The Role of Institutional Conditions in the Impact of Economic Growth on Income Inequality

Saeedeh Behnezhad, Seyed Mohammad Javad Razmi*, **Seyed Saeed Malek Sadati**

Department of Economics, Ferdowsi University of Mashhad, Mashhad, Iran
*Corresponding author: mjrazmi@um.ac.ir

Abstract   Analysis of the factors determining economic growth rates, development, and economic welfare has found that structures and institutions have important effects on economic performance. They are the main cause of the differences between countries. In this regard, the present study examines the role of institutional conditions in the impact of economic growth on income inequality in countries with middle and high per capita income during 2004-2017. This study was conducted by the panel threshold method. To measure the institutional quality, the general index of good governance was used, which was obtained using the weighted average of the six governance indices of the World Bank. This model's threshold value is -0.6928, which shows that when the good governance index crosses this threshold and institutional quality improves, economic growth reduces income inequality to a greater extent.

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1. Introduction

One of the most important discussions in economic development is fair income distribution, which is becoming one of the main objectives of economic policy in recent years. Over the past decades, economic growth was often regarded as the main solution for poverty reduction and fair income distribution [1]. However, with the rising differences between countries in terms of economic growth and the failure of some of them to enjoy the benefits of such growth, including the decrease in income inequality, a fundamental question was brought up as to what is the reason behind the differential performance level across countries.

In 1973, North & Thomas argued that the significant difference in growth, development, and economic welfare across countries was mostly because of their institutional foundations and structures. They believed that capital accumulation, innovation, the economics of scale, education, etc., were only proximate causes of the growth, but institutions were the fundamental explanation of comparative growth [2]. Therefore, a new approach known as New Institutional Economics was introduced to the economics literature. [3] stated that "Institutions are the rules of the game in a society, or more formally, are the humanly devised constraints that shape human interaction". Institutions create a framework for economic activities [4] and influence countries' macro-economic performances by affecting transaction costs by decreasing

uncertainty and building trust, and enhancing cooperation [5]. Moreover, by forming a motivational structure and protecting property rights, good institutions create an investment and economic growth environment. Conversely, bad institutions reduce investment and lead to stagnation and recession as they increase transaction costs and obstacles in economic activities [4,6].

Therefore, this study aimed to investigate the impact of economic growth on income inequality in different institutional conditions. To this end, 53 countries with middle and high per-capita income were studied in 2004-2017, using econometric models. The names of the countries can be found in Table 1:

Table 1. List of countries

High- income economies	Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Panama, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Uruguay
Upper- middle-income economies	Argentina, Armenia, Belarus, Brazil, Bulgaria, Colombia, Costa Rica, Dominican Republic, Ecuador, Georgia, Indonesia, Iran, Kazakhstan, Paraguay, Peru, Russia, Thailand, Turkey
lower-middle-income economies	Bolivia, El Salvador, Honduras, Kyrgyzstan, Moldova, Ukraine

The rest of the paper is organized as follows. In Section 2, theoretical and empirical studies of the impact of institutions on economic performance are reviewed. Section 3 describes the research methodology. Section 4

presents the results. Finally, the conclusion is presented in Section 5.

2. Literature Review

[7] reported the first systematic study about the relationship between income distribution and different development levels in 1955. He found that the early stages of the development of an economy are characterized by rising inequality, while later stages are associated with lower inequality levels. This hypothesis suggests that inequality may be rising in developing countries, as these countries are experiencing early stages of economic development [8].

Since [7]' pioneering work, whether economic growth improves or worsens the income distribution, has been debated. However, in recent years, statistical observations indicate that many developing countries have experienced economic growth and improved income distribution. For example, consider Asian tigers (South Korea, Taiwan, Singapore, and Hong Kong), which achieved significant economic growth and income inequality reduction [9]. It appears that the empirical evidence on the growth-inequality relationship may not be possible to conclude the effect of economic growth on the income distribution so that other factors such as institutional environment and governance must also be taken into consideration.

According to the new institutional approach, infrastructures of an economy, governance, regulations, and institutions of a country are the principal and major factors for determining people's incentives to invest in physical or human capital or adopt more efficient technologies. Moreover, institutions protect property rights and reduce uncertainty and transaction costs, resulting in economic success in terms of increased production, higher income, and better economic welfare in the long run.

[2] believe that the difference of institutions, laws affecting the economic performance, and individuals' motivations are the reasons for the difference between countries in their economic status. They further state that economic institutions are important to economic growth because they shape key economic players' incentives, specifically affecting investment in physical, human, and technological capital and production. Although cultural and geographical factors may play a role in economic performance, the difference between countries in economic growth and prosperity is mainly because of their economic institutions' different performances. Not only do economic institutions determine the aggregate economic growth potential of the economy, but also they determine the economic outputs, including resource distribution in the future (such as distribution of wealth, human and physical capital). Figure 1 shows this relationship:
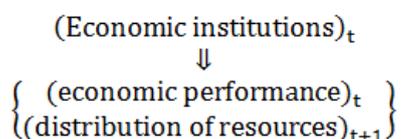
$$(\text{Economic institutions})_t$$
$$\Downarrow$$
$$\left\{ \begin{array}{c} (\text{economic performance})_t \\ (\text{distribution of resources})_{t+1} \end{array} \right\}$$

Figure 1. the effect of institutions on economic performance and resource distribution

[10] believe that institutional quality affects poverty and income inequality through market inefficiency and misallocation of resources. They claim that control of corruption, efficient government, and a stable political system can create the condition to promote economic growth and minimize income inequality. Therefore, generally, it can be stated that income distribution is affected by institutions both directly and indirectly through economic growth.

Numerous empirical studies on institutions and their role in economic performance and income inequality have been conducted using various institutional indicators. However, there is no research about institutions' role in the relationship between economic growth and income inequality.

Preliminary work on institutions and economic performance was undertaken by [11] in 1991. He carried out a study using political stability, measured by chaos, revolution, and political assassination, as the factor indicating security for property rights. The results of his study indicated that all these variables have a significant negative effect on economic growth. Later [12] examined the relationship among institutions, investment, and economic growth using new institutional variables for the first time. They employed the rule of law, repudiation of contracts by the government, expropriation risk, repudiation corruption in government and quality of bureaucracy (from ICRG indicators), contract enforceability, infrastructure quality, nationalization potential, and bureaucratic delays (from BERI factors) as property rights indicators. Using these variables, they concluded that property rights greatly affects investment and economic growth, compared to similar studies (which had used other indicators). [13] concluded that corruption decreases economic growth by reducing investment. [14] considered two criteria for institutions and government policies, which they called social infrastructures: government antidiversion policies and trade openness. Their findings indicated that differences in per capita income growth and per capita income levels were due to social infrastructure differences. [15] published the first systematic cross-section empirical research between institutional quality and income inequality. By investigating two groups of countries (poor and rich countries), they found that there is a quadratic relationship between institutional quality (as measured by a composite index based on measures of corruption of government, quality of bureaucracy, law and order tradition, risk of expropriation, and risk of contract repudiation) and income inequality. Indeed, institutional quality is positively linked to income inequality in poor countries. Still, for rich countries, institutional quality is negatively linked with the distribution of income. [16] showed that institutions, which is measured by Protection Against Expropriation Risk would be the main factor in explaining the differences between countries in income per-capita and welfare. [17] stated that developing Asian economies with government effectiveness, regulatory quality, and the rule of law scoring above the global means would grow faster on average than those scoring below the global means. [18] investigated the causal relationship between governance and economic growth in twelve Asian countries. Using Granger causality for three sample countries (Free, Partly Free, and Not Free), they

indicated that various dimensions of governance (from WGI indicators) lead to more significant economic growth in ''Not Free'' countries when compared to ''Free'' and ''Partly Free'' countries. [6] studied the effect of institutional quality on economic growth in OECD countries and estimated that one unit increase in institutional quality would increase 16.88% in economic growth.

As mentioned above, most empirical studies indicated the positive relationship between institutional quality measured by different indicators, economic growth, and income inequality.

3. Research Methodology

3.1. Estimation Method

As threshold models are used to investigate the nonlinear and asymmetric behavior of independent variables on the dependent variables, this study used the Panel Threshold Econometric Model.

The Threshold Regression Model introduced by [19] seeks the answer those questions as to whether regression functions identical across all observations in a sample or do they fall into discrete classes. This model is designed for non-dynamic panels with individual fixed effects. Individual observations may be divided into classes based on an observed variable's value in a panel threshold model, which is the threshold variable. In this model, the dependent variable (y_{it}) and threshold variables (q_{it}) are scalers, but the regressor (x_{it}) is a k vector. The structural form of the threshold model is as follows:

$$y_{it} = \mu_i + \beta_1' x_{it} I(q_{it} \leq \gamma) + \beta_2' x_{it} I(q_{it} > \gamma) + e_{it} \quad (1)$$

In this equation, $I(.)$ is the indicator function (q_{it}) is the threshold variable and γ is the threshold value. The observations are divided into two regimes based on whether the threshold variable (q_{it}) is smaller or larger than the threshold value (γ). The regimes are determined by the difference in the slopes of the regression β_1 and β_2. Determination of β_1 and β_2 requires that the elements of x_{it} are not time-invariant. Moreover, it is assumed that the threshold variable is also not time-invariant. The error term e_{it} assumes that it is independent and follows the identical distribution with mean zero and finite variance σ^2.

What matters in this equation is the estimation of γ value, based on which the observations can classify. To this end, [20] and [19] proposed the Least Squares Method, which is made possible by minimizing the sum of squared errors. Therefore, it is estimated as follows:

$$\hat{\gamma} = \arg\min_{\gamma} S_1(\gamma) \quad (2)$$

After the threshold value is determined, the threshold significance must be examined statistically. In this step, it must be tested as to whether β_1 and β_2 coefficients are significantly different from each other or not. The statistic used here is F:

$$F_1 = \frac{S_0 - S_1(\gamma)}{\sigma^2} \quad (3)$$

Where $S_0 = \tilde{e}^{*'} \tilde{e}^*$ is the sum of squared errors.

If the first threshold is statistically significant, the model should be estimated with two and/or three thresholds, and the significance of the thresholds should also be examined [19].

3.2. Empirical Model and Data

despite the numerous studies that have examined the effect of economic growth on income inequality, they cannot claim that they point toward a definite answer. Hence, it seems that the differential performance level across countries is mostly because of institutional quality. This study is designed to examine the effect of economic growth on income inequality in different institutional conditions. Since threshold models are used to investigate the nonlinear and asymmetric behavior of independent variables on the dependent variables, this study applied Panel Threshold Model to show different institutional conditions. The following equation was, based on theoretical principles, developed for investigating the research question:

$$
\begin{aligned}
GINI_{it} = \mu_i &+ \beta_1 INF_{it} + \beta_2 UNEM_{it} + \beta_3 POP_{it} \\
&+ \beta_4 HC_{it} + \beta_5 LOGGDP_{it} \times I(INS_{it} \leq \gamma) \\
&+ \beta_6 LOGGDP_{it} \times I(INS_{it} > \gamma) + \varepsilon_{it}
\end{aligned} \quad (4)
$$

In this study, the Gini coefficient index available in the Standardized World Income Inequality Database [21] (SWIID) for 2004 through 2017 was used to measure income inequality. Institutional quality, considered as the threshold variable, was obtained using Principal Component Analysis to calculate the weighted mean of six Good Governance indicators (voice and accountability, political stability and absence of violence, government effectiveness, regularity quality, the rule of law and control of corruption) proposed by the World Bank [22]. It should be noted that every indicator was within the range of -2.5 to +2.5, where the higher value signified a more desirable result for the country. To measure economic growth, which was considered a regime-dependent variable, the logarithm of gross domestic product per capita (at constant 2010 prices in US dollar) was employed. Control variables, including the inflation rate, unemployment rate, and population growth rate, were obtained from the World Bank Database [23]. Mean Years of Schooling as the human capital variable was collected from Human Development Database [24].

4. Results and Discussion

Before the estimation, the Hausman test was performed to determine fixed and random effects. This model's null hypothesis suggests that there is no correlation between the individual effects and explained variables. According to the results in Table 2, the null hypothesis of orthogonality was rejected, and thus the existence of fixed effects was confirmed.

Table 2. Hausman Test

Chi-Square Statistic	P-Value
74.24	0.00

For estimating the model, first, the threshold value was estimated by the Ordinary Least Squares Method. Then, the threshold significance test results were presented to ensure the validity of the Panel Threshold Method. The results of the tests are presented in the following tables:

Table 3. Threshold Significance Test

Hypothesis testing	F-stat	P-value	Critical values at 10%	Critical values at 5%
H_0: No threshold H_1: One threshold	15.07	0.06	13.04	16.32
H_0: One threshold H_1: Two threshold	3.26	0.43	9.19	11.31

Given this test results in Table 3, the first threshold's existence was statistically significant (significant at 10% level). Still, considering the bootstrap P-Value in the second case (0.43), the second threshold's existence could not be accepted. Table 4 shows the threshold value and the relevant confidence interval:

Table 4. Threshold Value and Confidence Interval

Model	Threshold Value	90% Confidence Interval
Model with one threshold	-0.6928	[-0.6993,-0.6868]

In this model, the threshold value was reported as -0.6928, indicating that when Good Governance reaches this point, the function breaks, and the coefficient of economic growth will change.

As shown in Table 4, 90% confidence interval for the first threshold was [-0.6993, -0.6868]. To construct this confidence interval, the likelihood ratio for different threshold values was estimated according to the null hypothesis: H_0: INS = INS. The threshold values with a likelihood ratio of less than or equal to $C(\alpha)$ ($LR_1(\gamma) \leq C(\alpha)$) were then considered as confidence intervals [19]. Table 5 shows the results of the model estimation:

Table 5. Results of Model Estimation

	Coefficient	P-Value	Std. error	t statistic
LOGGDP(INS≤-0.6928)	-8.06	0.04	3.99	-2.02
LOGGDP(INS>-0.6928)	-8.35	0.04	4.04	-2.07
INF	0.002	0.88	0.017	0.15
UNEM	0.09	0.00	0.03	2.69
POP	0.76	0.00	0.19	3.90
HC	-0.27	0.36	0.29	-0.92
Constant	70.005	0.00	15.04	4.65

As shown in the table, the growth coefficient is significantly different before and after the threshold. In the first regime, the impact of economic growth on income inequality is estimated to be -8.06, but the coefficient changes with the Good Governance index's improvement, which exceeded the threshold value (-0.6928). In fact, in this case, the impact of economic growth on income inequality is -8.35, which has increased compared to the previous case. However, these findings do not support Kuznets' hypothesis as economic growth led to improved income distribution. As mentioned in the literature review, institutions are the fundamental factors that determine the economic growth and development of societies, and not only do they determine the potentials for integrated economic growth, but also they determine the economic outputs in the future (such as wealth distribution, physical or human capital). Weak institutions may be conducive to income inequality [25]. For instance, corruption can change social spending structure to benefit the rich at the poor's expense, leading to higher inequality. Suppose institutions are trustworthy, and there is no corruption in the executive system. In that case, new businesses will be created easily, productivity and competition will increase, larger scale and technologically demanding production will take place, and market function will be improved in general [26]. Moreover, institutions also contribute to domestic and foreign labor division. In other words, efficient institutions decrease transaction costs in the economy [26]. As seen in this model, when institutional quality exceeds -0.6928, the coefficient of economic growth increases from -8.06 to -8.35. Following this, the inequality reduction rate increases, indicating the positive role of institutional quality in the relationship between economic growth and the Gini coefficient.

Since inflation transfers income from wage-earners toward profits, it is expected that inflation results in the rise of income inequality [27]. Furthermore, inflation increases income inequality by reducing the poor's purchasing power [28]. However, in this model, inflation did not affect income inequality.

According to the study's findings, the unemployment variable has a significant positive effect on the Gini coefficient. Income inequality increases by 0.09% with a one percent increase in the unemployment rate, assuming that other factors remain constant. Given that unemployment reduces individuals' income, it could increase income inequality as well. Accordingly, reducing the unemployment rate and paying attention to employment policies may serve a prominent role in improving income distribution.

In the estimated regression, a positive correlation was found between population growth rate and the Gini coefficient. Assuming that other variables remain constant, a one percent increase in population growth increases income inequality by 0.76%. Some believe that population growth could be regarded as an important reason for structural unemployment. Therefore, population growth and the resultant unemployment rise in deteriorate income distribution. On the other hand, population growth has been regarded as one of the main and most influential factors in per-capita income reduction, followed by a decreased standard of living and public welfare [29].

Although it is expected that with the increase of human capital (mean years of schooling), individuals' income increases and income inequality decreases, the insignificance of the coefficient of this variable was not far from expectation. Because governments mostly focus on preparing the condition for improving education and ignoring the demand for human capital, and creating jobs. Thus, it could be stated that such countries have failed in benefitting from the advantages of education to reduce income inequality.

5. Conclusion

This paper examined the role of institutional quality in the impact of economic growth on income inequality, using the Panel Threshold Econometric Model. The model was studied for the years 2004 through 2017. The results indicated the positive role of institutional quality in the impact of economic growth on income inequality. In this model, the threshold value was determined to be -0.6928, and the findings reported that when the Good Governance index exceeded this threshold, and hence the institutional quality improved, the impact of economic growth on income inequality increased as well, suggesting that economic growth further reduced income inequality at better institutional levels. These results are consistent with those of other studies and suggest that institutions and governance matter. It can thus be suggested that institutions, through increasing participation of people in economic, social, and political activities, reducing corruption, political stability, government efficiency, and effectiveness, and optimized resource allocation, can prepare the condition for improving economic growth and its resulting outcomes including income inequality reduction. If the structure of an economy encourages investment and production, that economy will prosper; on the contrary, if the structure encourages deviation from production, the consequences will be catastrophic. One notable point concerning institutions is that technological development, introduced as the driving force of economic growth in endogenous growth approaches, is formed and flourishes when there are effective economic, political, and social institutions in societies. Moreover, by improving governance indicators, governments can reduce transaction costs, increase investment and production, decrease unemployment, and reduce income inequalities.

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