South Asian Studies
A Research Journal of South Asian Studies
Vol. 30, No.2, July – December 2015, pp. 381 - 404.

Institutional Quality and Economic Growth: Panel ARDL Analysis for Selected Developing Economies of Asia

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Abstract

The role of institutions in economic growth has received much attention of the researchers and policy makers in the last two decades. The literature available on this issue is not clear. The literature reveals that there is a growing dissatisfaction over the neo-classical and endogenous growth models. In recent literature institutional economics has emerged for determining the economic growth. In view of this fact, the present study is an attempt to explain the impact of institutional quality on economic growth in developing economies of Asia. The study uses panel data for the period 1990-2013 for 13 developing economies of Asia. Institutional quality index has been constructed by using principal component analysis. The results of Panel ARDL show that institutional quality has positive impact on economic growth. The results of panel causality test show that causality runs from institutional quality to economic growth. The study stresses that for increasing economic growth there is a need to improve institutional quality in selected Asian developing countries.

Keywords: Institutional quality, Economic growth, Panel data

Introduction

The ongoing concern in the field of economics about the role of institutions may be considered as part of current search for the factors influencing economic growth. Up to large extent it can be viewed as increasing dissatisfaction that started in late 1980s about the neoclassical growth model introduced by Solow (1956) and Swan (1956). The standard neoclassical growth model considers capital formation or investment as the major determinant of economic growth.

Several attempts have been made to test this model empirically but results appeared to be inconclusive. These findings lead to move towards the reconsideration about the determinants of economic growth and stress to include human capital in the model (Becker, 1962). New growth models developed in late 1980s by Romer (1986), Lucas (1988) and in early 1990s by Romer (1990), Barro and Lee (1994) reconnoiter the empirical relation between human capital and economic progress. The introduction of the new growth models leads to consider the technology and innovation an important factor of economic growth (Grossman and Helpman, 1991). However, these models fail to explain truly the causative questions. For example, keeping in view capital formation or technological advancement as a major determinant of economic growth, the literature fails to explain the difference in level of economic development among countries. North and Thomas (1973) explain that the capital accumulation and innovation are not determinants of growth in fact they are growth themselves. In this way the existing growth models have clarified only the channels of growth and not the determinants of growth. In the light of this background, a new branch of economic literature known as institutional economics, has emerged which tries to extend the neoclassical growth models by including institutional rule in determining the long run economic growth. There are some studies that have highlighted the role of institutions[1] for economic growth (see for example, Acemoglu et al., 2000; 2002; 2003; 2005; Easterly and Levine, 2000; Dollar and Kraay, 2003; Hall and Jones, 1999; Rodrik et al., 2004; Rodrik et al., 2002; Rodrick, 1999; Knack and Keefer, 1995; Mauro, 1995).

Rodrik et al. (2002) stress the role of institutions in determining the economic growth as compared to other factors. The literature reveals that institutions play an

[1]Institutions refer to formal rules (constitutions, laws and regulations, political systems, etc.) and informal rules (value systems, beliefs, social norms, etc.) that humans use when interacting within a wide variety of repetitive and structured situations at multiple levels of analysis.

important role in reducing uncertainty and helps in mitigating economic volatility (for details, see North, 1990; Klomp and Haan, 2009; Aceomglu et al., 2003; Rodrik, 1999; Mobarak, 2005; Quinn and Wooley, 1996, 2001; Economides and Egger, 2009). Brousseau and Glachant (2008), Kirman (2007) and Furubotn and Richter (2005) explain that the literature of institutions has been becoming richer in economic growth over time.

There are three kinds of institutions, i.e. Economic, Political and legal institutions. Political institutions are responsible for making laws, rules and regulations for: protection of life, respect, property and enforcement of contracts. Economic institutions are important because they play their role in determining the investment decisions in human capital, physical capital, production process and technology. They are also helpful in the efficient allocation of resources. Legal institutions are responsible for the enforcement of laws, rules and regulations set by political institutions for the protection of life, respect, property and enforcement of contracts. These institutions ensure life security, safety of property rights, execution of contracts, accountability and transparency, checks and balances, rule of law, political stability, rheostat of corruption and provides the business friendly environment. If the institutions are weak, they may lead to poor policy making, inefficient allocation and poor law enforcement that may in turn retard the process of economic growth. Keeping in view the importance and role of institutions in economic growth, there is a need to conduct more research in this area. This helps us to provide business environment conducive to economic growth through the proper allocation of existing resources. This study is unique in this way that it analyzes the impact of quality of all these institutions, i.e. quality of economic, political and legal institutions. Furthermore, it uses quality of overall[2] institutions; on economic growth of developing economies of Asia. For this purpose,

[2]Index generated from quality of economic, political and legal institutions with the help of Principal Component Analysis.

institutional quality index constructed through the principal component method has been used in the econometric analysis.

Remaining study is systematized as: section II reviews the relevant existing literature. Section III sheds light on theoretical framework, Section IV discusses the research methodology, data, sample, and results, and, finally, section V concludes the study.

II. Literature Review

Knack and Keefer (1995) examine the association between institutions and economic progress. They use different proxies for institutions and find that political rights and civil liberties are not sufficient for measuring institutions; they used property rights as well. They find that property rights are significant determinant of economic growth. Their results show conditional convergence by controlling institutions. Grogen and Moers (2001) conclude that institutions are the major determinant of FDI and economic progress of 25 countries for the period 1990 to 1998.

Ali and Crain (2002) explain the interconnections among economic freedom, institutional distortion and economic growth. Using a sample of 119 countries for the period from 1975 to 1998, they conclude that civil liberties and political administration have no significant impact on economic growth, however, economic freedom plays significant role in enhancing economic growth. Vijayaraghavan and Ward (2001) test the empirical relation between institutions and economic growth for the period 1975 to 1990 for 43 countries. For analysis purpose, they use different proxies of institutional quality like property rights, structure of governance, size of the government and the political freedom. The results show that well defined property right and the size of the government are significant determinants of institutional quality which enhance economic performance. Adkins et al. (2002) investigate the determinants of inefficiency

employing stochastic frontier analysis by using two samples one having seventy three and second having seventy six countries. They find that institutions are helpful in enhancing economic freedom and efficiency which in turn increases economic growth. Ulubasoglu and Doucouliagos (2004) explore the relation between institutions and economic performance for the period 1990 to 1999. Using a sample of 119 countries, they use simultaneous model for econometric analysis using two proxies for institutional quality, one for political freedom and second for economic freedom. They find that political freedom has positive impact on human capital and total factor productivity (TFP) and physical capital. Le (2008) investigates the relationship among institutions, remittances, trade and economic growth for the period 1970 to 2005 for 67 developing economies. Using different estimation techniques, the study finds that better quality of institutions leads to higher economic growth in the long run as well as in the short run. However, remittances show negative impact on economic growth. Acemoglue and Robinson (2006) explore the significance of institutions in economic progress. They explain that main differences in economic performance among countries are due to differences in the quality of economic institutions. The study suggests that it is necessary to build high quality economic institutions although it is very difficult to do this as it requires strong political power. Klomp and Haan (2009) explore the relation between institutions and volatility of economic growth for 116 countries for the period 1960 to 2005 using different indicators for political administration like political stability, regime types and uncertainty of policy. They study employs specific to general approach and finds that uncertainty and instability, democratic regime and economic growth volatility are negatively related to each other. Hasan et al. (2009) find the relation among development of quality of institutions, deepening of finance and growth in china from 1986 to 2002. They apply OLS and GMM for analysis. They find that main institutional developments for a developing country are legalization and development of

market economy, safe guarding the property rights, expansion of financial system and the liberalization. The results show that development of quality of institutions, deepening of finance and legal environment have positive impact on economic growth. Lee and Kim (2009) explain that institutions and economic growth are positively related but it works through different channels in different conditions. Using data for the period 1965 to 2002 and different estimation techniques, the study finds that education, technology and institutions are main determinants of long run growth. The study points out that secondary education is helpful for growth in low income countries and higher education and better technology are appropriate for growth in middle and higher income countries. The results of causality indicate that bidirectional causality exist between institutions and growth. Zhuang et al. (2010) highlight the role of institutions and governance in enhancing economic progress. The study emphasizes the measurement of institutional quality and its impact on economic performance. The results of the study indicate two way long run relation between institutional quality and economic performance. Khan and Khawaja (2011) explore the relation among predation, quality of institutions and economic growth by using game theory model. They find that predation is significant hurdle in the way of economic progress as it reduces per capita consumption, enhances inequality and reduces overall output. Predators have comparative advantage in predation and high quality institutions eliminate this comparative advantage and enhance economic growth. Gwartney et al. (2004) explore the fact that differences in institutional quality are the major reason for differences in growth rates among countries. The study suggests that increase in economic freedom index is a long run phenomena. Islam (2012) investigates the relationship between compensation to civil servants and economic growth. Using threshold regression methodology, this study finds that growth is having vicious and virtuous circles with multiple equilibria. The

findings of the paper suggest that salary reduction of civil servants as part of budget balancing austerity measures may result in lower economic performance.

III. Theoretical Framework

In order to observe the influence of institutional quality on economic growth, the study uses neoclassical production function which has its origin in the work of Ramsey (1928). The neoclassical model was popularized by Solow (1956). This model assumes technological change as exogenous and returns to scale are considered to be constant. The model postulates that capital and labor can be substituted and their marginal products are assumed to be diminishing. The basic neoclassical production function can be written as:

$$Y = f(K, L) \quad (a)$$

Here, Y denotes the level of output, K is capital formation and L is the labor force.

Human capital is also considered to be the major determinant of economic growth in endogenous growth theories advanced by Romer (1986, 1990) and Lucas (1988) and it is the key extension of neoclassical model. Incorporating the Human capital (H) in the basic neoclassical production function:

$$Y = f(K, L, H) \quad (b)$$

Standard aggregate production can be modified as suggested by Feder (1983), Grossman (1988) and Ram (1996). Introducing the institutional quality and trade openness as independent inputs in the standard aggregate production function, (b) can be specified as:

$$Y = f(K, L, H, INSQ, TO) \quad (c)$$

To obtain the marginal effects of capital, labor, human capital, institutional quality and trade openness, we take the total derivatives and normalize them using the gross domestic product (Y) as follows:

$$\frac{dY}{Y}=\left(\frac{\partial Y}{\partial K}\right)\frac{dK}{Y}+\left(\frac{\partial Y}{\partial L}\right)\frac{dL}{Y}+\left(\frac{\partial Y}{\partial H}\right)\frac{dH}{Y}+\left(\frac{\partial Y}{\partial INSQ}\right)\frac{dINSQ}{Y}+\left(\frac{\partial Y}{\partial TO}\right)\frac{\partial TO}{Y}$$

(d)

$$\frac{\partial Y}{\partial K}=b_1 \qquad \frac{dK}{Y}=K$$

$$\frac{\partial Y}{\partial L}=b_2 \qquad \frac{dL}{Y}=L$$

$$\frac{\partial Y}{\partial H}=b_3 \qquad \frac{dH}{Y}=H$$

$$\frac{\partial Y}{\partial INSQ}=b_4 \qquad \frac{dINSQ}{Y}=INSQ$$

$$\frac{\partial Y}{\partial TO}=b_5 \qquad \frac{dTO}{Y}=TO$$

As per equation (d), it is expected that we may have positive signs of the partial derivatives of labor, human capital and physical capital with respect to output as literature shows that educated labor force plays a vital role for enhancing economic growth (Barro, 1991; Mankiw et al., 1992; Barro and Sala-i-Marin, 1995; Brunetti et al., 1998; Hanushek and Kimko, 2000). Knowledge is the significant source of growth (Romer, 1990; Grossman and Helpman, 1991) and investment is also major determinant of economic progress (see for example, Kormendi and Meguire, 1985; DeLong and Summers, 1992; Levine and Renelt, 1992; Mankiw, 1992; Auerbach et al., 1994; Barro and Sala-i-Martin, 1995; Sala-i-Martin, 1997; Easterly, 1997; Bond et al., 2001; Podrecca and Carmeci, 2001).

IV. Model Specification and Results

In recent literature, panel data analysis involves models having large time spans (T) for analysis purpose due to readily availability of data. The asymptotics of large number of cross sections (N) and large time periods (T) dynamic panels are

diverse from the asymptotic of the usual large number of cross sections (N) and small time periods (T) dynamic panels. Small time periods (T) panel estimation involves fixed and random effect estimators or Generalized Method of Moments (GMM) presented by Arellano and Bond (1991). These estimators involve pooling individual cross sections and allowing the constant term only to vary across cross sections. The main conclusions drawn from the large N, large T, reveal that the supposition of homogeneousness of slope coefficients is frequently unsuitable (for details see Pesaran and Smith, 1995; Pesaran, Shin, and Smith, 1997, 1999; Phillips and Moon, 2000; Im, Pesaran and Shin, 2003). The latest work on dynamic heterogeneous panel valuation with large N and T, proposes various methods for estimation. In fixed effect estimation method, time series data for each cross section are pooled, intercept terms are permitted to vary across cross sections. If slope coefficients are not alike then fixed effect may provide deceptive upshots. On the other hand, model may be built individually for each cross section and arithmetic mean of coefficients is obtained. This procedure is known as Mean Group (MG) estimator presented by Pesaran and Smith (1995). In MG technique the intercepts, slope coefficients, and error variances are all allowed to differ across cross sections.

Pesaran et al. (1997, 1999) popularize novel technique known as Pooled Mean Group (PMG) to estimate nonstationary dynamic panels as with an increase in time period of analysis, dynamic panels; nonstationarity is very important issue. PMG estimator is based on a blend of amalgamating and averaging of coefficients (Pesaran et al., 1997, 1999). This estimator permits short run parameters, intercepts terms and error variance to vary across groups (as in MG estimator). However, it restrains the long run coefficients to be equivalent. Starting from primary guesstimate of long run coefficient $\hat{\theta}$, the short run coefficients and swiftness of correction term can be found. These estimates are in turn, used to estimate θ, the process is iterated until convergence is achieved.

The general form of the empirical specification of the PMG model can be written as below.

$$Y_{it} = \sum_{j=1}^{p} \lambda_{ij} y_{i,t-j} + \sum_{j=0}^{q} \delta_{ij} X_{i,t-j} + \mu_t + \varepsilon_{it}$$

Where no of cross sections i = 1, 2, …. N and time t = 1, 2, 3 …. T. X_{it} is a vector of K × 1 regressors, λ_{ij} is a scalar, μ_i is a group specific effect. If the variables are I(1) and co-integrated then the disturbance term is an I(0) process. A major characteristic of co-integrated variables is their rejoinder to any deviance from long run equilibrium. This characteristic infers error correction dynamics of the variables in the system are swayed by the deviance from equilibrium. So it is common to re-parameterize above equation into the error correction equation as

$$\Delta Y_{it} = \phi_i y_{i,t-j} - \theta_i X_{i,t-j} \sum_{j=1}^{p-1} \lambda_{ij} \Delta y_{i,t-j} + \sum_{j=0}^{q-1} \delta_{ij} \Delta X_{i,t-j} + \mu_t + \varepsilon_{it}$$

The error correction parameter ϕ_i indicates the speed of adjustment. If ϕ_i = 0, then there is no evidence that variables have long run association. It is expected that ϕ_i is negative and statistically significant under the prior supposition that variables indicate a convergence to long run equilibrium in case of any disturbance.

With increase in time period of analysis, dynamic panels; nonstationarity is very important issue and in present study this issue has been taken into consideration by applying Levin, Lin and Chu (LLC) and Im, Pesaran and Shin (IPS) unit root tests.

LLC Unit Root Test

Levin, Lin and Chu (2002) introduced different panel unit root tests having different specifications dependent upon the assumption about entity specific intercepts terms and time trends. LLC test inflicts homogeneousness on the autoregressive coefficient (intercept and trend may vary across individual series)

which shows the presence or nonexistence of unit root. This test is based on ADF regression for examining unit root problem. The common form of LLC test with intercept term only may be written as

$$\Delta y_{i,t} = \gamma_{0i} + py_{it-1} + \sum_{i=0}^{p_i} \gamma_{1i} \Delta y_{i,t-j} + \mu_{i,t}$$

In the overhead equation γ_{0i} is the constant term which is supposed to differ across cross sectional entities while p is the identical autoregressive coefficient, γ_i denotes the lag order, $\mu_{i,t}$ is the disturbance term supposed to be sovereign across panel entities and follows ARMA stationary process for every cross section.

$$\mu_{i,t} = \sum_{j=0}^{\infty} \gamma_{1i} \Delta y_{i,t-j} + \varepsilon_{i,t}$$

The null and alternative hypotheses of this are as

H0: ρi = ρ = 0

HA: ρi = ρ < 0 for all i

LLC model is based on t-statistics, where ρ is supposed to stay fix across entities under null and alternative hypothesis.

$$t_p = \frac{\hat{p}}{SE(\hat{p})}$$

Under the assumption of independently and normally distributed error term and cross sectional independence, panel regression test statistics tp converges to standard normal distribution when N and T $\rightarrow$ ∞ and $\sqrt{\frac{N}{T}} \rightarrow 0$. However if cross sectional units are dependent, error term is serially correlated and time trend is present then test statistics does not converge to 0, under such circumstances LLC suggested modified version of test statistics as

$$t_p = \frac{t_p - N\tilde{T}\hat{S}_N \hat{\sigma}_0^{-2}(\hat{p})\mu_m^*}{\sigma_m^*}$$

μ_m^* and σ_m^* are modified mean and standard deviation, values of these are generated from monte carlo simulation by LLC (1993).

IPS Unit Root Test

Im, Pesaran and Shin (IPS), (2003) developed a test to check unit root in heterogeneous panel. This test is based on ADF test to individual series, however overall test statistics is based on the arithmetic mean of individual series, a series may be denoted by ADF as.

$$\Delta y_{i,t} = \overline{w}_i + py_{it-1} + \sum_{j=1}^{p_i} p_{i,j}\Delta y_{i,t-j} + \nu_{i,t}$$

IPS test allows for heterogeneity in ν_i value, the IPS unit root test equation may be written as

$$\bar{t}_T = \frac{1}{N}\sum\nolimits_{i=1}^{N} t_{i,t}(p_i)$$

Where $t_{i,t}$ is the ADF test statistics, pi is the lag order. In ADF test statistics is calculated as:

$$A_{\bar{t}} = \frac{\sqrt{N(T)}[\bar{t}_T - E(t_T)]}{\sqrt{Var(t_T)}}$$

The data for present study has been collected from 1990 to 2013 for thirteen developing economies of Asia.3 Various measures of institutional quality are available like pioneer effort to catch institutional environment by the Global Competitiveness Report of the World Economic Forum (Sala i Martin et al., 2011), Quality of Government project, compiled by the Quality of Government, Institute at the University of Gothenburg (Teorell et al., 2011). The CESifo Group in Germany has constructed an Institutional climate index (Eicher and Rohn, 2007). With the objective of using a most appropriate measure we used Kuncic (2013) data base which is based on specific institutional classification system as legal, political and economic institutions which is a more comprehensive measure. Rest of the data has been collected from World Bank's data base of world development indicators (WDI 2015).

[3]Bangladesh, China, Cyprus, India, Indonesia, Iran, South Korea, Malaysia, Pakistan, Philippines, Sri Lanka, Thailand and Turkey.

Table 1
Summary Statistic of Variables

Variables	Mean	Min	Max	Std. Dev
Quality of Legal Institutions	0.504	0.222	0.888	0.1438
Quality of Political Institutions	0.490	0.186	0.799	0.14153
Quality of Economic Institutions	0.475	0.150	0.851	0.1231
Overall Institutional Quality Index	0.533	0.029	1.398	0.1949
GDP Growth Rate	5.237	–13.126	14.240	3.655
Gross Fixed Capital Formation Growth Rate	6.368	–44.323	46.367	10.240
Log of Labor Force	17.270	12.673	20.491	1.764
Trade Openness	71.137	15.239	220.407	43.952

Table 1 shows the summary statistics of the variables used in the study. There is significant variations in minimum and maximum values of different measures of institutional quality as in case of legal institutional quality minimum value is 0.22 while maximum value is 0.88, minimum value of political institutional quality is 0.18 and maximum value is 0.79, minimum value of institutional quality of economic institutions is 0.15 while maximum value is 0.85. There is significant variation in GDP growth rate ranges from –13.12 to 14.24. Similarly growth rate of capital formation has lot of variations ranging from -44.32 to 46.36. The variable which shows the maximum variation is trade openness which has lowest value 15.23 and highest value 220.40.

The results of panel unit root tests are presented in Table 2. The results indicate that the trade openness and Labor Force are non-stationary at level, however they are stationary at first difference, so both variables have order of integration I(1), while remaining variables are integration of order I(0). In panel ARDL approach, unit root test is applied to exclude the possibility of I (2) variables (Pesaran et al., 2001). None of the variable is of order I (2). So Panel

ARDL appears to be more suitable technique for estimation in present circumstances. Long run results are presented in Table 3.

Table 2

Panel Unit Root Tests

Level					
		With Intercept		With Trend & Intercept	
Variables		**Statistic**	**P-Values**	**Statistic**	**P-Values**
Trade openness	LLC	–0.583	0.279	–1.98	0.238
	IPS	1.129	0.870	0.358	0.639
GDP Growth	LLC	–5.17	0.000***	–4.37	0.000***
	IPS	–5.12	0.000***	–4.39	0.001***
Capital Growth	LLC	–9.00	0.000***	–7.55	0.000***
	IPS	–8.38	0.000***	–5.95	0.000***
Log of Labor	LLC	–2.65	0.003***	–0.275	0.39
	IPS	1.44	0.926	1.737	0.95
Institutional quality index	LLC	–2.82	0.002***	–2.686	0.003***
	IPS	–1.365	0.086	–3.34	0.000***
Legal Institutional quality	LLC	–4.310	0.000***	–2.86	0.000***
	IPS	–4.90	0.000***	–4.56	0.000***
Political Institutional quality	LLC	–2.13	0.016**	–2.88	0.000***
	IPS	–3.01	0.001***	–3.62	0.000***
Economic Institutional quality	LLC	–2.83	0.002***	–4.14	0.000***
	IPS	–1.82	0.034**	–3.86	0.000***

irst Difference					
		With Intercept		**With Trend & Intercept**	
Variables		Statistic	P-Values	Statistic	P-Values
Trade openness	LLC	–9.79	0.000***	–9.210	0.000***
	IPS	–8.85	0.000***	–7.707	0.000***
Log of Labor	LLC	–3.39	0.000***	–2.863	0.000***
	IPS	–3.77	0.000***	–2.868	0.000***

Note: Levin, Lin & Chun (LLC) assumes common unit root process; Im, Pesaran and Shin (IPS) assume individual unit root process. ***, ** represent 1 and 5 percent level of significance respectively.

Table 3
Panel ARDL (1, 2, 2, 2, 2) Long Run Results (Dependent variable GDP growth)

	1	2	3	4	5	6	7
Labor	1.7545** (0.0770)	1.1094 (0.3274)	4.354*** (0.0000)	1.326 (0.193)	2.8981*** (0.0030)	2.349*** (0.0132)	3.582*** (0.0005)
Capital	0.3261*** (0.000)	0.3234*** (0.0000)	0.2981*** (0.0000)	0.318*** (0.0000)	0.3103*** (0.0000)	0.3313*** (0.0000)	0.3345*** (0.0000)
Trade openness	–0.0406*** (0.000)	–0.0358*** (0.0000)	–0.0080 (0.460)	–0.029*** (0.0001)	–0.0370*** (0.0000)	–0.0345*** (0.0000)	–0.048*** (0.0000)
Institutional Quality Index	1.3716*** (0.0098)						
Political Institutional Quality		0.8098 (0.712)					
Economic Institutional Quality			1.952 (0.280)				
Legal Institutional Quality				3.123** (0.078)			
Legal*Economic					2.2923 (0.2972)		
Legal*Political						3.157 (0.1202)	
Economic*Political							1.982 (0.467)

***, ** represent 5 and 10 percent level of significance respectively. In parenthesis ( ) are probabilities.

The results reveal that the index of overall institutional quality (generated from legal, political and economic institutional quality) has positive sign and it is statistically significant. It implies that higher level of institutional quality is associated with higher level of economic growth. Institutions provide incentives and penalties, which in turn play important role as catalyst and pave the way for rapid economic growth. Institutional quality may influence the economic growth of the country through the proper allocation of resources which is related in supplying public goods and services. Better resource allocation decisions may increase the functioning of the market. If allocation of resources is efficient, it will enhance economic growth. Better institutional quality increases economic

performance by reducing the level of corruption and improving the check and balance. Better quality of institutions is supposed to be well equipped with updated information relating to current market situations which can enhance investment level and higher investment enhances economic growth. High quality of institutions also creates an environment which is business friendly and very conducive to foreign investment. As a result higher inflows of foreign direct investment lead to an increase in economic growth. Similar conclusions were drawn by Acemoglu et al. (2001, 2002, 2004), Keefer and Knack (1997), Rodrik et al. (2004), Easterly and Levine (2003), and Bardhan (2005). When subcomponents of institutional quality (legal, political and economic institutional quality) are used separately they give quite different results. Only legal institutional quality has been found to be associated with higher economic growth which means that legal institutions are more important. Both political institutional quality and economic institutional quality are not found significant in determining economic growth. The results become quite interesting when legal institutional quality has been interacted with political and economic institutional quality, the effect is insignificant which means that the significant effect of legal institutional quality has been vanished by insignificant effect of political and economic institutional quality. The interaction of political and economic institutional quality is also insignificant. Neither of interaction of the two is significant. This means that institutional quality of all institutions is required to be enhanced to foster economic growth.

Labor force carries positive sign and statistically significant coefficient in all specifications which means that an increase in labor force contributes significantly in economic growth. The study finds similar results for gross fixed capital formation. An increase in gross fixed capital formation leads to an increase in gross domestic product; so, both of these variables have expected signs consistent to growth theory. The results of this study are in line with the results of previous

studies (for example, Kormendi and Meguire, 1985; DeLong and Summers, 1992; Levine and Renelt, 1992; Mankiw, 1992; Auerbach et al., 1994; Barro and Sala-i-Martin, 1995; Sala-i-Martin, 1997; Easterly, 1997; Bond et al., 2001; Podrecca and Carmeci, 2001).

Table 4

Panel ARDL (1, 2, 2, 2, 2) Short Run Results; Dependent variable d(GDP growth)

	1	2	3	4	5	6	7
ECT(−1)	−0.780*** (0.0000)	−0.719*** (0.0000)	−0.775*** (0.0000)	−0.741*** (0.0000)	−0.751*** (0.0000)	−0.741*** (0.0000)	−0.733*** (0.0000)
D(Institutional Quality Index)	−2.321 (0.679)						
d(Labor)	−16.346 (0.427)	4.388 (0.84)	−10.190 (0.6407)	−15.797 (0.371)	−15.29 (0.433)	−8.6931 (0.662)	−1.1851 (0.953)
D(Capital)	−0.0258 (0.439)	−0.0262 (0.443)	−0.0124 (0.808)	−0.0198 (0.492)	−0.0138 (0.680)	−0.0327 (0.388)	−0.021 (0.586)
D(Trade openness)	0.025 (0.600)	0.0142 (0.771)	−0.0243 (0.695)	0.0380 (0.413)	−0.0144 (0.537)	0.029 (0.537)	−0.0078 (0.911)
D(Legal Institutional Quality)				7.3516 (0.102)			
D(Political Institutional Quality)		−2.1058 (0.787)					
D(Economic Institutional Quality)			3.173 (0.541)				
D(Legal*Economic)					4.8173 (0.359)		
D(Legal*Political)						5.908 (0.314)	
D(Economic* Political)							4.558 (0.625)
cons	−18.99*** (0.000)	−9.537*** (0.000)	−55.29*** (0.000)	−13.61*** (0.000)	−33.40*** (0.000)	−26.19*** (0.000)	−40.82*** (0.000)

*** represent 5 percent level of significance. In parenthesis ( ) are probabilities.

Trade openness has negative impact on economic growth which means that an increase in trade openness leads to reduction in economic growth which may be due to the fact that developing economies are unable to reap the benefits of international trade. These countries face difficulties in competing the developed countries in international markets.

Table 4 shows the results of short run analysis. The results reveal that the coefficient of error correction term is negative and is statistically significant as well in all specifications. This is an indication that model converges towards equilibrium. The speed of adjustment is more than seventy percent in each specification.

Table 5 presents the results of Panel Homogeneous Causality Test which reveals that there is uni-directional causality between overall institutional quality and Economic growth. The causality runs from institutional quality to economic growth which means that high quality of institutions leads to higher economic growth but higher economic growth in turn does not lead to higher quality of institutions. This is against the notion that there seems to be two way relationships between institutions and economic growth. Better institutions lead to higher economic growth and resultantly higher economic growth requires better quality institutions.

There is uni-directional causality between capital and GDP growth, running from GDP growth to capital. There is bi-directional causality between Labor and GDP growth which means that increase in labor force leads to increase in economic growth and economic growth in turn also leads to higher labor force which may be due to the reason that with higher levels of income people can afford to have more children which will increase labor force. There is uni-directional causality between trade openness and GDP growth, running from GDP growth to Trade openness.

Table 5
Panel Homogeneous Causality Test

Dependent Variable	GDP		LABOR		CAPITAL		INSQ Index		Trade Openness	
	Prob.	Decision	Prob.	Decision	Prob.	Decision	Prob.	Decision	Prob.	Decision
GDP	–	–	0.001	Causality exist***	0.41	No Causality	0.052	Causality exist*	0.41	No Causality
LABOR	0.052	Causality exist*	–	–	0.005	Causality exist***	0.941	No Causality	0.046	Causality exist**
CAPITAL	0.007	Causality exist***	0.105	Causality exist*	–	–	0.036	Causality exist**	0.65	No Causality
INSQ Index	0.91	No Causality	0.000	Causality exist***	0.003	Causality exist***	–	–	0.001	Causality exist***
Trade Openness	0.048	Causality exist**	0.000	Causality exist***	0.60	No Causality	0.60	No Causality	–	–

***, **, * represent 1, 5 and 10 percent level of significance respectively.

V. Conclusion

This study is an attempt to explore the impact of institutional quality on economic growth of 13 developing economies of Asia. An index of institutional quality has been constructed from quality of legal, economic and political institutions using principal component method. Panel ARDL and Panel causality have been used for econometric analysis. Various specifications of the model have been used for different types of indicators of institutional quality, and overall institutional quality index generated with the help of principal component method. The results of Panel ARDL show that overall institutional quality index exerts positive impact on economic growth. The results of panel causality show that causality runs from institutional quality to economic growth. Quality of legal institutions also has positive impact on economic growth but economic and political institutional quality are unable to foster economic growth. Neither of the interaction of institutional quality indicators is significant. This study concludes that economic growth can be increased through enhancing the institutional quality of all institutions or at least quality of legal institutions. For achieving this objective, there is a need to take certain effective steps for improving the institutional quality. This requires for integrated efforts and introduction of radical changes in the political, social and institutional set up of the country.

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Appendix

Legal institutions quality index is constructed from different aspects of institutional quality like it uses index of economic freedom, Press freedom, civil liberties, judicial independence, impartial courts, protection of property rights, law and order, religion in politics, rule of law etc.

Political institutions quality index is generated from checks and balances, democratic accountability, control of corruption, bureaucratic quality, military in politics, political terror scale, political rights etc.

Economic institutions quality: This is computed from different measures like index of economic freedom, regulatory quality, Credit market regulations, Economic Environment, Labor market regulations, Business Regulations, Capital controls, Investment profile etc.

Null Hypothesis:	**W-Stat.**	**Zbar-Stat.**	**Prob.**
Labor does not homogeneously cause GDP	4.62512	3.28064	0.0010***
GDP does not homogeneously cause Labor	3.65897	1.93672	0.0528**
Capital does not homogeneously cause GDP	1.68261	–0.81903	0.4128
GDP does not homogeneously cause Capital	4.23026	2.67181	0.0075***
Institutional Quality does not homogeneously cause GDP	3.65987	1.93796	0.0526**
GDP does not homogeneously cause Institutional Quality	2.34527	0.10933	0.9129
Trade Openness does not homogeneously cause GDP	2.88133	0.81239	0.4166
GDP does not homogeneously cause Trade Openness	3.73187	1.97201	0.0486***
Capital does not homogeneously cause Labor	4.33001	2.80850	0.0050***
Labor does not homogeneously cause Capital	3.46021	1.61667	0.1059
Institutional Quality does not homogeneously cause Labor	2.31629	0.06903	0.9450
Labor does not homogeneously cause Institutional Quality	11.8499	13.3304	0.0000***
Trade Openness does not homogeneously cause Labor	3.74875	1.99503	0.0460***
Labor does not homogeneously cause Trade Openness	4.93781	3.61618	0.0003***
Institutional Quality does not homogeneously cause Capital	3.80673	2.09149	0.0365***
Capital does not homogeneously cause Institutional Quality	4.44980	2.97263	0.0030***
Trade Openness does not homogeneously cause Capital	1.95586	–0.44939	0.6531
Capital does not homogeneously cause Trade Openness	2.66439	0.51662	0.6054
Trade Openness does not homogeneously cause Institutional Quality	4.59877	3.15393	0.0016***
Institutional Quality does not homogeneously cause Trade Openness	1.94871	–0.45914	0.6461

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