amongst infrastructure, governance, and economic growth. From the literature review, GDP determination has always been a matter of great concern for social scientists. Many scholars have discussed various factors for determination of GDP, but governance has recently emerged as an important factor in literature of economic growth theories. Furthermore, it is evident from the literature that although infrastructure plays a significant role in GDP and has long been recognized in the classical neo classical, exogenous, and endogenous growth theories, but the impact depends on how efficiently infrastructure is being used in the presence of governance as a mediator, which is yet to be studied in general depth. This study therefore will seek out to bridge this gap by forming the relationship among governance, infrastructure, and GDP.

Literature Review

Theoretical Background

The phenomenon of development is explained by different theories like classical growth theory, exogenous growth theory, endogenous growth theory, infrastructure-led development theory, institutional theory, mercantilism, linear stages of growth, structural-change theory, and theory of the success and failure of nations, (Acemoglu, Johnson, & Robinson, 2005). For this study, the main focus is on infrastructure –led development theory as well as on institutional theory.

Economic Growth

Economic growth and economic development are both progressive economic phenomena that are interconnected. Many people in the 1950s and 1960s believed that substantial investments in infrastructure and physical capital were the main drivers of progress. The theory of economic development was viewed as a supplement to traditional economic theory by the 1960s. In this context, growth is simply defined as a rise in domestic output (Hall & Jacques, 1983). Endogenous growth

theory first appeared in the 2000s, emphasizing investments in technology, innovation in skills, and education. Infrastructure and governance are identified as two key determinants of economic growth in this study.

Infrastructure and Economic Growth

The infrastructure of a country is crucial to its development and is also the basis for any successful public policy. Infrastructure is now recognized as a large class of capital goods that, when combined with other inputs, provide services (Snieka & Simkunaite, 2009).

There is much evidence in the literature demonstrating links between infrastructure development and its impact on a nation's economy. However, the definition that is created will provide a range of results. The impact can be either direct, in which case infrastructure serves as an additional output in production, producing fiscal multipliers, or indirect, in which case infrastructure affects growth by increasing total factor productivity while lowering costs for firms, taking longer than the former (Fedderke & Bogeti, 2009). Authors began adding infrastructure in endogenous growth models throughout time to highlight the power of public capital, particularly productive infrastructure, to produce growth (Calderón & Servén, 2003).

Lack of infrastructure, such as roads and power, continues to be a significant hindrance to growth and development in many low-income countries. The highest transport costs in the world have a big impact on trade growth. Yoshino, Haruyama, and Nakagawa, for instance, found in 2008 that poor public infrastructure—measured by the typical number of days per year that firms experience power outages has a negative influence on the cost of production, transportation, and exports.

Governance and Economic Growth

Governance can be influenced by institution theory. Institutions contribute significantly to the economy by working to create an environment that is beneficial for the expansion of infrastructure, commerce, and investments. According to institutional theory, institutions are essential to society because they create and uphold laws and promote social cohesion and understanding. Institutions offer stability, and they deliver stability to the erratic and unstable project setting, making them a better investment for development organizations (Scott, 2005). The importance of institutions is illustrated by historical instances (Acemoglu and Robinson 2012).

Infrastructure and Economic Growth

According to Munnell (1992), policy makers primarily consider infrastructure to be a subject of public welfare and do not base their judgements on economic rationale. According to him, scholars should focus on the co-integration issue, the dispersion of causation problems, and the explanation of changes in coefficients by government level. To determine if investments in telecommunications infrastructure have any bearing on a nation's economic success, Roller and Waverman (2001) conducted research. Data from 21 OECD nations spanning 20 years was gathered for this purpose. To characterize supply and demand for investments in telecommunications infrastructure, researchers first created a model. The generated model was then connected with these macro production equations to evaluate the impacts at the macro level (Waverman, Meschi, & Fuss, 2005).

Infrastructure and Economic development

Looney (1997) examines the role of infrastructure development in economic growth. The study's findings suggest that infrastructure plays a very difficult role in economic growth. On the one hand, it does not appear to speed development considerably, but on the other hand, it reacts to private investment, therefore minimizing genuine inefficiencies. Hashim et al., (2009) use data from 1968 to 2007 to investigate the influence of communications infrastructure on economic development.

Pakistan places a high priority on investments in energy production. Apart from railroad transportation, Gherghina, Onofrei, Vintilă, and Armeanu (2018) find that all types of transportation infrastructure have a favorable effect on economic growth.

Governance

Governance is described as the exercise of government authority to control its economic and social elements. The way the state exercises its control is connected to several institutions that serve as keys to economic development. There is a collection of vital institutions required for economic development which include well-defined land rights, impartial compliance of contracts, a limited difference in knowledge between sellers and buyers, and unwavering macroeconomic environments (Al-Saadi & Khudari, 2020).

Fukuyama (2013) narrated good governance to be the potency of the government make rules, implement them, and provide services to the general public. He liberalized the question of governance from the issue of democracy and autocracy and discussed four approaches of good governance which are procedural measures, capacity, output, and autonomy.

Governance and Economic growth

The development of endogenous growth theories has drawn the attention of economists to find out the other sources of economic growth and variance among the country’s economic development levels.

To investigate the relationship of public governance and economic growth Almost all of the research has used the Worldwide Governance Indicators (WGI) of the World Bank in examining the effect of public governance on economic growth and have generally found out that the components of public governance impact positively on economic growth (Marselina, 2020) .

Regulatory Quality and Development Outcomes

The outcome of a regulatory framework can be measured against efficacy and performance criteria. Efficient enforcement supports the government's social security aims for regulatory authority. Priorities for regulation of social welfare in industrialized nations are expected to focus not only on achieving economic efficiency, but also on encouraging sustainable development and poverty reduction. The social security aims are achieved at a minimal economic cost through effective regulation.

The World Bank (2001: v) emphasized the significance of "improving regulatory systems and builders and the ability to effectively control the private sector" in recognizing that all of this is not well. Using regressions on a cross-section of nations with instrumental variables, numerous articles have proven the causal association between higher per capita incomes and better government over time (Luong, Nguyen, & Nguyen, 2020).

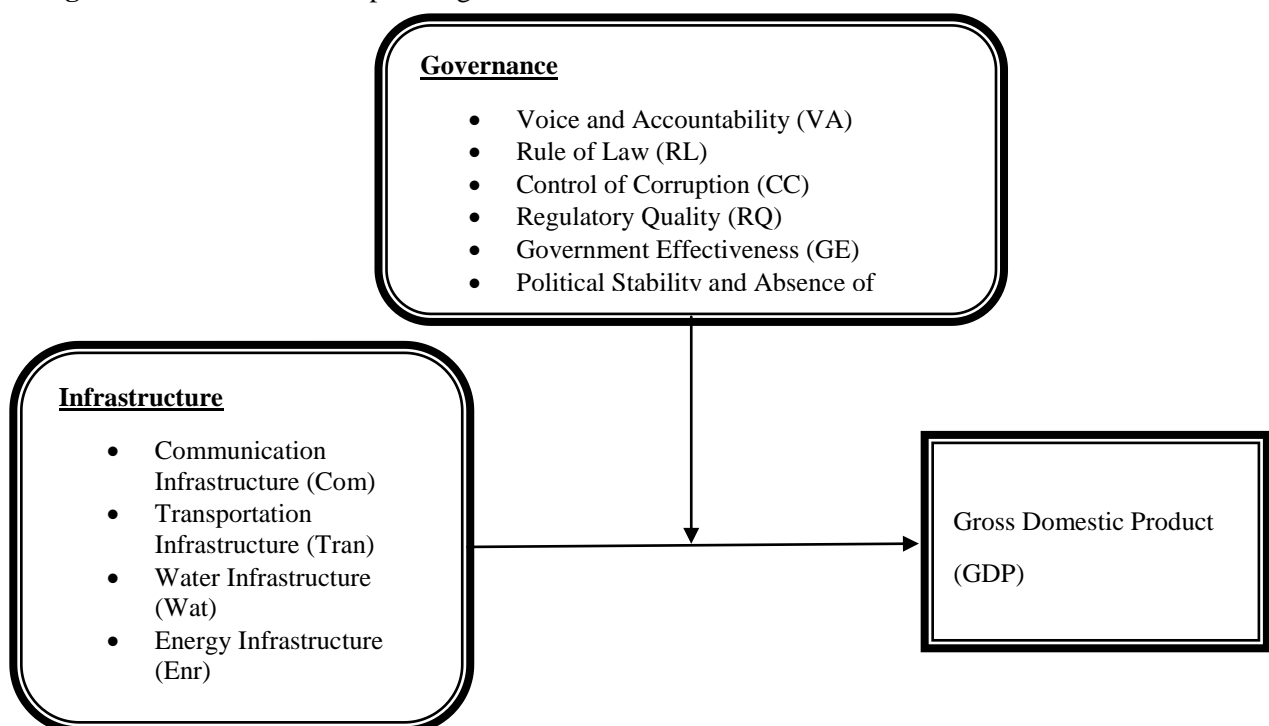
Role of Governance and Regulatory Control in Economic Development

According to Shapiro and Willig (1990), while public control provides authorities with more knowledge than private ownership, procurement can be less onerous because the state simultaneously regulates and governs. However, state ownership is associated with insufficient incentives to gather and use this data to maximize economic wellbeing. In other words, there appears to be a trade-off situation between state ownership, which reduces information asymmetries and thus administrative transaction costs, and perceived incentives for agents to improve economic performance under state regulation and private ownership (Yarrow, 1999).

Model

The relationship of various components infrastructure, governance and GDP are presented in the following diagram, whereas hypothesis developed from the model are given thereafter.

Diagram Model: Relationship among infrastructure, Governance and GDP



Source: Prepared by the author

Hypotheses

- H1₀ There exist no relationship between Infrastructure and GDP
- H1₁ There exist a relationship between Infrastructure and GDP
- H2₀ There is no relationship between Governance and GDP
- H2₁ There exist a relationship between Governance and GDP
- H3₀ There exist no moderation of Governance between Infrastructure and GDP
- H3₁ There exist a moderation of Governance between Infrastructure and GDP

Methodology

This research study is quantitative and might be classified as exploratory in nature. In this study, hypotheses were tested. This study looked at a new problem area that had hardly been investigated before in Pakistan.

Sample Selection

Our sample consists of Pakistan over the period of 1992-2018.

Data Source

Secondary data has been used for this research. World Governance Index (WGI) is used as a proxy for governance. For the Infrastructural Development Index, a self-constructed index is used. And for determining GDP, data from the World Bank is used. Worldwide Governance Indicators (WGI) has been constructed including more than 200 countries since 1996 (Kaufmann, Kraay, & Mastruzzi, 2009). Therefore, this research adopted the WGI to be used to be consistently comparable in cross country analysis.

Governance

Governance is subdivided into four components i.e., Voice and Accountability (VA), Political Stability and Absence of Violence (AV), Control of Corruption (CC), Rule of Law (RL), Regulatory Quality (RQ) and Government Effectiveness (GE). World Governance Indicators developed by the World Bank in 1996 are used to determine quality of governance.

Principal component analysis

The primary goal of principal component analysis (PCA) is to minimize the dimensionality of a data set composed of many connected variables while maintaining as much variance as possible. This is accomplished by transforming to a new collection of variables, the principal components (PCs), which are uncorrelated and are ordered in such a way that the first few maintain most of the variance included in all the original variables.

Control Variables

Control variables used in this study are Population Growth, Government Consumption, Trade (% of GDP) and Foreign Direct Investment growth. Data for these control variables were taken from World Bank data.

Data Analysis Procedures

The data collected for the analysis is a quantitative data from Pakistan. The study performs descriptive statistics to introduce some basic characteristics of variables. Correlation analysis was done to check the relationship with each variable of the study. Regression analysis technique has been conducted to determine the relation between the variables.

Econometric Model

This study used time series data analysis technique. The main purpose of the study is to capture the moderating effect of country level governance in the relationship between infrastructure and GDP growth. The following model is used to capture this effect.

$$y = f(Inf, Inst)$$

Where y on the left-hand side represents GDP, Inf on the right-hand side represents Infrastructural growth and Inst on right hand side is used to represent Governance. The working equation of the above model is as below.

$$y_t = \alpha_0 + \alpha_1 I_t + \alpha_2 G_t + \alpha_3 X_t + \alpha_4 I_t G_t + \varepsilon_t$$

where the sub-scripts “t” time dimensions, respectively. The dependent variable represents GDP growth. On the right-hand side, It Infrastructure development Gt shows governance indicators which include Voice and Accountability (VA), Political Stability and Absence of Violence (AV), Control of Corruption (CC), Rule of Law (RL), Regulatory Quality (RQ) and Government Effectiveness (GE). (Inf) is infrastructure, Xt includes some other growth determinants including Control variables used in

this study are Population Growth, Government Consumption, Trade (% of GDP) and Foreign Direct Investment growth. ItGt is an interaction term to account for the moderating effects of governance indicators on relationship between Infrastructure and GDP growth.

Unit root test

Testing for the unit root is used to verify the sequence of integration when using the auto-regressive distributed lag (ARDL) model. Regressing a series against another non-stationary variable produces a misleading regression if the series has a unit root or is non-stationary. The null hypothesis that each variable in the study is non-stationary or has a unit root is investigated using the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests. The PP test uses "nonparametric statistical methods" as opposed to adding lagged difference factors, even if the asymptotic distribution of both tests is the same (Gujarati & Porter, 2009).

Auto Regressive Distributed Lag

In order to ascertain the relationship between the variables over the long and short terms, the Autoregressive Distributed Lags (ARDL) technique is used. This method can also be used when the underlying regressors are mutually cointegrated, pure I(0), pure I(1), or pure I(0). After finding the lag order of the model, the usage of the ARDL is useful when determining co-integration relationships due to its superior small sample qualities to the Johansen cointegration technique (Ghatak & Siddiki, 2001).

The F-statistic (Wald test) is used to determine how the underlying variables are related over the long term. According to this method, the series' long-term association has been established when the F statistic rises above the crucial value range.

Data Analysis and Empirical Results

Descriptive Statistics

The descriptive statistics for all variables are presented in tables 4.1, 4.2 and 4.3 below. In descriptive statistics, the average values have been measured by mean and median. The statistic for the Pakistan shows the mean value of GDPG as 0.0697. Moreover, the maximum and minimum values for each variable have also been presented in the tables. The variation in data has also been shown by using standard deviation. The values of GDPG show the standard deviation of 0.667 for the country. The skewness and kurtosis for data are also presented in the results.

Table 1 Descriptive statistics- Pakistan

	Mean	Median	Maximum	Minimum	Std. Dev.	Skewness	Kurtosis
Variables							
GDPG	0.0697	0.0522	0.226	-0.0225	0.0714	0.5372	2.2351
INFRA	0.1537	0.3154	1.1129	-1.2957	0.6987	-0.655	2.4751
AV	-1.9871	-2.2674	-1.103	-2.81	0.6389	0.3103	1.4607
CC	-0.9523	-0.9083	-0.7622	-1.22	0.1432	-0.3413	1.8507
GE	-0.606	-0.6242	-0.3752	-0.8179	0.1431	0.0786	1.7032
RL	-0.8083	-0.8044	-0.6253	-0.9687	0.0956	0.3067	2.2706
RQ	-0.6336	-0.6341	-0.4823	-0.9053	0.1096	-0.4713	2.8607
VA	-0.8321	-0.8007	-0.5447	-1.2203	0.1928	-0.4652	2.4863
FDIG	0.0121	0.0084	0.0367	0.0038	0.0092	1.6058	4.4062
GCONGD	65.227	57.14	103.1672	28.6374	22.5843	0.1823	1.7958
POPG	2.3443	2.2817	2.8702	2.0575	0.2719	0.8753	2.4057
TRADEGD	-0.0712	-0.0764	-0.0052	-0.132	0.0347	0.346	2.445

Source: Estimated by the author

GDPG=Gross Domestic Product Growth, INFRA=Infrastructure, AV=Voice and Accountability CC=Control of Corruption, GE=Government Effectiveness, RL=Rule of Law, RQ=Regulatory Quality, VA=Voice and Accountability, FDIG=Foreign Direct Investment Growth, GCONGD=Government Consumption, POPG=Population Growth, TRADEGD=Trade to GDP

Correlation Analysis

Table 2 shows the results of the correlation analysis. The results indicate that all variables have weak correlation, particularly independent variables have weak correlation to each other, so there is no serious issue for multi-co-linearity.

Table 2: Correlation Analysis

Variable	GDPG	INFRA	AV	CC	GE	RL	RQ	VA	TRADEGD	POPG	FDIG
GDPG	1										
INFRA	-0.12	1									

AV	-0.21	-0.38	1								
CC	0.32	-0.39	-0.22	1							
GE	0.21	-0.45	0.62	0.213	1						
RL	-0.47	0.44	0.23	-0.24	0.05	1					
RQ	-0.17	0.49	0.01	-0.22	0.03	0.40	1				
VA	-0.42	0.77	-0.10	-0.46	-0.29	0.51	0.66	1			
TRADEGD	-0.20	-0.60	0.61	-0.09	0.33	0.03	-0.36	-0.40	1		
POPG	-0.32	-0.16	0.88	-0.49	0.40	0.28	0.33	0.15	0.50	1	
FDIG	0.31	0.00	-0.14	0.07	0.29	-0.28	0.40	-0.02	-0.48	-0.00	1

Source: Estimated by the author GDPG=Gross Domestic Product Growth, INFRA=Infrastructure, AV=Voice and Accountability CC=Control of Corruption, GE=Government Effectiveness, RL=Rule of Law, RQ=Regulatory Quality, VA=Voice and Accountability, FDIG=Foreign Direct Investment Growth, TRADEGD=Trade to GDP

Testing of Hypotheses

Impact of Infrastructure on GDP

Results in mentioned table 3 show that infrastructure has a significant impact on GDP growth. The term Infra is significant which means that infrastructure does play a significant role in GDP growth. Moreover, in testing of hypothesis the FDI to GDP, and Trade to GDP have been taken as control variable to avoid the biasness of the results. The explanatory power of the model is 65% with F-statistic significant and D.W Statistic is almost 2.5, which addresses the issue of autocorrelation. The empirical analysis also includes a graphical representation of parameter constancy using CUSUM-CUSUM square tests. The null hypothesis is that the regression coefficients are constant across time (Brown et al. 1975). Both the CUSUM and CUSUMSQ graphs in Fig. 1 are inside the 5% critical boundaries, confirming the null hypothesis of parameter stability across the sample period.

Table 3: Impact of Infrastructure on GDP

Pakistan	Coeff	
C	-0.6250	
	-1.5315	
GDPG (-1)	-0.6350	
	-2.5665**	
GDPG (-2)	-0.8923	
	-3.2525*	
INFRA	0.1424	
	2.1792**	
FDIG	4.9672	
	1.3791	
FDIG (-1)	7.8789	
	1.5921	
FDIG (-2)	-5.3627	
	-1.7070	
POPG	0.9889	
	0.8362	
POPG (-1)	-4.7212	
	-2.2166**	
POPG (-2)	3.9235	
	2.9133*	
TRADEGD	-2.2738	
	-2.1270**	
R-squared	0.9392	0.9501
Adjusted R-squared	0.8074	0.9002
F-statistic	7.1274**	19.0444*
Durbin-Watson stat	2.4996	2.3463

Impact of Infrastructure on GDP

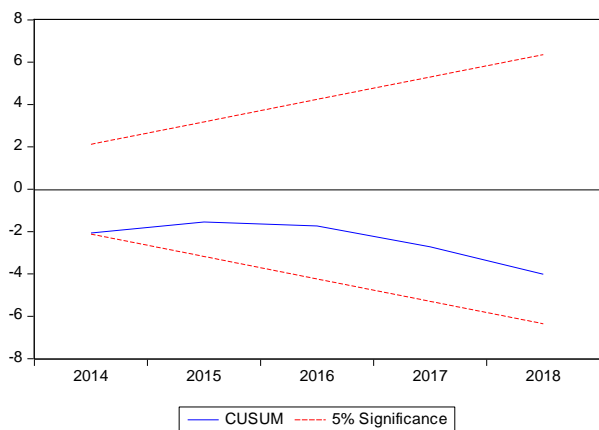


Figure 1

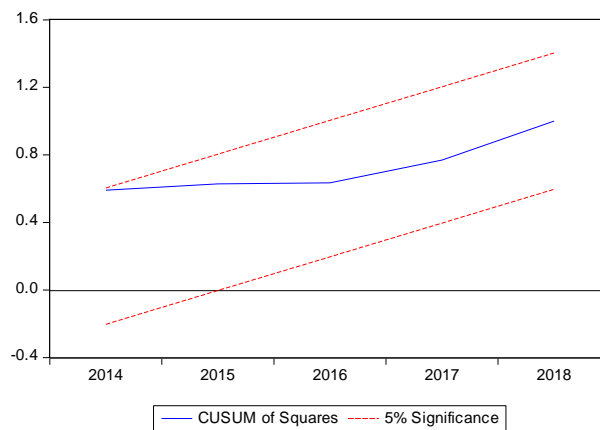


Figure 2

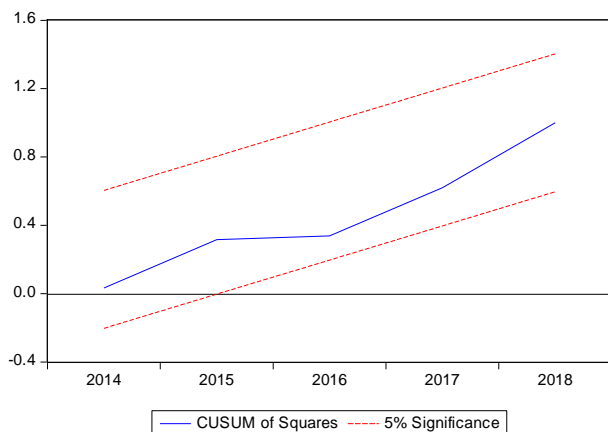


Figure 3

Unit Root Test

In unit root test, the Phillips-Perron test statistic has been applied on all variables with Null Hypothesis: variable has a unit root. Table 4.10 shows that all variables are stationary at 1st difference.

Table 4 Unit root test

Variable	Level		1st difference	
	Constant	Constant and trend	Constant	constant and trend
GDPG	-3.8023***	-3.6778**	-5.3134***	-5.4215***
	-0.0093	-0.0459	-0.0004	-0.0016
INFRA	-1.9078	-2.5871	-3.6543	-3.6842**
	-0.3228	-0.2886	-0.0133	-0.0465
AV	-1.3036	-0.3026	-3.4943	-3.7656**
	-0.609	-0.985	-0.0187	-0.0398
CC	-2.6133	-2.6765	-4.9753	-4.8820***
	-0.1054	-0.2542	-0.0007	-0.0043
GE	-1.5104	-3.4435	-4.7045	-4.5605***
	-0.5098	-0.0769	-0.0015	-0.0088
RL	-2.0502	-2.0595	-4.9481	-5.7111***
	-0.2649	-0.5356	-0.0009	-0.0009
RQ	-4.5369***	-4.4288**	-4.9273***	-4.8556***
	-0.0025	-0.0131	-0.0008	-0.0046
VA	-2.2731	-10.6859	-4.7347	-4.6693***
	-0.1886	0	-0.0019	-0.0091
FDI	-1.8126	-1.7939	-2.9910*	-2.9693
	-0.3649	-0.6729	-0.0521	-0.163
GCONG	-0.2601	-1.8486	-3.3995**	-3.3094*
	-0.9163	-0.6462	-0.0228	-0.092
POPG	-1.885	-0.967	-2.3389	-3.0654
	-0.3328	-0.9285	-0.1699	-0.1394

Impact of Infrastructure on Economic Growth in Pakistan.....Murtaza

TRADEG	-1.3911	-2.3987	-3.8640***	-3.7853**
	-0.5677	-0.3699	-0.0085	-0.0384

Source: estimated by the author

*Shows sig at 1% level, **shows at 5% and ***shows sig at 10% level

Table 5: ADRL Results

Variable	Coefficient	Variable	Coefficient	Variable	Coefficient	Variable	Coefficient	Variable	Coefficient	Variable	Coefficient
AV		CC		GE		RL		RQ		VA	
GDPG (-1)	-0.63	GDPG(-1)	-0.29	GDPG(-1)	-0.35	GDPG(-1)	-0.86	GDPG(-1)	0.17	GDPG(-1)	-0.09
GDPG(-2)	-0.75	GDPG(-2)	-0.79	GDPG(-2)	-0.47	GDPG(-2)	-0.88	GDPG(-2)	-0.55	GDPG(-2)	-0.33
INFRA	-0.25	INFRA	0.09	INFRA	0.18	INFRA	-0.06	INFRA	0.37	INFRA	-0.22
AV	0.052664	INFRA(-1)	-0.056	INFRA(-1)	0.3550	INFRA(-1)	-0.2262	INFRA(-1)	-0.55	VA	0.5600
AV*INFRA	-0.15	CC	0.09	GE	0.12	RL	-0.61	RQ	0.49	VA(-1)	0.26
FDIG	7.42	CC(-1)	-0.47	GE*INFRA	0.21	RL*INFRA	-0.10	RQ*INFRA	0.60	VA*INFRA	-0.30
FDIG(-1)	3.44	CC*I		GE(-1)*INFRA(-1)	-0.58	RL(-1)*INFRA(-1)	-0.22	RQ(-1)*INFRA(-1)	-0.88	FDIG	3.90
TRADEGD	-1.11	FDIG	5.83	FDIG	8.40	FDIG	8.12	FDIG	1.17	POPG	1.02
TRADEGD(-1)	0.30	POPG	-0.25	POPG	-1.95	FDIG(-1)	-3.94	FDIG(-1)	4.87	POPG(-1)	-1.07
TRADEGD(-2)	2.22	TRADEGD	-1.86	POPG(-1)	1.80	POPG	-0.09	POPG	-0.23	TRADEGD	0.23
C	-0.01	TRADEGD(-1)	1.12	TRADEGD	-0.68	TRADEGD	-1.29	TRADEGD	-1.23	TRADEGD(-1)	1.17
		C	0.27	C	0.31	C	-0.21	TRADEGD(-1)	3.74	C	0.09
R-squared	0.80		0.77		0.64		0.78		1.07		0.85
Adjusted R-squared	0.61		0.50		0.21		0.52		0.75		0.68
F-statistic	4.14		2.85		1.48		3.02		0.38		4.90
Prob(F-statistic)	0.01		0.06		0.28		0.05		2.06		0.01
Durbin-Watson stat	2.74		3.25		2.56		2.59		0.15		2.82

Source: Estimated by the author

*Shows sig at 1% level, **shows at 5% and ***shows sig at 10% level

Discussion

The study is based on three major hypothesis which are further tested. Results of first hypothesis show a significant impact of Infrastructure on gross domestic product growth (GDPG). Results are consistent with the study by Lau and Sin (1997) who concluded that infrastructure investment effect significantly on output. Corong et al. (2013) examine the effect of public infrastructure investment on economic growth. Results of second hypothesis impact of governance on GDPG are as follow, government effectiveness, regulatory quality and political Stability and absence of violence show insignificant relationship with GDP. Results are consistent with the study conducted by with the study by many previous studies such as by (Mustapha, 2014; Zaouali & Amira, 2014; and Amin, Ahmed & Zaman, 2013) all these research's results in negative effect of corruption on economic growth The third hypothesis. i.e., moderating role of governance between infrastructure and GDP is also proved true. This is consistent with the study conducted by Ghani (2006) and Awan and Mustafa (2015) who conducted their study for developing and south Asian nations respectively government effectiveness and political stability are observed significant and positively linked with economic growth.

Conclusion

The study aims to understand the role of infrastructure and governance in economic growth of a Pakistan. Data for the governance, infrastructure and GDP growth has been taken from the World Bank. The World Governance Index has been used to measure governance and the self-constructed Index has been used to measure infrastructure. Four control variables, namely Foreign Direct Investment growth, Population growth, Government consumption and Trade (% of GDP) have been

used to study the desired relationship. Regression analysis is used to test the relationship among these three variables in presence of above stated four control variables.

Findings of the study are discussed in three folds first infrastructure and GDP, second Governance and GDP and third moderating effect of Governance on relationship between Infrastructure and GDP growth.

For the second hypothesis each World Governance Indicator is regressed. The results of the second hypothesis show that not all governance indicators contribute to economic development. All policies aim for improving governance in the country are not friendly to economic growth.

Recommendations

To better achieve the goal of economic development through Infrastructural development, before starting any infrastructure project it should be ensured that the project is not only feasible but also sustainable and hence may not prove to be a burden on economy. Pakistan should also involve private sector in their mega projects which will not only reduce financial pressure from the government but will also introduce an additional check on the projects for their quality and taking up of political motivated projects.

Besides physical infrastructure, soft infrastructure such as government policies, rules and regulations are required to properly exploit physical infrastructures to achieve economic growth. Pakistan should develop institutions to implement policies and regulations for better implementation of new as well as already operational infrastructure.

Future Directions of the study

Researchers can further study by investigating the impact of all possible indicators of governance on GDP growth for various countries depending on the development stages of their economy. This will help in précising those governance indicators which will prove to be helpful in contributing to economic growth. Future research studies can further classify different countries based on their per capita income and quality of economic and political governance to test the impact of different governance indicators on economic growth. Similarly, the impact of different types of infrastructures especially of IT and digital technology on economic growth along with mediators such as economic governance, tax structure, inflation, public- private- partnership, human capital and FDI on GDP may also be studied.

Limitations of the study

Non availability of data on governance indicators for a longer period is a major constraint for this study as regression analysis gives better results in case of long time series of data. Limitation of time also proved to be a potent limitation to the very study. Due to time constraint, it is not possible to cover the various facets of governance and infrastructure and their impact on economic growth and wellbeing of the masses. Although efforts are made to make this study comprehensive and precise but there are many facets of the study discussed above which can be explored further to measure and develop the relationship among Governance, infrastructure, and economic growth.

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