Institutions and Economic Growth Nexus: A Cross Country Analysis

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Abstract
Differences in economic growth among countries are likely to arise because of differences in capacity of regulatory institutions. It is believed that good quality institutions lead towards higher economic growth. This study is designed to investigate the impact of institutional quality on economic growth for 50 developing and developed countries over 1996-2013, using OLS and 2SLS methods. The major determinants of growth include institutions along with physical capital, human capital and inflation. The results obtained revealed that institutions have significant and positive influence on economic growth for the whole sample. The results are highly significant for developed countries. In developing countries human capital and a reduction in corruption are the most powerful institutional measures for boosting growth. This study recommends that governments of developing and developed countries should focus on development of quality institutions.

Keywords: Institutions, Economic growth, 2SLS, Developed and Developing countries
**JEL Codes:** E02, F43

I. Introduction

Boosting economic growth and raising the standard of living of people has become an important concern for policy makers. According to existing growth theories labor, physical capital, land, human capital and technology are key determinants of economic growth. Apart from these determinants, concern regarding the importance of quality of institutions in determining economic growth is getting attention now a days. Countries may differ in economic growth due to differences in capacity of regulatory institutions. It is believed that quality institutions result in higher economic growth (Knack and Keefer, 1995; and Gwartney et al., 2006).

Institutions promote economic growth by removing market inefficiencies and insuring proficient distribution of resources. It is also believed that strong institutions play an important role in promoting investment and capital development by reducing corruption and attracting foreign investment which in turn accelerate economic growth. In addition, institutions help to boost output by settling down the clashes among conflicting groups.

The poor institutional quality increases insecurity of property rights, profits and patent, discouraging new inventions and technology. Dishonest bureaucracies and weak regulations delay the provision of permits and licenses which hinders innovations in technology and lower growth rates (Mauro, 1995). According to Sarwar et al. (2013) institutions allocate resources efficiently by discouraging the rent seeking activities and promoting innovative activities

Figure 1: Channel Showing How Institutions Boost Economic Growth
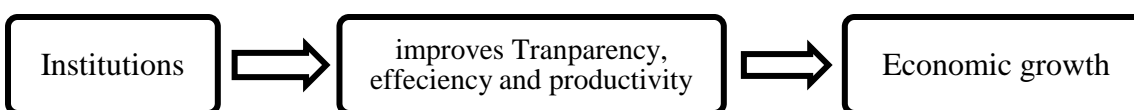
This paper contributes to the existing literature in a number of ways. First, we use a mix of 50 countries covering both developed and developing to analyze the role of institutions on growth. Second, we compare the power of different measures of institutions in both sets of countries separately. This study intends to use ordinary least squares and two stage least squares to assess the impact of institutional quality on economic growth.

The remainder of the paper is organized as follows. Section 2 presents literature on economic growth and institutions. Section 3 demonstrates the data sources and model. Section 4 provides an explanation of estimation techniques. Section 5 consists of the interpretation and discussion of the results followed by conclusion presented in Section 6.

II. Literature Review

In recent years, the importance of an institution's quality in determining economic growth is receiving considerable attention. The foremost difficulty in assessing the linkage between "economic growth and quality of institution" is inherent limitation and complexity in defining and measuring institutions. There are various definitions of institution, for instance, according to North (1990) "institutions are the rules of the game in a society. They are humanly devised constraints that structure, political, economic and social interactions". Institutions comprise of state or formal institutions such as provision and protection of property rights, contract enforcement, and rule of law, financial markets and governance. They also incorporate non-state or informal institutions like social value, norms and habits. Engerman and Sokoloff (1994) argued that "institutions should be interpreted broadly as to encompass not only the political and legal structure but the culture as well".

Sala-I- Martin (2002) interprets institutions as the set of rules and attributes according to which society works in modern capitalism. According to him the measures of quality of institutions are control of corruption, property rights, effective judicial system, transparency of public administration, and free market regulations. In this study, we closely followed Knack and Keefer (1995), Sala-I-Martin (2002) and Glaeser et al. (2004) and used the measures of institutions similar to them, such as, control of corruption, rule of law, political stability, bureaucratic quality and democratic accountability. Broadly, we interpret institutions as an aggregate index of all these measures of institutional quality.

Overall, the literature suggests a positive impact of institutions on economic growth. Institutions affect economic growth by causing fair and efficient distribution of limited available resources. Higher quality of institutions has better effects on the investment, physical capital, human development and growth of a country. Gwartney et al. (2006) examined the indirect impact of institutions on economic growth by first finding their impact on investment. They found that higher quality of institutions causes more investment which in turn leads to higher growth rate. According to Siddique et al. (2016), institutes plays a vital role in reducing poverty and improving the quality of education.

Sarwar et al. (2013) examined the impact of institutions in four countries of South Asia for the period 1995-2010. They found that the region possesses an average quality of good institutions. Using both Fixed effects and GMM method they showed that institutional index has positive and significant impact on GDP per capita index. The other variables included in the model such as, population growth, growth of physical capital, education index and inflation also have a significant role in explaining economic growth.

Knack and Keefer (1995) examined the impact of institutions on economic growth by using alternative measures of institutions from ICRG and BERI data sets along with political violence and Gastil index. They found that ICRG and BERI measures have a more significant impact on growth than Gastil and political violence variables. Particularly, they found that a property right is an important proxy for institutional quality. Courtiers that protect and enforce property rights tend to show better economic performance than others.

Several studies examined the individual impact of alternative measures of institutions. For instance, Mauro, (1995) analyzed the impact of corruption, red tape, judicial system, and different measures of political stability for a cross section of 58 countries. He found that corruption has a negative impact on investment which has a deleterious impact on economic growth. The analysis is carried out using OLS and 2SLS methods where an index of ethno linguistic fractionalization has been used to instrument corruption.

Similarly, Mo (2001) investigated the impact of corruption and other institutional measures on economic growth in a sample of more than 53 countries. He mainly focused on finding the channels of transmission through which corruption can halt the process of economic growth. The author found that 1 percent increase in the corruption reduces economic growth by 0.72 percent. The damaging effect of corruption on growth is transferred through its destructive impact on human capital, the share of private investment and political instability. The most important channel through which corruption affects economic growth is political instability, which covers 53 percent of overall effect.

Also, Jalilian et al. (2007) have investigated the impact of regulatory quality on economic performance. They used data on a sample covering more than 100 countries and employed both cross sectional and panel techniques. Two proxies are used to measure regulations, namely, government effectiveness and regulatory quality. The results from both data sets showed a strong association between economic performance and regulatory quality and conclude that the good standard of regulation plays an important role in boosting economic performance.

III. Data Sources and Model
This study intends to disentangle the relationship between economic growth and institutional quality, using data on various measures of institution. To achieve this objective this study uses data on a cross section of 50 countries covering both developing (27) and developed countries (23). The cross section is done by taking the average of data from 1996-2013.The annual data on institutional measures is collected from International Country Risk Guide (ICRG) 2014 dataset. The data on GDP per capita and macroeconomic variables is taken from World Development Indicators (WDI) 2017.

To empirically investigate the relationship between economic growth and the institution following augmented production function is used.
$$Y = f(Ins, K, E, Inf) \ldots\ldots (1)$$

For the purpose of estimating the model in equation form is written as:
$$Y_i = \alpha_0 + \alpha_1 Ins_i + \alpha_2 K_i + \alpha_3 E_i + \alpha_4 Inf_i + \varepsilon_i \ldots\ldots (2)$$

The elasticity form of model can be written as.

$$lnY_i = \alpha_0 + \alpha_1 Ins_i + \alpha_2 lnK_i + \alpha_3 lnE_i + \alpha_4 Inf_i + \varepsilon_i \dots \dots (3)$$

Where i denotes cross section/country 1,2,3,…..50. *ln* is natural logarithm, *lnY* is economic growth, *Ins* is Institutional Quality, *K* is Physical capital, *E* is Education/Human capital, *Inf is* Inflation and ε_i is the white noise error term with standard classical model properties.

The natural logarithm of GDP per capita is used as a proxy of Economic growth; this proxy is used by many studies (see, for example, Knack and Keefer, 1995; Siddique et al., 2016; Siddique and Majeed, 2015 Ali (2015), Ali and Rehman (2015), Haider and Ali (2015), Ali and Bibi (2016) and Ali (2018)). The main independent variable is institutional quality. It comprises twelve institutional indicators, namely corruption index, government stability, law and order, socioeconomic conditions, bureaucratic quality, democratic accountability, religion in politics, military, politics, ethnic tensions, internal conflict, external conflict and investment portfolio.

This study uses five popular measures of institutional quality, namely government stability (maximum score; 12 points), bureaucratic quality (maximum score; 4 points), corruption in the government (maximum score; 6 points), law and order (maximum score; 6 points) and democratic accountability (maximum score; 6 points). For all institutional measures a higher score represents better institutional quality, for example, for corruption a score of 5 mean less corruption in that country and zero mean a highly corrupted country. The minimum score assigned to these measures is zero. The data on capital formation in receiving from WDI. Education plays a vital role in boosting growth. Greater school enrollment helps in building stronger human capital and enhances chances of good employment and ideas of investments which contribute to economic growth. We have used data on "Primary School Enrolment" from WDI (2017) as a proxy of human capital. To capture the impact of macroeconomic environment, we have used inflation as a control variable. High and unpredictable inflation are thought to be detrimental to economic growth. We have used "Consumer price index" to capture the effect of inflation on growth and data is taken from WDI (2017).

IV. Estimation Technique

We first apply ordinary least squares because it yields BLUE estimates if all standard classical linear regression model assumptions (CLRM) are met. The use of OLS requires fulfillment of "zero conditional mean" assumption. This assumption becomes void in the presences of (a) endogeneity (simultaneous linkages between explanatory and explained variable (b) measurement error in independent variable and (c) omitted variable bias. One common solution to all these problems is the use of instrumental variable technique.

It is found in the literature that institutional quality is an endogenous variable. Higher institutional quality increases economic growth, reverse relationship may also exist. In the presence of endogeneity it is not efficient to use OLS so we move toward two stage least squares (2SLS) to tackle this problem. To apply 2SLS we need a good instrument of institutions. A good instrument is one that has zero correlation with error term, hence with growth, and strong relationship with endogenous variable (i.e. institutions). The existing literature suggests that colonial origin of the country plays an important role in determining institutional quality of a country. According to Acemoglu *et.al.* (2001) colonial origin form the basis for institutional set up. On the basis of Acemoglu *et.al.* (2001) paper, we have used colonial origin to instrument institutional quality. From Klerman *et.al.* (2009) we have taken following colonial origin dummies; (i) colonial origin French (ii) colonial origin British (iii) colonial origin Other F.C (iv) not colonized (v) other former colony. Colonial origin dummies are generated by assigning a value of 1 if the country belongs to a specific colony and 0 otherwise. To check the validity of the instrument we have applied Hansen, J test and strength is checked by looking at first stage regression F stats, R-2 and T statistics.

V. Empirical Results and Discussion

Before proceeding towards estimations, we present correlation matrix and descriptive statics of the data. Table 1 shows the correlation matrix of important variables used in the regression analysis. All coefficients have expected signs, particularly; all measures of institutional quality have positive signs as predicted by theory. Table 2 shows summary statistics. Table 3 provides correlation matrix among the institutional measures. It is observed that correlation among most of the institutional measures is greater than 50% indicating that they share some common information and can be aggregated to generate a single index.

Table 1: Correlation Matrix of the Variables

	Variables	1	2	3	4	5	6	7	8	9
1	Economic Growth	1								
2	Corruption	0.86	1							
3	Govt. Stability	0.07	0.11	1						
4	Law & Order	0.80	0.83	0.18	1					
5	Democratic Accountability	0.73	0.76	-0.25	0.71	1				
6	Bureaucratic Quality	0.86	0.87	-0.01	0.84	0.85	1			
7	Human Capital	0.33	0.13	-0.07	-0.10	0.13	0.20	1		
8	Physical Capital	0.19	0.18	0.16	0.15	0.15	0.18	0.02	1	
9	Inflation rate	-0.24	-0.26	0.13	-0.26	-0.31	-0.32	0.11	-0.06	1

Table 2: Summary Statistics of the Data

Variable	Obs.	Mean	Std. Dev.	Mini. value	Maxi. value
Economic growth	50	8.68	1.69	5.16	11.05
Corruption	50	3.16	1.31	1.13	5.94
Govt. Stability	50	8.87	0.76	7.25	10.88
Law and Order	50	4.07	1.44	1.06	6.00
Democratic accountability	50	4.47	1.52	1.17	6.00
Bureaucratic quality	50	2.57	1.19	0.09	4.00
Human capital	50	4.61	0.13	4.09	4.99
Physical capital	50	3.52	3.15	2.37	25.32
Inflation rate	50	15.93	46.60	0.65	309.43

Table 3: Correlation Matrix of Institutional Measures

	Variables	1	2	3	4	5
1	Corruption	1				
2	Govt. Stability	0.11	1			
3	Law and Order	0.83	0.18	1		
4	Democratic Accountability	0.76	-0.25	0.71	1	
5	Bureaucratic Quality	0.87	-0.014	0.84	0.85	1

Table 4 presents baseline estimation results obtained from ordinary least squares. For Model 1 to Model 5 we added different measures of institutional quality one by one. From Table it is found that all variables have expected signs, implying that all measures of institutional quality have a positive and significant coefficient except government stability. The improvement in law and order, bureaucratic quality, democratic accountability and reduction in corruption are the main contributor to economic growth. As correlation analysis revealed that all measures of institutions are highly correlated so we aggregated them to make a single index. The estimated coefficient of the institutional quality index is positive and significant, indicating that a 1 unit increase in institutional quality will increase economic growth by 1.54%. Other control variables have expected signs. From Model 6 we can see that 1 % increase in human capital increases growth by 0.03%. Impact of physical capital is also significant and it directs that accumulation of capital by 1 % may cause economic growth to incline by 0.019%. Inflation has a deleterious effect on growth, but its impact remains insignificant with most measures. According to the results, 1% increase in inflation reduces growth by 0.0010% only.

In Tables 5 and 6 same analyses is separated for developing and developed countries. Reduction in corruption is the only institutional variable which has a highly significant impact on the growth of developing countries. Other institutional measures remain positive, albeit insignificant in explaining growth. The reason for less effect of institutions on developing countries' growth lies in the importance of human capital. Human capital has significant and positive impact on growth rates of developing countries. Our result is consistent with Glaeser et al. (2004), according to whom human capital influences institutional quality in poor countries which in turn affect economic growth. Therefore, these countries need to build up human capital so that they can derive the benefits of strong institutions. Also, a country having a larger amount of educated population would be able to create conditions favorable for creation formation of good institutions. Table 6 uses the same model but applies two stage least squares. In 2SLS we have used colonial origin as an instrument of institutional quality. To check

the presence of endogeneity we have used Hausman test of endogeneity. The Chi (2) p -value = 0.0766 is less than 10 % level of significance so we can say that endogeneity is present as predicted by theory. The validity of colonial original as instrument for institutions is checked by Hansen J test. As calculated Chi sq (5.89) is smaller than tabulated Chi sq (49), we can say that our instrument is valid. Results obtained from 2SLS are similar to OLS as with regard to the impact of institutional measures. The coefficient of institutions (index) is positive and it is highly significant. According to our results of 2SLS 1 unit increase in institutional quality will increase economic growth by 1.02%. Our results regarding the impact of institutions on growth are consistent with the theory. All control variables education, capital and inflation have significant impact on economic growth. The signs of control variables are also consistent with the theory.

VI. Conclusion

In this study, we attempt to determine the relationship of institutional quality with economic growth. To accomplish this objective, we have used cross sectional data from 50 countries, including 27 developing and 23 developed. Different econometric methods like ordinary least squares and two stage least squares are used. This study employed several measures of institutional quality such as control of corruption, law and order, government stability, democratic accountability and bureaucratic quality. According to our findings, institutions are the important factors of economic growth. We also found that alternative measures of institutional quality used in this study have significant impact on economic growth of developed countries. Whereas, in developing countries human capital plays a greater role than institutions. The reduction in corruption is the most powerful institutional measures for boosting growth in developing countries. On the basis of our findings, we suggest that governments of developing and developed countries should focus on the strategies which insure the quality and fairness of institutions. We also suggest that along with focusing on institutions developing countries should pay serious attention on promoting human capital that can be made possible only with investment in education.

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Table 4: Ordinary Least Square Results for full Sample

Dependent variable is Economic growth												
	1		2		3		4		5		6	
Corruption	1.067***	(0.083)										
Law and order			0.970***	(0.07)								
Democratic acc.					0.759***	(0.102)						
Bureaucratic qua.							1.181***	(0.09)				
Govt. stability									0.238	(0.331)		
Institutions											1.544***	(0.110)
Interactive term												
Human capital	0.028***	(0.010)	0.054***	(0.014)	0.0293*	(0.016)	0.0196**	(0.008)	0.0437**	(0.021)	0.0305**	(0.012)
Physical capital	0.021***	(0.007)	0.034***	(0.008)	0.046***	(0.011)	0.023***	(0.007)	0.083***	(0.018)	0.019***	(0.005)
Inflation	-0.0016	(0.001)	-0.00024*	(0.001)	-0.0017	(0.002)	0.00050	(0.001)	-0.01***	(0.004)	-0.00095	(0.001)
Constant	2.389**	(1.015)	-0.881	(1.482)	2.176	(1.601)	3.561***	(0.858)	1.993	(3.887)	1.104	(1.211)
Observations	50		50		50		50		50		50	
R-squared	0.786		0.797		0.584		0.754		0.193		0.781	

Note: (a) Robust standard errors in parentheses. ***p<0.01, **p<0.05, *p<0.1

Table 5a: Ordinary Least Square Results for Developing Countries

Dependent variable is Economic growth												
	1		2		3		4		5		6	
Corruption	0.673**	(0.283)										
Law and order			0.387	(0.238)								
Democratic acc.					0.0446	(0.119)						
Bureaucratic qua.							-0.126	(0.250)				
Govt. stability									0.049	(0.38		

	1		2		3		4		5		6	
										4		7)
Institutions											0.259	(0.387)
Human capital	0.032***	(0.007)	0.046***	(0.009)	0.038***	(0.007)	0.042***	(0.008)	0.039***	(0.007)	0.038***	(0.0072)
Physical capital	0.117	(0.524)	-0.480	(0.703)	0.366	(0.538)	0.435	(0.504)	0.283	(0.552)	0.231	(0.532)
Inflation	-0.00036	(0.0013)	-0.00188	(0.0002)	-0.00106	(0.0001)	-0.0015	(0.001)	-0.00149	(0.0002)	-0.00101	(0.0012)
Constant	2.247	(1.803)	3.065*	(1.778)	2.121	(1.864)	1.991	(1.788)	2.001	(2.183)	2.199	(1.837)
Observations	27		27		27		27		27		27	
R-squared	0.562		0.538		0.474		0.476		0.472		0.483	

Note: (a) Robust standard errors in parentheses. ***p<0.01, **p<0.05, *p<0.1

Table 5b: Ordinary Least Square Results for Developed Countries

Dependent variable is Economic growth												
	1		2		3		4		5		6	
Corruption	0.271**	(0.123)										
Law and order			0.495**	(0.183)								
Democratic acc.					0.502*	(0.242)						
Bureaucratic qua.							0.595**	(0.237)				
Govt. stability									0.229	(0.158)		
Institutions											0.615***	(0.199)
Human capital	0.0177	(0.0279)	0.0129	(0.025)	-0.01331	(0.02)	-0.01112	(0.0264)	0.00657	(0.032)	-0.00419	(0.0254)
Physical capital	0.00186	(0.0052)	0.01222	(0.008)	-0.00571	(0.005)	0.00111	(0.0044)	-0.00775	(0.006)	0.00349	(0.0042)
Inflation	-0.191***	(0.0633)	-0.162**	(0.075)	-0.272***	(0.05)	-0.188***	(0.0603)	-0.272***	(0.069)	-0.166***	(0.0549)
Constant	7.861**	(3.055)	6.731**	(2.804)	9.559***	(2.836)	9.774***	(2.689)	8.397*	(4.008)	8.912***	(2.685)
Observations	23		23		23		23		23		23	
R-squared	0.768		0.776		0.730		0.801		0.687		0.822	

Note: (a) Robust standard errors in parentheses. ***p<0.01, **p<0.05, *p<0.1

Table 6: Two Stage Least Square Results for full Sample

Dependent variable is Economic growth												
	1		2		3		4		5		6	
Corruption	1.043***	(0.229)										
Law and order			0.664***	(0.139)								
Democratic acc.					0.490*	(0.255)						

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	(1)		(2)		(3)		(4)		(5)		(6)	
Bureaucratic qua.							0.725***	(0.239)				
Govt. stability									0.343	(0.751)		
Institutions											1.102***	(0.269)
Interactive term												
Human capital	0.029***	(0.012)	0.051***	(0.014)	0.0338*	(0.017)	0.0283**	(0.014)	0.0444**	(0.020)	0.0338**	(0.014)
Physical capital	0.0226	(0.016)	0.053***	(0.011)	0.063***	(0.019)	0.049***	(0.017)	0.0788**	(0.035)	0.041***	(0.015)
Inflation	-0.00186	(0.002)	-0.005***	(0.002)	-0.00453	(0.003)	-0.0034*	(0.002)	-0.01***	(0.004)	-0.003**	(0.002)
Constant	2.430**	(0.969)	0.729	(1.333)	2.899*	(1.628)	3.813***	(1.178)	1.011	(7.278)	1.994	(1.225)
Observations	50		50		50		50		50		50	
R-squared	0.786		0.736		0.533		0.669		0.191		0.732	

Note: (a) Robust standard errors in parentheses. ***p<0.01, **p<0.05, *p<