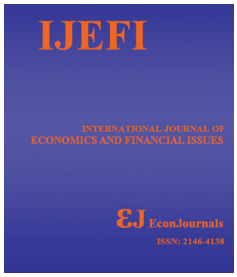

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The Relationship between Institutional Structure and Economic Growth: A Comparative Analysis for Selected Countries[#]

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ABSTRACT

This study explores the long-run relationship between institutional structure and economic growth for selected countries for 1993–2012 period by using dynamic panel data analysis. The results can be summarized as follows: (i) There exists a cross-sectional dependence for variables and models, (ii) all variables are stationary at their first difference except for institutional indicator of second group, (iii) there exists a cointegration relationship between non-stationary variables, (iv) institutional structure has positive and statistically significant impact on economic growth in first group of countries, (v) there is no significant relationship between institutional structure and economic growth in second group of countries, (vi) gross capital formation has positive impact on economic growth in both groups.

Keywords: Institutional Economics, Institutional Structure, Economic Growth, Panel Data Analysis, International Country Risk Guide
JEL Classifications: C33, D72, O50

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1. INTRODUCTION

Economic growth inequality is one of the toughest challenge in economics in modern era. What does create the inequality between Nogales Arizona and Nogales Sonora (Acemoglu and Robinson, 2012)?. Why did Britain industrialize first? Why didn't other prominent countries of age that industrialize first? These questions have been prepossessing researchers' mind for a long time. Many researchers have made an effort in order to find answers to these questions. This attempts have contributed to the rise of development economics in 1950s.

Most of growth and development studies have been created on numeral basis after Keynesian revolution and most of them have a similar approach that is ruling out of societal and political conditions which can be called as institutional factors. This paradigm has maintained until the late 1970s and researchers have accepted politics and economics as separated working fields. Political and sociological factors were not considered appropriate for formal analysis and were excluded from it. Besides, these factors have been considered as topics of other social sciences and policy-making process was seen as a "black box" (Sayer, 2000). This approach has begun to change at the beginning of the 1980s and has evolved to a "new approach." There are many reasons for this alteration, but it can be said that two things came forward that are creation of indexes which measure political and sociological institutions and rise of New Political Economics.

The new approach analyses the interaction of economic decisions with political institutions that can be summarized as follows; examining of how policy decisions are taken, what shapes the policy authorities' motives and constraints on decision-making process and how politic conflicts are resolved. Hence, it is accepted that economics and politics are in a mutual interaction. According to Alt and Crystal (1983), economics and politics cannot be treated as separate fields, although; proposed policies seem to be purely economic, it can be easily seen that they are politically influenced

because of their affects. In this regard, Lippi (1999) stated that political institutions affect policy choices (Telatar, 2004).

This progress has contributed to emergence of new researches in this field. Particularly, many efforts have been devoted to measure institutions that aim to clarify the interaction between political institutions and economics. The creation of various indices has allowed to empirical testing of political institutions and economic relations. Thus, empirical testing of relationship between political institutions and economics has become easier and the number of studies in this area have increased and relationships between institutions and economics have been analyzed versatile. Some of the prominent papers have been shown at literature table. If the literature table is summed up generally, it can be seen that institutional indicators and analysis methods vary which are used in practice. The reason of this challenge can be that impetus to understanding of growth inequalities between countries which have same investment and resource possibilities that remained as a black box for many years.

This study aims three key issues as follows; emphasizing the importance of political institutions on economic growth process, examining the effects of political institutions on economic growth in terms of selected countries and make a contribution to the growing literature on this field. This study neither aims to proselytize no one nor find a "panacea" for growth inequalities.

Rest of the paper is organized as follows: Section 2 explains data and model that used in this paper. Section 3 reveals methodology and empirical findings. Section 4 emphasizes concluding remarks (Table 1).

2. MODEL AND DATA

This paper employs a logarithmic and linear model as below in order to test the relationship between political institutions and economic growth in terms of selected countries:

$$\text{Ln gdp}_{it} = \beta_0+\beta_1(\text{lnins}_{it})+\beta_2(\text{lngcf}_{it})+\beta_3(\text{lnto}_{it}) \quad (1)$$

$i = 1,2...I$ and $t = 1,2,\ldots T$.

Real GDP (Constant 2005 US$) (lngdp) has been obtained from World Bank Online Data Base and has been used as an indicator of economic activity. Political institutions indicator components have been obtained from International Country Risk Guide (ICRG). The ICRG's political risk indicators consist of 12 subcomponents (Political Risk Service, 2017). Primarily, these components have been first classified according to their importance for the countries that included to analysis, then 7 of them have been chosen which are most important for these countries. These components have been re-weighted according to their importance level on political

Table 1: Literature table

Author(s)	Sample-period	Method(s)	Institutional indicator	Result
Barro (1991)	98 Country, 1960-1985	Panel Data Analysis	Political Instability	Negative Effect
De Haan and Siermann (1995)	Different Country Groups, 1961-1992	Sensitivity Analysis	Democracy	Weak Relationship with Economic Growth
Alesina et al. (1996)	113 Country, 1952-1982	Panel Data Analysis	Political Instability	Negative Effect
Barro (1996)	100 Country, 1960-1990	Panel Data Analysis	Democracy	Negative Effect
Leblang (1996)	50 Country, 1960-1990	Panel Data Analysis	Property Rights and Democracy	Positive Effect
Acemoglu et al. (2003)	1970-1997	Ordinary Least Squares and 2-Stage Least Squares	Institutional Quality	Indirect Positive Effect
Dollar and Kraay (2003)	168 Country, 2000-2001	Panel Data Analysis	Rule of Law	Positive Effect
Butkiewicz and Yanikkaya (2006)	100 Country, 1970-1999	Panel Data Analysis	Rule of Law Democracy	Positive Effect There isn't any significant relationship
Haggard and Tiede (2011)	74 Counrty, 1985-2004	Panel Data Analysis	Rule of Law	Strong Relationship at Developed Countries Weak Relationship at Developing Countries
Arslan (2011)	Turkey 1987-2007	Time Series Analysis	Political Instability	There isn't any significant relationship
Valeriani and Peluso (2011)	181 Country, 1950-2009	Panel Data Analysis	Civil Freedoms and Quality of Government	Positive Effect
Artan and Hayaloglu (2013)	110 Country, 2000-2009	Panel Data Analysis	Politic Freedom	Positive Effect
Hisamoglu (2014)	Turkey, 1987-2004	ARDL Approach	Institutional Quality	Positive or Negative Effect According to the Indicator
Nawaz (2015)	56 Country, 1981-2010	Panel Data Analysis	Institutional Quality	Positive Effect
Acaravci et al. (2015)	MENACountries, 1999-2012	Panel Data Analysis	Democracy	Negative Effect
Yildirim and Gokalp (2016)	38 Developing Country, 2000-2011	Panel Data Analysis	Different Institutional Indıcators	Different Effects According to Indicator

institutions which have shown at Table 2. Furthermore, Political institutions index (lnins) has been created through taking total of re-weighted components that varies between 0 and 100.

Gross capital formation (Constant 2005 US$) (lngcf) variable that is one of the important determinant of economic growth and trade openness (lnto) which used as a control variable have been obtained from World Bank Online Data Base.

Within the scope of the analysis; two panels have been employed. First group consists of G-7 countries. Furthermore, Second group consists of 14 countries that have similar conditions in terms of institutional or economic aspects. Comparing these countries with the G-7 countries is important for a reason as follows; there is an effort to develop the economic and institutional structure in the related countries as G-7 countries. Therefore, the analysis of economic and institutional developments in these countries is important in terms of policy implementations and implications for converging G-7. Both two groups are shown on Table 3. Data are complete for all countries between 1993 and 2012 for both groups.

3. METHODOLOGY AND EMPIRICAL RESULTS

3.1. Testing the Cross-sectional Dependency and Slope Homogeneity

This section firstly aims to examine whether the variables are cross-sectionally dependence or independent using the approaches developed by Breusch and Pagan (1980) and Pesaran et al. (2008). Breusch and Pagan propose following cross-section dependence test which based on Lagrange multiplier:

$$LM = T\sum_{i=1}^{N-1}\sum_{j=i+1}^{N}(\hat{p}_{ij}^2) \sim \frac{X^2 N(N-1)}{2} \quad (2)$$

Where $(\hat{p}_{ij}^2)$ is the correlation coefficient of residuals. Lagrange multiplier test has good properties for large T and small N. Pesaran et al. (2008) propose following cross-section dependence test which is adjusted form of Breusch-Pagan's LM statics that is called as "Bias-Adjusted LM Test:"

$$LM_{adj} = \sqrt{\frac{2}{N(N-1)}}\sum_{i=1}^{N-1}\sum_{j=i+1}^{N}\frac{(T-K)\hat{p}_{ij}^2 - \mu_{Tij}}{u_{Tij}} \quad (3)$$

Bias-adjusted LM test has good properties when T>N or T<N. Besides, Possible biases are adjusted when N is larger than T. Both tests work under the null hypothesis of no cross-sectional dependency. Furthermore, delta tests that proposed by Pesaran and Yamagata (2008) have been applied to examine whether there is slope homogeneity or not. Pesaran and Yamagata's approach tests null hypothesis of slope homogeneity (H_0:$\beta_i=\beta$ for all i) against alternative hypothesis of slope heterogeneity (H_1:$\beta_i\neq\beta_j$). Delta test is valid while N,T→∞ and when the error terms are normally distributed. Two statistics are calculated in delta approach. While delta statistics (4) gives more accurate results for large samples, the small sample properties of delta statistics can be improved under normally distributed errors by using bias adjusted version (5):

$$\tilde{\Delta} = \sqrt{N}\left(\frac{N^{-1}\tilde{S} - k}{\sqrt{2k}}\right) \quad (4)$$

$$\tilde{\Delta}_{adj} = \sqrt{N}\left(\frac{N^{-1}\tilde{S} - E(\tilde{z}_{iT})}{\sqrt{Var(\tilde{z}_{iT})}}\right) \quad (5)$$

Cross-sectional dependency test results for variables and models are shown in Tables 4 and 5. The null hypothesis of no cross-sectional dependence is rejected at different significance levels for variables in both group. Furthermore, the null hypothesis of no cross-sectional dependency is strongly rejected for models in both group. These results suggest that economic cases in one country are affects other countries in each group as well.

Slope homogeneity test result are shown in Table 6. The null hypothesis of slope homogeneity is strongly rejected for each group.

3.2. Stationary Analysis

This paper employs Smith et al. (2004) test that allows cross-sectional dependency in order to examine stationarity properties of series. This approach is generally based on Im et al.'s (2003) approach and computes 5 different statistics under null hypothesis of non-stationarity but this paper uses standard IPS test statistics. This method considers cross-sectional dependency through bootstrap approach and computes t-bar statistics as an average of individual t-statistics from ADF specification as:

$$t^* = \mathbf{N}^{-1}\sum_{0=1}^{N} t_i \quad (6)$$

$$\bar{t}_s = \frac{\sqrt{N}\{\bar{t} - E(t_i)\}}{\sqrt{Var(t_i)}} \quad (7)$$

Where i = 1,2,...,N and t = 1,2,…T and the standardized statistics is given as it is shown in equation (7). Smith et al. (2004) unit root test results are shown in Tables 7 and 8 for both group. On one hand, the null hypothesis of non-stationary is strongly accepted

Table 2: Political institutions index components

Political risk components	ICRG score	New score
Law and order	6	20
Democratic accountability	6	20
Government stability	12	16
Military in politics	6	14
Socioeconomic conditions	12	12
Bureaucracy quality	4	10
Corruption	6	8
Total	52	100

Table 3: Countries

First group	Second group	
Canada	Brazil	Poland
France	China	Portugal
Germany	Czech Republic	Romania
Italy	India	Russia
Japan	Indonesia	North Africa
United Kingdom	Mexico	Spain
United States	Nigeria	Turkey

Table 4: Cross-sectional dependency tests' results for variables

Tests	lngdp	lnins	lngcf	lnto
First group				
LM	60.763 (0.000)	29.952 (0.093)	57.121 (0.000)	31.382 (0.068)
LM_{adj}	4.613 (0.000)	2.834 (0.002)	6.232 (0.000)	5.052 (0.000)
Second group				
LM	145.927 (0.000)	165.317 (0.000)	175.962 (0.000)	178.689 (0.000)
LM_{adj}	15.490 (0.000)	6.236 (0.000)	11.970 (0.000)	0.019 (0.493)

Probability values for cross-sectional dependency tests are in parenthesis

Table 5: Cross-sectional dependency tests' results for model

Model ingdp=(lnins, lngcf, lnto)	Statistics and P values	
Tests	First group	Second group
LM	75.599 (0.000)	174.301 (0.000)
LM_{adj}	4.515 (0.000)	3.529 (0.000)

Table 6: Slope homogeneity test results

Tests	Statistics and P values
First group	
$\tilde{\Delta}$	8.306 (0.000)
$\tilde{\Delta}_{adj}$	9.516 (0.000)
Second group	
$\tilde{\Delta}$	7.643 (0.000)
$\tilde{\Delta}_{adj}$	8.756 (0.000)

for all variables in the models that includes constant or trend and constant in the context of first group. Besides, all variables become stationary at their first differences. On the other hand, the null hypothesis of non-stationarity is strongly accepted for all variables except for institutional variable in the models that includes constant or trend and constant in the context of second group. Besides, these variables become stationary at their first differences. However, institutional indicator is non-stationary at 1% significance levels in the model that includes trend and constant while stationary in the models that include constant.

3.3. Cointegration Analysis

The results of the analysis so far can be summarized as follows:

i. The null hypothesis of no cross-sectional dependency has been rejected for each group,
ii. The null hypothesis of slope homogeneity has been rejected,
iii. In the context of second group; institutional indicator is stationary in the model that comprises constant. Furthermore institutional indicator is stationary at different significance levels in the model that comprises constant and trend.

It is necessary to consider these conditions to apply the cointegration test. Therefore, Durbin-Hausman approach that developed by Westerlund (2008) is applied in order to test whether there is cointegration between variables or not. Durbin-Hausman method allows slope heterogeneity and cross-sectional dependency and test the null hypothesis of no cointegration for whole panel against the hypothesis of cointegration for some i. Besides, Durbin-Hausman test is feasible when some of independent variable is stationary. Two statistics are computed within the scope of cointegration that group statistics is computed under slope heterogeneity and panel statistics is computed under slope homogeneity. The heterogeneity of the slope coefficients makes it necessary to use the group statistics in this paper and statistics specification can be defined as:

$$DH_g = \sum_{i=1}^{n} \tilde{S}_i \left(\tilde{\phi}_i - \hat{\phi}_i\right)^2 \sum_{t=2}^{T} \tilde{e}_{it-1}^2 \quad (8)$$

Durbin-Hausman test results are shown in Table 9. The null hypothesis of no cointegration is rejected at different significance levels in each group. These results suggest that there is a long-run relationship between variables.

3.4. Estimation of Long-run Cointegration Coefficients

This paper employs Augmented Mean Group Estimator (AMG) that developed by Eberhardt and Teal (Eberhardt and Bond, 2009; Eberhardt and Teal, 2010; Eberhardt and Teal, 2011) in order to compute long-run cointegration coefficients. AMG approach allows to estimate of coefficients of variables which have different levels of stationarity under cross-sectional dependency. Furthermore, AMG approach allows to slope heterogeneity. The estimation method consists of two steps as follows:

$$\Delta y_{it} = b'\Delta x_{it} + \sum_{t=2}^{T} c_t \Delta D_t + e_{it} \quad \hat{c}_t \equiv \hat{\mu}_t^{\bullet} \quad (9)$$

$$y_{it} = \alpha_i + b_t' x_{it} + c_i t + d_i \hat{\mu}_t^{\bullet} + e_{it}, \quad \hat{b}_{AMG} = N^{-1} \sum_i \hat{b}_i \bullet \quad (10)$$

Equation 9 is the first ordered standard least squares equation and contains dummy variables at time T-1. $\hat{\mu}_t^{\bullet}$ parameter that is included in equation 10 represents linear trends and country-specific features of each cross-section. Including of $\hat{\mu}_t^{\bullet}$ parameter allows to compute β_i or $E(\beta_i)$ coefficient. Long-run coefficient estimations are shown in Table 10 for each group.

Results can be summarized as follows: Institutional indicator is positively and statistically significant at %10 significance level for first group while statistically insignificant for second group. Gross-capital formation variable is positively and statistically significant for each group. On the contrary, trade openness is statistically insignificant for both group.

4. CONCLUSION

This study explores the long-run relationship between institutional structure and economic growth for selected

Table 7: Smith et al. bootstrap test results for first group

Model	Level		First difference	
	IPS statistics		IPS statistics	
Variables	Trend and constant	Constant	Trend and constant	Constant
lngdp	−1.124 (0.945)	−2.203 (0.106)	−3.750 (0.024)	−3.298 (0.010)
lnins	−2.384 (0.272)	−1.918 (0.136)	−2.913 (0.016)	−3.001 (0.000)
lngcf	−1.839 (0.716)	−2.126 (0.108)	−3.928 (0.009)	−3.610 (0.002)
lnto	−3.238 (0.050)	−1.647 (0.390)	−5.234 (0.000)	−5.164 (0.000)

Maximum lag-length has been determined as k=1 and probability values have been obtained from 10,000 bootstrap replication and shown in parenthesis

Table 8: Smith et al. bootstrap test results for second group

Model	Level		First difference	
	IPS statistics		IPS statistics	
Variables	Trend and constant	Constant	Trend and constant	Constant
lngdp	−1.678 (0.843)	−0.650 (0.935)	−3.402 (0.006)	−3.167 (0.000)
lnins	−2.819 (0.022)	−2.675 (0.000)	−4.270 (0.000)	−4.048 (0.000)
lngcf	−1.979 (0.679)	−0.961 (0.900)	−3.607 (0.001)	−3.449 (0.000)
lnto	−2.566 (0.088)	−1.735 (0.230)	−4.129 (0.000)	−4.160 (0.000)

Maximum lag-length has been determined as k=1 and probability values have been obtained from 10,000 bootstrap replication and shown in parenthesis

Table 9: Durbin-Hausman cointegration test results

Test	Statistics and P values	
	First group	Second group
DH_g	−1.428 (0.077)	−2.598 (0.005)

Table 10: Long-run coefficient estimation results

Variables	First group		Second group	
	Coefficients	Statistics and P values	Coefficients	Statistics and P values
lnins	0.067	1.83 (0.067)	−0.035	−1.14 (0.253)
lngcf	0.160	6.30 (0.000)	0.243	10.86 (0.000)
lnto	0.054	1.60 (0.111)	−0.029	−0.76 (0.447)
Constant	23.688	34.52 (0.000)	20.439	38.64 (0.000)
Wald stat.		64.47 (0.000)		122.82 (0.000)

countries for 1993–2012 period by using dynamic panel data analysis. The results can be summarized as follows: (i) There exists a cointegration relationship between non-stationary variables, (ii) institutional structure has positive and statistically significant impact on economic growth in the first group of countries, (iii) there is no significant relationship between institutional structure and economic growth in the second group of countries.

The positive effect of institutional structure on economic growth in G-7 countries can be explained by positive effects of institutional structure improvement for establishing an environment of trust for economic activities. Thus, policies that aims to encourage improvements in institutional quality in the G-7 countries contribute to the increase of economic prosperity. Although there is no empirically significant relationship between institutional structure and economic growth in terms of second group of countries, the positive contributions of improvements of institutional quality to both social and economic life cannot be ignored factors. It is certain that improvements in the institutional quality will encourage economic stability and a balanced economic growth in these countries in the long run.

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