The Impact of Governance on Income Inequality in Ten Asian Countries

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Abstract: This study utilizes panel data analysis over the 1996 to 2015 period to investigate the impact of governance quality (including democratic quality and technical quality) on income inequality in ten Asain countries, classified as "advanced economies" and "emerging market and developing economies". The empirical results show that the impacts of democratic quality and technical quality on income inequality are significantly negative within "emerging market and developing economies". However, for the "advanced economies", the effects of democratic quality and technical quality on income inequality are nonsignificantly positive and significantly positive, respectively. These findings imply that promoting good governance is useful to reduce income inequality for "emerging market and developing economies" but the effect may not be effective for "advanced economies.

Keywords: Income Inequality, Governance, Panel Data Analysis.

1. INTRODUCTION

In recent years, Southeast Asia has world's fastest growing economy while it also has the serious income inequality. A large number of studies explore the relationship between income inequality and economic growth; such as Kuznets (1955), Persson and Tabellini (1994), Psacharopoulose *et al*. (1995), Barror (1996), Deininger and Squire (1998), Barror (2000), Janvry and Sadoulet (2000), Panizza (2002), Alfranca *et al*. (2003), Samanta and Heyse (2006), Jomo (2006), Ricardo (2006), Lee *et al*. (2013), and Oueslati and Labidi (2015) etc.

Governance is vital for sustainable economic growth. In fact, governance plays an important role in promoting a country's competitiveness, attracting foreign investment, and increasing economic growth. Good governance has been widely discussed and applied in various fields of study since the World Bank first used the concept of good governance in its 1989 report. One of the most commonly discussed questions about governance is whether good governance is beneficial to economic performance. There has been a number of empirical studies examined the impact of governance on economic growth which suggest that good governance is helpful for promoting economic growth (Scully, 1988; Sacks and Warner, 1995; Hall and Jones, 1999; Rodrik, 1997; Kaufmann *et al*., 1999; Wei, 2000; Acemoglu *et al*., 2001; Dollar and Kraay, 2002; Kaufmann and Kraay, 2002; Easterly and Levine, 2003; De Groot *et al*., 2004; Rigobon and Rodrik, 2005; Jalilian *et al*., 2006; Gamber and Scott, 2007; Arusha,

2009; Evrensel, 2010; Marı´a-Teresa *et al*., 2012; Fayissa and Nsiah 2013; Huang and Ho, 2017).

Meanwhile, governance may involve in government policies to allocate resources for poverty alleviation and reduce economic inequality. The question whether good governance is beneficial to reducing income inequality is gradually being taken seriously. Studies such as Johnston (1989); Hendriks and Muthoo (1998); Jain (2001), Gupta *et al*. (2002); Gyimah-Brempong (2006); and Dincer and Gunalp (2011) suggest that corruption will reduce the competitiveness of a country, lead to a decline in economic growth, and widen existing income inequality. Li *et al*. (2000) find that low and high corruption levels correspond to low income inequality but the intermediate level of corruption is associated with high income inequality so they claim that the relationship between corruption and income inequality exhibits an "inverted-U" shape. Dobson and Ramlogan-Dobson (2010) argue that corruption will reduce income inequality. Huang (2013) finds that there is a Granger causality running from corruption to income inequality in China and Philippines.

Except for corruption, there are existing studies that discuss the impact of other dimensions of governance on income inequality. For example, Shafique and Haq (2006) find that regulatory quality, rule of law, and control of corruption have significantly negative impacts on income inequality while political stability and government effectiveness have significantly positive impacts on income inequality in four SARRC countries (Bangladesh, India, Pakistan and Sri Lanka). Broekhuis (2008) suggests that there is a negative correlation between income inequality and governance which is in terms of rule of law, control of corruption, and government effectiveness. Pornpen (2012) and

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Oueslati and Labidi (2015) adopt six dimensions of governance including voice and accountability, political stability, government effectiveness, regulatory quality, rule of law, and control of corruption. Pornpen (2012) finds that the pro-poor policy in Thailand could not effectively reduce poverty without good governance. Oueslati and Labidi (2015) find that governance has nonsignificant impact on income inequality in twenty two countries from the Middle East and North Africa region.

Does good governance improve income inequality? Does a different kind of governance quality have the different impact on the income inequality? Is it possible for governments in Asia to reduce the income inequality by improving different dimensions of governance quality? This is worth exploring. The purpose of this paper is to explore the impact of governance quality on income inequality and investigate whether governments can enhance governance quality to reduce income inequality. The remainder of the paper is organized as follows. Section 2 describes the data and methodology used in this study. Section 3 reports the empirical results. Section 4 concludes the paper.

2. DATA AND ECONOMETRIC METHODOLOGY

2.1. Data

The purpose of this study is to investigate the impact of governance quality on income inequality in Asian countries. Annual data involving ten Asian countries from 1996 to 2015 was used in the analysis. We adopt the definition of the International Monetary Fund (IMF) to categorize the ten countries into "advanced economies" and "emerging market and developing economies". "Advanced economies" consist of Japan, Singapore, South Korea, and Taiwan. "Emerging market and developing economies" include China, Indonesia, Malaysia, Philippines, Thailand, and Vietnam.

The variables in this study include income inequality (Gini), economic growth (EG), share of the elderly population (Old), and two types of governance quality those are democratic quality (DemoQ) and technical quality (TechQ). We use the Gini index to measure income inequality, the growth rate of real GDP per capita to measure economic growth, and use the population ages 65 and above as a percentage of the total population to measure the share of the elderly population. Changing demographics such as age

structure may affect income inequality. Lee, *et al* (2013) and Muinelo-Gallo and Roca-Sagalés (2013) suggest that the share of elderly population has a positive impact on income inequality.

The quality of governance is measured by the World Bank's Worldwide Governance Indicators (WGIs). The WGIs comprise six indicators those are voice and accountability, political stability and absence of violence, government effectiveness, regulatory quality, rule of law, and control of corruption. Following Helliwell and Huang (2008) and Ott (2011), the quality of governance in this study is classified as democratic quality and technical quality. Democratic quality is the average of the first two indicators of WGIs related to the political situation. Meanwhile, technical quality is the average of the last four indicators of WGIs related to the institutional quality and effectiveness.

Data on real GDP per capita (constant 2010 US$) and population ages 65 and above (% of total) are obtained from the World Bank. Data on Gini index is obtained from World Income Inequality Database (WIID), World Development Indicators (WDI) data bank, Association of Southeast Asian Nations, and each country's Bureau of Statistics.

2.2. Econometric Methodology

In this study, the equation estimated to explain inequality is as follows:

$$Gini_{i,t} = \alpha + \beta_1 EG_{i,t} + \beta_2 Old_{i,t} + \beta_3 Gov_{i,t} + \varepsilon_{i,t} \qquad (1)$$

where

$Gini_{i,t}$ is Gini index for country *i* in year *t*;

$EG_{i,t}$ is economic growth for country *i* in year *t*;

$Old_{i,t}$ is share of elderly population for country *i* in year *t*;

$Gov_{i,t}$ is one of the two governance measures (DemoQ or TechQ) for country *i* in year *t*;

$DemoQ_{i,t}$ is democratic quality for country *i* in year *t*;

$TechQ_{i,t}$ is technical quality for country *i* in year *t*;

$\varepsilon_{i,t}$ is the error term.

The ordinary least squares (OLS) estimates are efficient and consistent under the five key assumptions

those are linearity, multivariate normality, no autocorrelation, homoscedasticity and no multicollinearity (Greene, 2012). However, if the individual effect u_i is not zero or heterogeneity exists, the OLS estimator is no longer best linear unbiased estimator for equation (1). Fixed effect model and random effect model provide a way to deal with this problem. Fixed effect model allows an individual specific effect correlated with other regressors and considered a part of the intercept, while a random effect assumes that individual effect (heterogeneity) is not correlated with any regressor and then estimates error variance specific to groups (or time).

Fixed effect model and random effect model are as follows:

$$Gini_{i,t} = (\alpha + u_i) + \beta_1 EG_{i,t} + \beta_1 Old_{i,t} + \beta_1 Gov_{i,t} + v_{i,t} \tag{2}$$

$$Gini_{i,t} = \alpha + \beta_1 EG_{i,t} + \beta_1 Old_{i,t} + \beta_1 Gov_{i,t} + (u_i + v_{i,t}) \tag{3}$$

where u_i is the unobserved individual effect and error terms are independent identically distributed, $v_{i,t} \sim iid(0, \sigma_v^2)$. In equation (2) fixed effect model, intercepts vary across the group and/or time and error variances are constant. Meanwhile, in equation (3) random effect model, intercepts are constant and error variances are randomly distributed across the group and /or time.

In order to determine the fixed or random effects, we can use the Hausman test (Hausman, 1978) where the null hypothesis is that the individual effects are uncorrelated with the other regressor. In other words, the null hypothesis means that the preferred model is random effects. If the null hypothesis is not rejected, a random effect model is favored. Otherwise, a fixed effect model is favored.

2.2.1. Testing Cross-Sectional Dependence

Before estimating empirical models, we first test for cross-section dependence and slope homogeneity. If assumptions of no cross-section dependence and slope homogeneity hold, then OLS will be adopted and without the next step of deciding fixed or random effects. On the contrary, cross-section dependence or heterogeneity exhibits, then fixed or random effects will be decided. In this study, Breusch and Pagan (1980) cross-section dependence test and Pesaran and Yamagata (2008) slope homogeneity test are employed.

Breusch and Pagan (1980) propose the Lagrange Multiplier (LM) test to detect cross-sectional dependence. To compute the LM test requires the estimation of the following panel data model:

$$y_{it} = \alpha_i + \beta_i' x_{it} + \varepsilon_{it} \text{ for } i = 1, \ldots, N ; \ t = 1, \ldots, T \tag{4}$$

where y_{it} is Gini index (*Gini*), i is the cross-sectional dimension, t is the time dimension, x_{it} is the vector of explanatory variables (such as *EG*, *Old*, and *GOV*), α_i is the individual intercept, and β_i is slope coefficients. In the LM test, the null hypothesis of no cross-sectional dependence, i.e. $H_0 : Cov(\varepsilon_{it}, \varepsilon_{jt}) = 0$ for all t and $i \neq j$. The LM test statistic for cross-sectional dependence of Breusch and Pagan (1980) is given by:

$$CD_{BP} = T \sum_{i=1}^{N-1} \sum_{j=i+1}^{N} \hat{\rho}_{ij}^2 \tag{5}$$

where $\hat{\rho}_{ij}$ is the sample estimate of pair-wise correlation of the residuals from OLS estimation of equation (1) for each i.

2.2.2. Testing Slope Homogeneity

In order to test slope homogeneity, the familiar approach is to apply the Wald principle. Swamy (1970) develops the slope homogeneity test that allows for cross-section heteroscedasticity. Meanwhile, the Wald test and Swamy's test are applicable for panel data models where the cross section dimension (*N*) is small relative to time dimension (*T*).

Pesaran and Yamagata (2008) propose a standardized version of Swamy's test (the so called $\tilde{\Delta}$ test) for testing slope homogeneity in large panels. In this study, we employed the following bias-adjusted version:

$$\tilde{\Delta}_{adj} = \sqrt{N} \left(\frac{N^{-1} \tilde{S} - E(\tilde{z}_{it})}{\sqrt{\text{var}(\tilde{z}_{it})}} \right) \tag{6}$$

where the mean $E(\tilde{z}_{it}) = k$ and the variance $\text{var}(\tilde{z}_{it}) = 2k(T - k - 1) / (T + 1)$.

2.2.3. Panel Unit Root Tests

After determining the empirical model such as pooled OLS, fixed effect model, or random effect model, we conduct the empirical analysis. Before conducting the empirical analysis, we test whether the variables in the model are stationary or not. A variety of procedures for the analysis of unit roots in a panel context have been developed. In this study, four panel unit root tests which are Levin, Lin and Chu (2002; LLC, hereafter), Im, Pesaran, and Shin (2003; IPS, hereafter), ADF-Fisher, and PP-Fisher are employed.

LLC test is one of the popular panel unit root tests and is based on analysis of the equation as shown below:

$$\Delta y_{i,t} = \alpha_i + \beta y_{i,t-1} + \gamma_i t + \sum_{j=1}^{k} \theta_{ij} \Delta y_{i,t-j} + \varepsilon_{i,t} \qquad (7)$$

where Δ is the first difference operator, $\varepsilon_{i,t}$ is a white noise disturbance with a variance of σ^2, t =1, 2, …, T represents time periods, and i =1, 2, …, N indexes cross-sectional regions. This model allows for two-way fixed effects (α and θ) and unit-specific time trends. LLC test involved the null hypothesis $H_0 : \beta_i = 0$ for all i against the alternative $H_A : \beta_i = \beta < 0$ for all i.

IPS test extends the LLC framework to allow for heterogeneity in the value of under the alternative hypothesis. IPS relaxed the assumption of identical first-order autoregressive coefficients of the LLC test and developed a panel-based unit root test that allows β to be different across regions under the alternative hypothesis. The null and alternative hypotheses are defined as: $H_0 : \beta_i = 0 \quad \forall i$; $H_A : \beta_i < 0$, for some i. IPS demonstrated that their test has better finite sample performance than that of LLC.

The Fisher-ADF test proposed by Maddala and Wu (1999) and the Fisher-PP test proposed by Choi (2001) assume an individual unit root process and compute probabilities by using an asymptotic Chi-square distribution. The advantage of the Fisher test is that unlike the IPS test, it does not require a balanced panel. Additionally, the Fisher test allows the use of different lag lengths in the individual ADF regression and can also be carried out for any unit root test derived. One disadvantage of the Fisher test is that the p-values have to be derived via Monte Carlo simulation.

3. EMPIRICAL RESULTS

Results of tests for cross-section dependence and slope homogeneity are reported in Table **1**. Breusch

and Pagan (1980) cross-section dependence test result (CD_{BP}) shows that for "advanced economies" and "emerging market and developing economies", the null hypothesis of no cross-section dependence across countries cannot be rejected in models 1 and 2. Furthermore, we examine whether slope homogeneity exists using the methodology proposed by Pesaran and Yamagata (2008). According to the test result ($\tilde{\Delta}_{adj}$), we cannot reject the null hypothesis of slope homogeneity in model 2 for both "advanced economies" and "emerging market and developing economies". Although we reject the null hypothesis of slope homogeneity in model 1 for both "advanced economies" and "emerging market and developing economies" at the 5% level of significance, we cannot reject it at the 1 % level of significance. Therefore, we suggest that slope homogeneity holds at the 1% level of significance. Because there is no cross-section dependence and slope homogeneity, the pooled OLS regression is favored.

In principle regression based on nonstationary panel variables may prove spurious as in the case of time-series. Therefore, before conducting the panel data analysis, we first test whether variables are stationary using panel unit root tests to ensure selecting stationary variables in the empirical model. In this study, four panel unit root tests which are LLC, IPS t, ADF-Fisher, and PP-Fisher tests are employed. The results of panel unit root tests are reported in Table **2**.

The null hypothesis of all four panel unit tests is unit root (i.e. nonstationary). If the null hypothesis is rejected, it implies that a variable is stationary. On the contrary, if the null hypothesis is not rejected, then a variable is nonstationary. For "advanced economies", all variables except *Old* are stationary because only variable *Old* cannot reject the null hypothesis according to the four panel unit root test statistics. This means that *Old* is nonstatonay but the first difference of *Old* is stationary. Therefore, we use the levels of all variables except *Old*, while variable *Old* in the first-order difference to conduct the panel data analysis. As for

Table 1:   Cross-Sectional Dependence and Slope Homogeneous Tests

Test	Advanced Economies		Emerging Market and Developing Economies	
	Model 1	Model 2	Model 1	Model 2
Cross-Section Dependence: CD_{BP}	4.147 (0.6568)	3.216 (0.7813)	16.697 (0.3373)	19.566 (0.1892)
Slope Homogeneity: $\tilde{\Delta}_{adj}$	2.276** (0.0114)	1.2815 (0.1000)	2.300** (0.0107)	1.101 (0.1355)

Notes: Model 1: dependent variable is Gini and independent variables are EG, Old, and DemoQ. Model 2: dependent variable is Gini and independent variables are EG, Old, and TechQ. The p-values are in parentheses. ** indicates significance at the 5% level.

Table 2:   Panel Unit Root Test Results

Country	Method	Variable				
		Gini	*EG*	*Old*	*DemoQ*	*TechQ*
Advanced Economies	LLC	-9.794***	-9.082***	-0.962	-2.328***	-5.440***
	IPS	-8.157***	-7.228***	1.388	-2.358***	-2.755***
	ADF-Fisher	61.611***	54.371***	1.927	17.884**	20.958***
	PP-Fisher	61.723***	56.814***	0.023	17.667**	13.644*
Emerging Market and Developing Economies	LLC	-6.001***	0.634	4.917	-4.289***	0.075
	IPS	-3.389***	0.237	6.612	-1.909**	-2.340***
	ADF-Fisher	30.931***	7.269	0.029	19.425*	23.195**
	PP-Fisher	30.931***	8.425	0.001	26.117**	11.769

Note: *, ** and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

"emerging market and developing economies", variables *Gini* and *DemoQ* are stationary according to all of the four panel unit root tests. Variable *TechQ* is stationary according to IPS and ADF-Fisher tests so *TechQ* is treated as a stationary variable. Variables *EG* and *Old* are nonstationary according to all of the four panel unit root tests and the first difference of them are stationary. Therefore, for "emerging market and developing economies", variables *Gini*, *DemoQ*, and *TechQ* in levels while *EG* and *Old* are in first differences are employed to conduct the panel data analysis.

Estimation results are reported in Table **3**. Table **3** indicates that for "advanced economies", economic growth has a negative impact on income inequality but the effect is nonsignifican in models 1 and 2. This

means that an increase in economic growth causes a decrease in income inequality but the effect is not significant. The impact of the share of elderly population on income inequality is positive in model 1 but is negative in model 2, as well as the impact is not significant both in models 1 and 2. In fact, in "advanced economies", there is a sound social security system and elderly people may not belong to the poor or the low income group. Therefore, an increase in the share of elderly people may not cause an increase in income inequality. Additionally, two types of governance quality have a positive effect on income inequality. The effect of technical quality on income inequality is significant at the 10% level of significance but the effect of democratic quality is not significant. This implies that good governance will not improve income inequality for

Table 3:   Pooled OLS Estimation

Independent Variable	Advanced Economies		Emerging Market and Developing Economies	
	Dependent Variable: *Gini*		Dependent Variable: *Gini*	
	Model 1	Model 2	Model 1	Model 2
Constant	27.438*** (2.773)	30.960*** (0.923)	-12.642*** (4.396)	-8.213*** (5.586)
EG	-0.0092 (0.051)	-0.023 (0.051)	0.474 (0.338)	-0.709 (0.427)
Old	1.392 (1.449)	-1.806 (1.964)	34.166*** (8.630)	96.960*** (11.036)
DemoQ	3.9023 (2.371)		-46.910*** (4.544)	
TechQ		1.941* (1.007)		-98.653*** (13.744)
R^2	0.041	0.054	0.587	0.446
N	76	76	114	114

Notes: Standard errors are in parentheses. *, ** and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

"advanced economies". On the other hand, an increase in technical quality for "advanced economies" will enhance income inequality.

For "emerging market and developing economies", the impact of economic growth on income inequality is nonsignificantly positive in model 1 but nonsignificantly negative in model 2. The proportion of elderly people has a significantly positive impact on income inequality. This indicates that an increase in the proportion of elderly people will widen income inequality in "emerging market and developing economies". As to the impact of governance quality on income inequality, both democratic quality and technical quality have a significantly negative effect on income inequality. This implies that an increase in governance quality (either democratic quality or technical quality) will cause a decrease in income inequality. Therefore, we can conclude that good governance is beneficial for improving unequal income distribution in "emerging market and developing economies".

4. CONCLUSIONS

Asian countries have experienced rapid growth in economic development and serious income inequality in recent years. Does good governance improve income inequality? This study examines the impacts of governance quality on income inequality during the period of 1996 to 2015 in ten Asian countries, which have different levels of economic development are classified as "advanced economies" and "emerging market and developing economies".

In this study, the quality of governance is measured by six indicators of WGIs and classified as democratic quality and technical quality. Democratic quality is related to the political situation. Technical quality is related to the institutional quality and effectiveness. The empirical results show that for "advanced economies", the impact of democratic quality on income inequality is nonsignificantly positive as well as the impact of technical quality on income inequality is significantly positive. This indicates that improving a country's political situation such as voice and accountability, political stability, and absence of violence within "advanced economies" will not be effective to reduce income inequality. On the contrary, promoting technical quality within "advanced economies" may widen income inequality. For "emerging market and developing economies", the impacts of democratic quality and technical quality on income inequality are significantly negative. Therefore,

promoting democratic quality such as voice and accountability, political stability, and absence of violence or promoting technical quality such as government effectiveness, regulatory quality, rule of law, and control of corruption will cause a decrease in income inequality. Good governance will reduce income inequality within "emerging market and developing economies".

The findings of this study indicate that good governance plays an important role in improving income inequality for "emerging market and developing economies". Promoting good governance such as democratic quality or technical quality is beneficial for improving unequal income distribution within "emerging market and developing economies" but the effect may not be effective within "advanced economies". Government authorities in "emerging market and developing economies" should opt to pay more attention to promoting good governance in order to improve income inequality. However, this way may not be effective for government authorities in "advanced economies".

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