The governance quality-growth nexus revisited: A new evidence from the Bayesian multilevel generalized linear model

Anh Hoang Le[a*], Khai Nguyen Hoang[b] and An Pham[c]

[a]Institute for Research Science and Banking Technology, Banking University Ho Chi Minh City, Ho Chi Minh City 700000, Vietnam
[b]Faculty of Business Administration, Ho Chi Minh City University of Technology (HUTECH), Ho Chi Minh City 700000, Vietnam
[c]Faculty of Finance and Banking, Van Lang University, Ho Chi Minh City 700000, Vietnam

CHRONICLE	ABSTRACT
	Many empirical studies have been conducted so far on economic growth in the world. In these studies, the effect of various elements on the economic growth, such as public expenditure, inflation, labor, private investment, etc., has been examined. In this study, the effect of governance on the economic growth in 43 Asian countries is considered during the period from 2004 to 2016. Using the Bayesian multilevel generalized linear model, it is estimated that governance has a positive impact on economic growth with a probability of more than 80%. Based on this, policy implications are provided for improving the governance quality to promote economic growth.

1. Introduction

Economic growth is considered the major concern of countries around the world for decades. Many empirical studies have been conducted up to now on economic growth in the world. In these studies, the effect of various elements on the economic growth, such as public spending, inflation, labor, private investment, etc., has been examined (Alexiou, 2009; Gemmell, Kneller, & Sanz, 2014; Malek, 2014; Nguyen Ngoc Thach, Anh, & An, 2019). However, these studies often do not completely agree on the effect of these elements on economic growth. In particular, the economic growth rate indicates a slowdown or even a decreasing trend when countries use these elements (Malek, 2014). Thus, countries that only use these elements are not sufficient in order to ensure sustainable economic growth. By the early 1990s, the issue of governance and the effect on economic growth became a topic of discussion on international levels. Later, the researchers started to provide theories about the relationship between governance and economic growth (Acemoglu & Robinson, 2010). Besides, empirical studies also showed evidence of the effect of governance on economic growth, contributing to the theory. Most of these studies demonstrated the positive effect of governance on economic growth (e.g., Kaufmann, Kraay & Mastruzzi, 2003). This study proves that good governance leads to a higher per capita income. Moreover, Kaufmann, Kraay & Mastruzzi (2003) emphasized that the primary objective of good governance is to eradicate poverty and fight against corruption and obstacles that affect economic growth. Although there is evidence that governance has an effect on economic growth, no studies have completely considered the components of governance, which influence this effect. In addition, some recent studies considered the individual effect of governance on economic growth, but this method could not be implemented (Siddiqui & Ahmed, 2013). The studies report that most of the

* Corresponding author.
E-mail address: anhlh_vnc@buh.edu.vn (A. H. Le)

measures of governance are based on two sets of indicators: (i) Worldwide governance indicators (WGI) and (ii) National risk assessment index (International Country Risk Guide (ICRG)). Although the above two indicators are widely applied in empirical studies that measure the quality of governance depending on the research conditions, researchers may choose either WGI or ICRG. However, recent studies have shown some limitations of these indicators. Specifically, the studies of Knoll and Zloczysti (2012) and Langbein and Knack (2010) showed evidence of the overlap of six groups of indicators that constitute these two sets of indicators. Furthermore, it is difficult to separate some indicators in these two sets of indicators. This implies that in these two sets of indicators some can measure a concept together. As a result, some other empirical studies, such as Al-Marhubi (2004), Bjørnskov (2006), Easterly and Levine (2002), and Easterly and Rebelo (1993), have averaged all six WGI indicators in their analysis. However, this approach does not accurately describe the quality of public governance, according to Siddiqui and Ahmed (2013). In this study, we provide a revisited examination of the effects of governance on economic growth using a large sample of Asian countries. Simultaneously, this paper also contributes to methodology in solving the limitations using the set of indicators of governance as mentioned above. Different from previous studies, to identify factors that represent public governance measurement, we use the method of exploratory factor analysis (EFA) based on two sets of WGI and ICRG indicators. This method can help groups of indicators in measuring a concept together in order to form a representative factor. Simultaneously, these representative elements are different from each other. We use the representative factors that measure governance for assessing and evaluating the effect on economic growth. The current study, in contrast to previous studies, did not follow the frequentist inference. Instead, we used Bayesian inference to exam the effects of governance on economic growth. Unfortunately, frequentist inference suffers from some weaknesses in decision mechanism. In frequentist statistics, we compare an obtained p-value to a criterion (commonly 0.05). Conventionally, if p-value > 0.05, we fail to reject a null hypothesis, and if p-value < 0.05 we reject the null hypothesis. Failure to refute the null hypothesis, however, does not constitute proof for it and reject the null hypothesis (H0) does not mean that we have found evidence to support the alternative hypothesis (H1). The proof isn't quantified in Frequentist inference. Fisher himself was of the opinion, according to Wagenmakers et al. (2009), that p-values are proof against the null hypothesis. However, this would imply that p-values, when used to test proof, would at least correspond to the requirement of consistency. In a sample with 100 observations and in a sample with 3000 observations, this would require a p-value of say, 0.05 to represent the same amount of data. Unfortunately, that's not. In contrast to Frequentist inference, Bayesian inference can quantify evidence. In Bayesian inference, Bayes factors show the degree to which the evidence supports the null hypothesis, the alternative hypothesis, or none of the hypotheses (Wagenmakers et al., 2018). Therefore, no hypothesis is tested explicitly in Bayesian inference since the null is presumed to be true, Bayes factors provide clear support for every hypothesis considered.

This study is organized as follows. The next section presents a theoretical concept. Section 3 covers research methods. We discuss our findings in Section 4, and provide conclusions and some policy implications in Section 5.

2. Theoretical Concept

There have been many definitions of governance; some of them are discussed below. According to Schneider (1999), governance is the exercise of empowering or controlling the operations and resources of a country. On the other hand, the United States Agency for International Development (USAID, 2002) defines governance as functions and processes that are characterized by the value of accountability, transparency, and participation. According to Zinnbauer (2002), governance is a method of regularizing the rule of law, transparency, fairness, efficiency, responsibility, and strategic vision in the exercise of political, economic, and administrative power. From the above definitions, it can be concluded that governance is a multidimensional term (Keefer, 2004). Keefer (2004) states out that most of the meanings relate to the degree to which governments respond to individuals and provide them with certain core services, such as ownership security, the enforcement of the general rule of law, and the degree to which governance offers a stimulus for government regulators to respond well to people. According to Siddiqui and Ahmed (2013), governance is considered as a multidimensional concept, which is often measured by the perception of the public and businesses about many different aspects of governance. Therefore, the measurement of governance concept is also considered a very diverse activity. At present, both commercial organizations such as the Political Risk Service (PRS) and the Business Environment Risk Intelligence (BERI) and non-commercial organizations such as the World Bank, the World Economic Forum (WEF), the Global Integrity and Freedom House have developed various metrics for measuring governance quality in countries. In those sets of indicators, the two sets of indicators used by most of the empirical studies on governance are Worldwide Governance Indicators (WGI) and national risk assessment index (International Country Risk Guide – ICRG).

3. Material and methods

3.1. Method of identifying factors that represent governance

In order to determine the factors that represent governance, we used the EFA discovery factor analysis. The objective of EFA is to assess the two types of scale values that have convergent and distinctive values and to reduce most of the observed variables

into a group of factors so that they can be used more meaningfully and still containing most of the information content of the original variables. This reduction concept is based on the linear relationship of factors with observed variables (Hair, 1998).

We use observed variables of two sets of indicators measuring public governance as Worldwide Governance Indicators (WGI) and International Country Risk Guide (ICRG). Each set of indicators includes six major groups, namely, voice and accountability, political stability and absence of violence, government effectiveness, regulatory quality, rule of law, and control of corruption. Thus, the combination of these two sets creates 12 observed variables of 43 Asian countries collected during the period from 2004 to 2016.

3.2. Method of assessing the impact of governance on the economic growth

The impact of governance on economic growth is assessed by using a model adapted from the Cobb–Douglas function. This model is developed by using a combination of growth theories proposed by Lucas and Prescott (1971), Romer (1986), and Solow (1956):

$$\text{growth}_{it} = \varphi_0 + \varphi_1 \ln y_{i(t-1)} + \varphi_2 \text{inv}_{it} + \varphi_3 l_{it} + \varepsilon_{it}. \tag{1}$$

Here, the factors of human capital l_{it}, investment capital inv_{it}, and the productivity of aggregate factors φ_0 determine the economic growth growth_{it}. However, when these factors are completely used, economic growth slows down or decreases. The recent empirical study conducted by Siddiqui and Ahmed (2013) shows that governance plays a vital role in promoting economic growth. Therefore, it is concluded that governance variables should be included in the growth model, which is expressed as follows:

$$\text{growth}_{it} = \varphi_0 + \varphi_1 \ln y_{i(t-1)} + \varphi_2 \text{inv}_{it} + \varphi_3 l_{it} + \sum_{k=1}^{l} \gamma_k \text{gov}_{k,it} + \varepsilon_{it}. \tag{2}$$

Here, the factors that represent governance $\text{gov}_{k,it}$ extracted from EFA are included in the model. Finally, the inflation variable is included in the model based on Siddiqui & Ahmed (2013). Hence our final research model is expressed as follows:

$$\text{growth}_{it} = \varphi_0 + \varphi_1 \ln y_{i(t-1)} + \varphi_2 \text{inv}_{it} + \varphi_3 l_{it} + \varphi_4 \text{open}_{it} + \varphi_5 \text{inf}_{it} + \sum_{k=1}^{l} \gamma_k \text{gov}_{k,it} + \varepsilon_{it}. \tag{3}$$

Table 1
Summary of variables

Variables	Notation	Definitions and Calculations
Economic growth	growth$_{it}$	$lny_{it} - lny_{i(t-1)}$ with y_{it} and $y_{i(t-1)}$, respectively GDP per capita of country i year t and year (t–1)
GDP per capita	$lny_{i(t-1)}$	Logarithm of GDP per capita of country i year $(t–1)$
Investment	k_{it}	Investment capital per GDP of country i year t
Human capital	l_{it}	Labor force ratio of country i year t
Trade openness	Open	Import-export ratio per GDP of country i year t
Inflation	inf	Inflation rate of country i year t
Governance	CCICRG	Control of Corruption belonging to the ICRG index
	RLICRG	Rule of Law belonging to the ICRG index
	RQICRG	Regulatory Quality belonging to the ICRG index
	GEICRG	Government Effectiveness belonging to the ICRG index
	PVICRG	Political stability and Absence of Violence belonging to the ICRG index
	VAICRG	Voice and Accountability belonging to the ICRG index
	CCWGI	Control of Corruption belonging to the WGI index
	RLWGI	Rule of Law belonging to the WGI index
	RQWGI	Regulatory Quality belonging to the WGI index
	GEWGI	Government Effectiveness belongs to the WGI index
	PVWGI	Political stability and Absence of Violence belonging to the WGI index
	VAWGI	Voice and Accountability belonging to the WGI index

3.3. The Bayesian multilevel generalized linear model

The Bayesian approach takes into account a posterior model specification. The posterior model defines the probability distribution of all model parameters based on the data observed and some prior information. The posterior distribution takes the form of two parts: a likelihood function that provides information on model parameters based on observed data and prior knowledge (before observing data) on model parameters. Using the Bayes law, the probability and prior models are combined to produce the posterior distribution:

$$\text{Posterior distribution} \propto \text{Likelihood function} \times \text{Prior information}$$

Simulations are used for estimating the posterior distribution. MCMC sampling can be used to simulate potentially very complex posterior models with arbitrary precision. MCMC approaches for simulating Bayesian models are always challenging to define an efficient sampling algorithm and check the convergence of the algorithm to the optimal posterior distribution. Panel data were calculated using the generalized linear model of Bayesian multilevel:

For $Y = \{y_{ij}\}$, where $i = 1, 2, ..., k$ and $j = 1, 2, ..., n$, the generalized linear model of Bayesian multilevel can be written as follows:

$$y_{ij} = \alpha_i + \beta_i X + \varepsilon_{ij}, \tag{4}$$

where $X = (x_{ij1}, x_{ij2}, ..., x_{ijp})$, in which α_i and β_i are individual-specific intercept and slope, respectively, and ε_{ij} are the errors. The likelihood function is written as follows:

$$f(Y|\alpha_i, \beta_i, \delta^2, X) = \prod_{i=1}^{k}[\prod_{j=1}^{n_i} \frac{1}{\sqrt{2\pi\delta^2}}\exp\{-\frac{1}{2\delta^2}(y_{ij} - (\alpha_i + \beta_i x_{ij}))^2\}] = (\frac{1}{\sqrt{2\pi\delta^2}})^n \exp(-\frac{1}{2\delta^2}\sum_{i=1}^{k}\sum_{j=1}^{n_i}(y_{ij} - (\alpha_i + \beta_i x_{ij}))^2) \tag{5}$$

n addition to the likelihood, Prior distributions must be defined for all Bayesian model parameters. In a Bayesian model, prior distributions are known to be the main elements. Generally, priors are divided into two categories: informative (subjective) and noninformative (objective). In addition, vague priors are also known as non-informative priors. But they may also have a negative effect on the MCMC convergence. So, it is important to find and apply good priors in the model based on previous studies. In addition, good priors are also required to perform sensitivity analysis for competing priors. This study primarily focuses on the prior structure proposed by Fernandez, Ley, and Steel (2001), which conforms to the majority of the current literature (Steel, 2017). Fernandez, Ley, and Steel (2001) first applied a proper conjugate prior specification, but later on, they adopted Jeffreys-style noninformative priors for the common parameters α and δ^2. For the model-specific regression coefficients β_i, they proposed a g-prior specification (Zellner, 1986) for the covariance structure. In this study, we concentrate on a collection of eight standard candidate priors commonly mentioned in the research. Table 2 presents the sources of all eight priors. The selection criteria of g depend on the sample size n or the model dimension k.

Table 2
Parameters of the Prior Structures

Prior	Specification of g-prior	Comment	Source
1	$g = \frac{k}{n}$	Prior information rises with model regressors	Fernandez, Ley, & Steel (2001a)
2	$g = \sqrt{\frac{1}{n}}$	This is suggested by Fernandez, Ley, & Steel (2001a), where a smaller asymptotic penalty is chosen for larger models.	Fernandez, Ley, & Steel (2001a)
3	$g = \sqrt{\frac{k}{n}}$	This is suggested by Fernandez, Ley, & Steel (2001a) where Prior information rises with model regressors.	Fernandez, Ley, & Steel (2001a)
4	$g = \frac{1}{(\ln(n))^3}$	The Hannan-Quinn criterion.	Hannan-Quinn (1979)
5	$g = \frac{\ln(k+1)}{\ln(n)}$	Prior information reduces much slower with sample size and asymptotic convergence to the Hannan-Quinn criterion.	Hannan-Quinn (1979)
6	$g = \frac{\delta\gamma^{\frac{1}{k}}}{1 - \delta\gamma^{\frac{1}{k}}}$	Fernandez, Ley, & Steel (2001a) suggest the values of $\gamma = 0.65$ and $\delta = 0.15$	Laud and Ibrahim (1996)
7	$g = \frac{1}{k^2}$	This prior is suggested by the risk inflation criterion (RIC).	Foster and George (1994)
8	$g = \frac{1}{n}$	Similar to the Unit Information Prior.	Fernandez, Ley, & Steel (2001a)

In addition, we also assume that a prior distribution of interest parameter β has hyperparameters β_i for which a prior distribution is defined. We apply to the inverse-gamma hyperprior distribution. Specifically, β_i^h is a variance of a normal prior distribution of β with a mean μ_i; mean and variance are independent a priori:

$$\beta|\mu_i, \beta_i^h \sim N(\mu_i, \beta_i^h),$$
$$\beta_i^h \sim InvGamma(\alpha, \gamma),$$
$$\beta_i^h|\mu_i, \beta \sim F_i = InvGamma\left(\alpha + 0.5, \gamma + \frac{(\beta - \mu)^2}{2}\right), \tag{6}$$

where α and γ are the prior shape and prior scale, respectively, of an inverse-gamma hyperprior distribution for β_i^h. Gibbs sampling algorithm is used to simulate the required distributions, and the results were examined under the MCMC estimation method. In this paper, instead of random-walk MH sampling, we use Gibbs sampling since a set of parameters β_i has a prior conjugate, or more precisely, a semiconjugate prior, with respect to the respective likelihood distribution for this set.

3.4. Data

To shed light our objective, we use 43 Asian countries during the period from 2004 to 2016. This period was selected for many reasons. First, this period ensures that these 43 countries can provide enough data to conduct research. Second, this period includes the period before the global economic crisis (2004–2007), the crisis period (2008–2009), and the period after the crisis (2010–2016). Therefore, the impact of governance on economic growth can be comprehensively analyzed during an economic cycle in 43 Asian countries. The research database includes secondary data collected from reliable sources. The measurement data of GDP per capita, investment on GDP, trade openness, inflation, and human capital are taken from the World Economic Outlook (WEO) of the International Monetary Fund (IMF) and the World Development Indicators (WDI) of the World Bank for 43 Asian countries in the period from 2004 to 2016. Generally, governance data are collected from reliable sources. The Worldwide Governance Indicators (WGI) of 43 Asian countries for the period from 2004 to 2016 were taken from the World Bank data. The International Country Risk Guide (ICRG) of 43 Asian countries for the period from 2004 to 2016 was taken from the political risk services (PRS).

4. Results

EFA is used for identifying the representative factors for governance. The results are shown in Table 3. We find that all observed variables had a factor loading of greater than 0.55. Three factors are extracted for representing the original 12 observed variables.

(i) Factor 1 includes the following observed variables: VAWGI, GEWGI, RLWGI, RQWGI, and CCWGI. This factor is called WGI. (ii) Factor 2 includes the following observed variables: VAICRG, GEICRG, RLICRG, RQICRG, and CCICRG. This factor is called ICRG. (iii) Factor 3 includes the following observed variables: PVICRG and PVWGI. This factor is called PV.

Table 3
Rotated Component Matrix

	Factors		
	1	2	3
VAWGI	0.860		
GEWGI	0.825		
RLWGI	0.814		
RQWGI	0.784		
CCWGI	0.766		
GEICRG		0.853	
VAICRG		0.797	
CCICRG		0.774	
RLICRG		0.707	
RQICRG		0.683	
PVICRG			0.775
PVWGI			0.748

The values of these three factors WGI, ICRG, and PV are determined by calculating the average of the component observed variables. Next, we estimate the models by using the Bayesian multilevel generalized linear method. Table 4 presents the results. The prior distribution is selected via log(ML). Specifically, Table 4 shows that Inverse-gamma hyperprior distribution was chosen because of the largest log(ML) value.
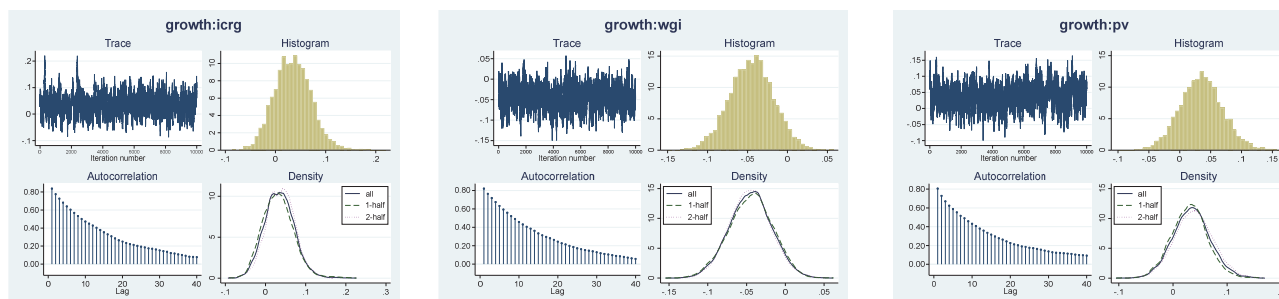
Table 4
Prior selection results

Variable	Prior1	Prior2	Prior3	Prior4	Prior5	Prior6	Prior7	Prior8	Inverse-gamma hyperprior
ICRG	685.7087	686.8115	686.6958	703.8014	687.3990	684.7296	686.3268	686.0595	704.1531
WGI	685.8363	693.0807	685.6749	689.5768	689.7352	685.7161	690.8170	692.6335	693.1731
PV	694.5903	687.9763	684.6645	689.6984	683.1018	689.5460	688.2489	682.8007	694.9503

The impact of governance on economic growth is estimated by using each of the factors that represent governance. In Table 5, the estimation results are presented. The variables applied in the model and the corresponding statistical values are presented in Table 5. For the analysis of results, only four columns of the data table are taken into consideration: posterior mean of coefficient (first column), posterior standard deviation of the regression coefficient (second column), standard error estimate of the posterior mean (third column), and posterior median of the posterior distribution (fourth column). The posterior means of ICRG, WGI, and PV are estimated to be 0.0347535, −0.0449493, and 0.0347226, respectfully. This demonstrates that most of the variables that represent governance exhibit a positive impact on economic growth.

Table 5

The impact of governance on economic growth

Governance	Variables	Mean	Std. Dev.	MCSE	MEDIAN	FIXED-EFFECTS MODEL
ICRG	lngdp	.0006225	.0019371	.000115	.000631	.0063176
	inf	-.0425524	.0422217	.000991	-.0420954	-.1000428
	inv	.0506686	.0343853	.00145	.0507695	.0707805
	L	-.0327628	.0498057	.003177	-.0310671	-.6210359
	open	-.0077671	.00835	.000409	-.0080605	-.0138445
	icrg	.0347535	.0371051	.001983	.0341151	.0960786
	_cons	.0159524	.0349733	.001873	.0158067	.1889865
	RE_cons	.0021253	.036918	.001322	.0032136	
	RE_var	.0085331	.0071977	.000344	.0062457	
	id U0:sigma2	.00153	.0004103	.000013	.0014685	
	e.growth sigma2	.0030364	.0002016	2.4e–06	.0030279	
	Acceptance rate	.6953				
WGI	lngdp	.0001131	.0021018	.000135	-.0041745	.0092185
	inf	-.0556238	.0419291	.000898	-.1387857	-.114937
	inv	.0492654	.0337699	.00138	-.0170588	.0810005
	l	-.0032301	.0465623	.002212	-.0945624	-.5915605
	open	-.002074	.0081635	.000343	-.0180526	-.0100086
	wgi	-.0449493	.0275218	.001564	-.0998417	-.1311857
	_cons	.0436605	.0332076	.002043	-.0173661	.2448803
	RE_cons	-.0003467	.0351847	.001048	-.0707175	
	RE_var	.0089729	.0091473	.000796	.0022429	
	id U0:sigma2	.0014131	.0003831	.000011	.0008427	
	e.growth sigma2	.0030357	.0001976	2.4e–06	.0026731	
	Acceptance rate	.7027				
PV	lngdp	.0005945	.0021063	.000162	-.0034586	.0063103
	inf	-.0419395	.0424182	.001029	-.1261308	-.1044501
	inv	.0555296	.0344567	.001456	-.0103926	.068927
	l	-.0450215	.0517609	.002652	-.1516334	-.572743
	open	-.0084089	.0086823	.000413	-.0259881	-.0090436
	pv	.0347226	.034646	.002249	-.0326856	.13937
	_cons	.0231161	.0330737	.002173	-.0420193	.1451476
	RE_cons	.0033096	.0385279	.001218	-.0744416	
	RE_var	.0096999	.014541	.001609	.0022345	
	id U0:sigma2	.001621	.0004492	.000015	.0009546	
	e.growth sigma2	.0030201	.0002139	2.8e–06	.0026486	
	Acceptance rate	.6903				

The standard error estimates of the posterior means (MCSEs) are found to be low, which suggests that MCMC may converge. The posterior means and medians of ICRG, WGI, and PV are close to each other, which suggests that the posterior distributions for ICRG, WGI, and PV may be symmetric. In terms of defining an effective sampling algorithm and checking the convergence of the algorithm to the optimal posterior distribution, MCMC methods for simulating Bayesian models are often challenging. So we are testing the convergence of the MCMC. The findings are shown in Fig. 1.

Fig. 1. The MCMC convergence

We make trace plots, which map simulated parameter values against the number of iteration and connect consecutive values with a graph. The range of the parameter is easily traversed by the use of the MCMC chain for a well-mixing parameter; as a result the drawn lines appear almost vertical and thick. It is concluded that sparseness and patterns in a parameter's trace plot indicate problems with convergence. The trace plots for the coefficients of ICRG, WGI, and PV appear almost vertical, dense, and no trend is observed and thus indicating the convergence of MCMC. As the second graphical summary, an autocorrelation plot is demonstrated. This plot demonstrates the degree of autocorrelation in an MCMC sample for a range of lags, which start from lag 0. Moreover, it is observed that the autocorrelation plots for the coefficients of ICRG, WGI, and PV tend to 0 after some lags, which suggests a well-mixing MCMC chain. In addition, the histograms for the coefficients of ICRG, WGI, and PV are found to be in good agreement with the normal distribution. The Kernel density plots show the three density curves close to each other, which indicates that the MCMC samples have converged and mixed well. Besides, Table 5 also shows that the results of Bayesian models are not different from the fixed-effects model. This implies that the results are robust. Next, the probability of the coefficients of ICRG, WGI, and PV being positive is determined. The results are presented in Table 6.

Table 6
The probability of the coefficients being positive

Variable	Mean	Std. Dev.	MCSE
ICRG	.8272	0.37809	.0157599
WGI	.0507	0.21940	.0070585
PV	.8423	0.36448	.0132095

Table 6 shows that the probability of greater than 0 of regression coefficients is 82.72% and 84.23% corresponding to ICRG and PV, respectively. The regression coefficient has a probability of greater than 0 at a low level of 5.07% corresponding to WGI. This indicates that increasing the quality of governance exhibits a positive impact on economic growth. Finally, this study examines whether there is a relationship between growth and ICRG, WGI, and PV. For this analysis, the following five models are considered: the mean-only model, the model with ICRG only, the model with WGI only, the model with PV only, and the full model with both covariates. In a frequent setting, the above five models correspond to the following hypotheses: H_0: $\beta_1 = \beta_2 = \beta_3 = 0$, H_0: $\beta_2 = \beta_3 = 0$, H_0: $\beta_1 = \beta_3 = 0$, H_0: $\beta_1 = \beta_2 = 0$, where $\beta_1, \beta_2, \beta_3$ are the regression coefficients of ICRG, WGI, and PV, respectively. In a Bayesian analysis, point hypotheses for parameters with continuous distributions cannot be formulated. However, probabilities of how likely each of the five models provided the observed data are computed. The computed posterior probabilities of the five models are presented in Table 7.

Table 7
Posterior probabilities of the five models

Model	log (ML)	P (M)	P (My)
mean	682.9526	0.2000	0.0407
icrg	685.0117	0.2000	0.3193
wgi	684.8288	0.2000	0.2660
pv	685.0511	0.2000	0.3322
full	682.9765	0.2000	0.0417

The mean-only model and full models are somewhat similar to the respective posterior probabilities of 0.0407 and 0.047. The ICRG and PV models exhibit a higher probability of occurrence as compared to other models with the respective posterior probabilities of 0.3193 and 0.3322. Finally, this result once again confirms the positive impact of governance on the economic growth in Asian countries.

5. Policy Implications

The results also show factors, such as represent voice and accountability, government effectiveness, regulatory quality, rule of law, control of corruption, which exhibit a positive impact on economic growth. Therefore, economic growth may be boosted by improving these factors. Therefore, Asian governments require to implement the following rules:
In terms of voice and accountability, lack of voice and accountability will increase poverty and corruption, negatively in the administrative apparatus in particular and in society in general. Raising the voice and accountability will create transparency and increase the efficiency of the government in carrying out its duties. To do this, governments need to require to be aware of the meaning of implementing due diligence. In addition, officials require to show the attitude of serving people. Besides, the government needs to improve the efficiency of operations, ensure fairness in the provision of public services, and improve the responsibilities of state officials. Also, ensure the implementation of social security in parallel with economic development. Governments need to detect and eradicate bureaucracy in the public administration to make the administrative apparatus work better. The decisions being rapidly made will attract a lot of domestic and foreign investment. Moreover, consistency in policies and highly predictable policies will create confidence for businesses, as well as investors. In addition, to improve Regulatory Quality and Rule of Law, it is necessary to improve the quality of legal dissemination and education for all classes of residents, by creating a remarkable change in legal awareness and law enforcement acts. For controlling corruption, governments require to develop codes of conduct and codes of ethics and to change the positions of officials.

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