Governance quality and economic growth: Panel evidence and difference-in-difference analysis of the Asian financial crisis

ORCID Genie Cyprien[1+]
ORCID Muhamad Iksan[2]

[1]Department of Political Science, National Cheng Kung University, Tainan, Taiwan.
[1]Email: cypriengenie@yahoo.com
[2]Department of Management, Faculty of Economics and Business, Paramadina University, Jakarta, Indonesia.
[2]Email: muhamad.ikhsan@paramadina.ac.id

(+ Corresponding author)

ABSTRACT

This research investigates the influence of variations in governance quality on economic growth in Asia-Pacific nations. The study underscores that crises, despite their disruptive nature, can act as accelerators for policy enhancement and institutional fortification. To examine this, the analysis considers crisis times as a quasi-natural experiment and uses a difference-in-differences design, facilitating causal inference by analyzing variations in the variable of interest while keeping other pertinent components relatively stable. Panel data methods are applied to data from 1996 to 2006 across several countries, using pooled OLS, fixed effects, random effects, and a difference-in-differences framework to assess the causal effects. The findings suggest that not all governance indicators significantly influence real GDP growth. Instead, two macroeconomic variables, inflation and the previous year's growth, are identified as primary determinants, with a one-point increase in inflation correlating with a 0.315-point decrease in economic growth, statistically significant at the 1 percent level. The study also shows how financial crises may be disruptive, slowing economic growth during crisis years and creating volatility in post-crisis periods. Practical implications of these results indicate that policymakers and stakeholders must emphasize strengthening governance frameworks and maintaining stable inflation rates to foster long-term economic stability and sustainable growth while promoting institutional resilience.

Contribution/ Originality: This paper demonstrates that crisis years can serve as natural or quasi-experiments for explaining post-crisis economic changes. Our findings show that inflation and previous growth rates consistently explain variations in annual economic growth across the sample. Conversely, governance indicators do not provide statistical evidence that they account for the changes in growth among the examined East Asian and Southeast Asian economies.

1. INTRODUCTION

The Asian Financial Crisis (AFC), or the Asian contagion of 1997-1999, was a regional crisis affecting several East and Southeast Asian countries. Before the crisis, many of these Asian economies experienced exceptional growth. From 1990 to 1996, Malaysia, Thailand, and Singapore saw their annual exports grow at impressive rates (World Trade Organization, 1997). The crisis started with the depreciation of the Thai baht. It quickly spread, and countries like Indonesia, the Philippines, South Korea, and Malaysia faced financial sector problems and shrinking economies (Berg, 1999; Garnaut & McLeod, 2002; Krugman, 1994; World Bank, 1993). Once the financial crisis passed,

Southeast Asia began an economic recovery. Data from thirteen East Asian, Southeast Asian, and Australian nations between 1996 and 2006 is used to explain the trends. Figure 1 compares annual growth trends over time by nation. Figure 2 offers a more comprehensive view of annual growth and time.
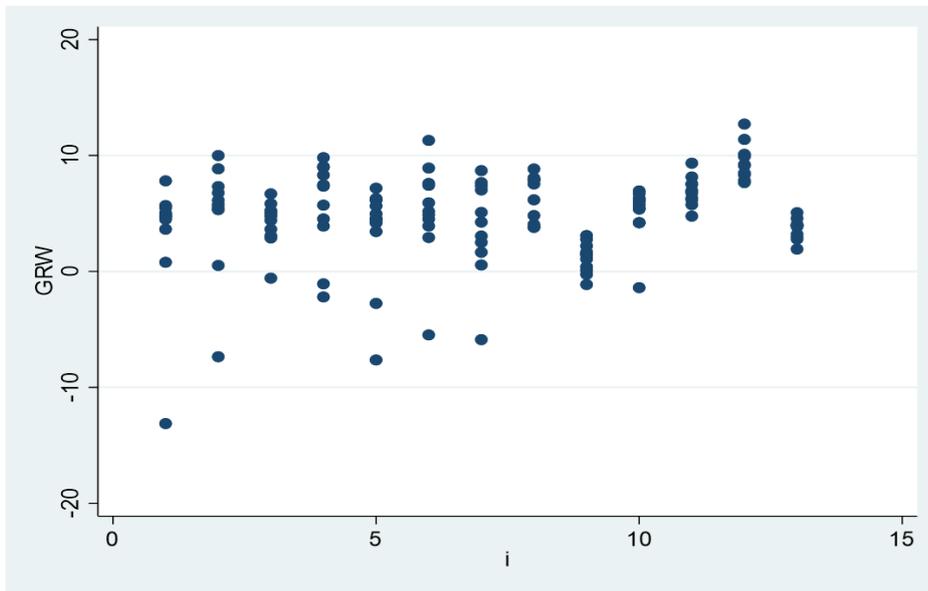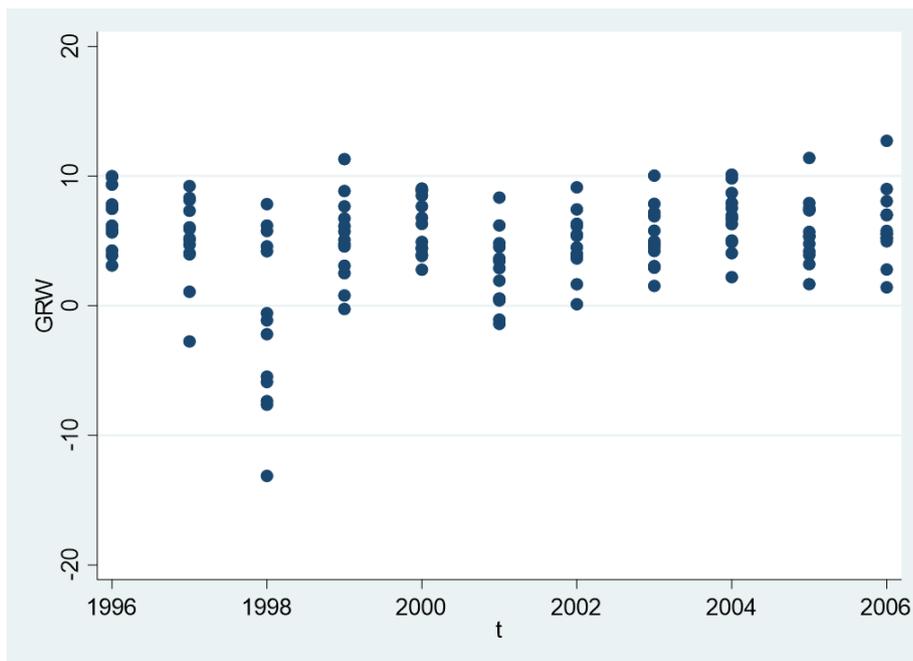

Figure 1. Annual growth and Country-ID.

Figure 2. Annual growth and time (1996-2006).

Previous studies have contributed significantly to providing scholars, policymakers, and broader audiences with a rationale for understanding the causes and consequences of the AFC. The actual causes remain unknown. For instance, Corsetti, Pesenti, and Roubini (1999) highlighted two main ideas post-crisis: The regional crisis emerged as a consequence of sudden shifts in market perception and investor confidence, whereas another explanation pointed to a mix of economic recession, policy lapses, and inadequate financial markets within the countries.

While there is literature explaining how the AFC came into existence and unfolded, few studies have used it as a natural experiment. There have not been studies employing an empirical design that would control the effect of the

crisis on the economy. The AFC acts as a randomized trial, where one variable (the economy's growth) is varied, and all others are held constant (Angrist & Pischke, 2009). Thus, there is a greater appeal to a causal relationship without the worries of endogeneity or omitted-variable bias. Furthermore, the crisis also revealed a greater need for better governance within these nations and more nuanced institutional frameworks to lessen the vulnerabilities and to respond better to external crises.

Thus, this paper aims to understand the relationship between economic growth and governance. More specifically, it aims to answer three basic questions: How do past economic growth and inflation affect a nation's future annual growth? How does government performance affect a country's future growth? And finally, what are the effects of years of crises on annual growth when disaggregating the years into pre-/post-crisis years? In answering these questions, the study hopes to give a picture of how governance, measured by real indicators, affects economic results. The article breaks down the topic into several sections. The intro sets out the main issues and background. The literature review presents a structure for understanding the topic and empirical studies that relate to economic growth and governance. Then follows the model for measuring and assessing variables in the research methods section of the paper. Finally, the paper discusses the empirical results of the analysis and the conclusion.

2. LITERATURE REVIEW

Economic growth refers to the gradual increase in a nation's economic output, typically measured by annual percentage changes in real GDP or gross national product. It includes not only favorable economic indicators but also improved quality of life for citizens, such as good health, education, and overall well-being (Agere, 2000; Kaufmann & Kraay, 2002). Taiwan, Singapore, Japan, South Korea, and Hong Kong are good examples of countries that have experienced significant economic development in the past century.

While these countries have experienced substantial economic progress, a large majority of countries in sub-Saharan Africa are considered growth nightmares. They fail to sustain economic expansion and rising living standards. Therefore, when the issue of economic growth arises, it begs the question: What causes economic growth? What drives economic growth in different regions across the globe? If economic growth moves in cycles, will the current drivers support growth in the future? Scholars and economists have put a foundational framework in place to give satisfactory explanations for those questions.

Within the World Bank's framework, governance is operationalized through six Worldwide Governance Indicators (WGI). Based on data from Transparency International's Corruption Perceptions Index (CPI) and the World Bank's Control of Corruption Index (CCI), Shadabi and Adkisson (2021) investigated the level of corruption in countries relative to their natural resources' endowments. They showed that natural resource wealth alone does not significantly influence corruption levels. Key predictors of lower corruption included higher GDP per capita, higher government spending, more business freedom, and political stability.

Chapsa and Katrakilidis (2022) examined how corruption affects economic growth in the European Union (EU)-15 countries and tested the extent to which governance quality moderated this relationship. Dynamic panel techniques and the system-GMM estimator were employed to analyze data from 2002 to 2013. They measured corruption using two indices (CPI and CCI) and three governance measures and found that, in general, corruption hinders growth; however, the magnitude and direction of this effect depend on governance quality. Aikins (2009) argued that you only get a stable financial environment when economic policies and legal regulations are functional. If these aren't in place, a country's economy can just keep falling into crisis after crisis. Transparency, accountability, and the existence of strong institutions build confidence, attract investment, and enable a country to effectively manage and recover from an economic crisis.

Within the new institutional economic framework, economic growth depends on a wide range of factors (Gani, 2011; Jalilian, Kirkpatrick, & Parker, 2007). Early contributions by Olson (1982) and Choi (1983) started examining the differences in institutional structures that explain divergent growth paths across countries. North (1990) argued

that institutions reduce uncertainty. He explained that when a society is missing strong institutions, transactions cost more and carry more risks. Another major advancement came from Acemoglu, Johnson, and Robinson (2001), who used instrumental variable strategies to study the link between institutions and economic growth in colonial history. They used settler mortality as an instrument for institutional quality. High settler mortality discouraged permanent European settlement. Thus, instead of building long-term inclusive institutions, they often created extractive institutions.

Several other studies report weak, statistically insignificant relationships between economic growth and governance, despite theories and empirical evidence. For instance, Wilson (2016) used a panel data methodology to study the governance-growth nexus for provinces in China from 1995 to 2005 and found that governance as a variable had little explanatory power for China's growth. Hence, in countries where institutional enforcement is weak, progress in governance indicators may not lead to economic benefits. Moreover, a panel data setting on Arab countries looked at governance, human capital, and investment (Abdelbary & Benhin, 2019). Their result did not show a clear link between governance indicators and economic growth, but human capital and investment did have a positive connection.

3. THEORETICAL FOUNDATION

To operationalize the relationship between economic growth and governance, we use the WGI framework. Basically, good governance is expected to foster economic development. According to Olson, Sarna, and Swamy (2000), numerous low-growth, underdeveloped countries are now growing closer to the levels of developed-country GDP per capita due to differences in governance quality.

Gani (2011) studied governance and economic growth in developing countries through a meta-analysis of over 80 low-income nations. There is a strong positive relationship between political stability and government efficiency that fosters growth, while opposing values such as corruption, weak voice, and poor accountability hinder growth. Good governance is a key determinant of economic growth.

Afolabi (2019) analyzes the influence of governance on sustainable development in West Africa from 2002 to 2016. The system GMM approach is employed, utilizing all six governance indicators: voice and accountability, political stability, government effectiveness, regulatory quality, rule of law, and control of corruption. Findings indicate that voice and accountability, political stability, government effectiveness, and rule of law are positively correlated with development and government effectiveness. In contrast, regulatory quality and control of corruption have an indirect relationship with development in the short term. In the long term, all governance variables are directly correlated with growth in West African nations, with political stability and regulatory quality exerting the most significant influence.

Panel co-integration was used by Singh (2019), and a long-run relationship was found between growth and governance across countries. Governance supports higher growth levels. Higher growth levels supported efficient governance. The 2022 study by Kesar and Jena (2022) used the autoregressive distributed lag model to conclude that from 2002 to 2018, political stability correlated positively with economic growth among BRICS (Brazil, Russia, India, China, and South Africa) countries.

In addition, they found a U-shaped relationship between corruption and growth, meaning that while corruption helps to grow at some point, it negatively impacts growth. From the literature review, it appears that a lack of governance and institutional frameworks stifled productivity activity since they undermine the factors needed for sustainable economic growth.

4. DATA AND EMPIRICAL METHODOLOGY

The third part discusses data, methodology, and models in detail. The first purpose of our analysis is to explain the interplay between previous economic growths as well as the influence of inflation on a country's prospective

economic growth. The second research aim is to find causal inference on how past economic performance and governance influence a country's future growth. To operationalize these two research interests, our study then proposes the first and second hypotheses as follows:

Hypothesis 1: The higher growth rate in real domestic product is positively correlated with the previous growth rate, negatively associated with inflation, and positively (negatively) associated with governance indicators (Null hypothesis).

$$GRW_{it} = \beta_0 + \beta_1 PGRW_{it-1} + \beta_2 INF + \beta_3 VOA + \beta_4 PSV + \beta_5 GOE + \beta_6 REG + \beta_7 ROL + \beta_8 COC + \epsilon \quad (1)$$

Hypothesis 2: The higher growth rate in real domestic product is positively correlated with the previous growth rate, negatively associated with inflation, and positively (negatively) associated with the six governance indicators; year of crisis is irrelevant (null hypothesis).

$$Y_{it} = \beta_0 + \beta_1 X1_{it-1} + \beta_2 X2 + \beta_3 Z + \beta_3 D1 + \epsilon \quad (2)$$

Dy= Dummy year (1: Crisis and 0: not crisis).

Additionally, operationalizing the third research question, the third hypothesis argues to capture the trouble economies as a control variable as follows.

Hypothesis 3: There is no difference in economic growth before and after the crisis, controlling for other variables constant (Null hypothesis).

The econometric model used to explain and address the third research question is:

$$Y_{it} = \beta_0 + \beta_1 X1_{it-1} + \beta_2 X2 + \beta_3 Z + \beta_3 D2 + \epsilon \quad (3)$$

$Y_{it} = GRW_{it}$ = Growth rate in real gross domestic product term for country i, year t.

$X1 = PGRW1_{it-1}$ = GDP growth for country i, year $t-1$, previous year indicated by previous study.

$X2$ =INF = Inflation rate (GDP deflator).

Z = VOA, PSV, GOE, REG, ROL, COC.

Dy = Dummy year (1: Crisis and 0: not crisis).

ϵ = Error term.

4.1. Data Sets and Measurement of Variables

According to Table 1, thirteen countries were selected with a panel data estimation approach during eleven years of time series data (1996 to 2006). Raw data is available on request. The independent variables come from the WGI.

Table 1. List of countries.

Number	Country
1	Indonesia
2	India
3	Japan
4	Malaysia
5	Philippines
6	Singapore
7	Thailand
8	Taiwan
9	Vietnam
10	South Korea
11	Hong Kong
12	China
13	Australia

Table 2 summarizes the characteristics of the variables selected for this research, along with their definitions and sources. The WGI indicators reflect a country's governance quality on an annual basis across six areas (Alfano, Capasso, & Filoso, 2020). The study has a total of 143 panel data observations based on eleven years of data from 1996 to 2006 across 13 countries.

Table 2. Measurement for each variable.

Variable(s) (Abbreviation)	Measurement
Growth (GRW)	Real growth of gross domestic product (annual %)
Previous growth (PGRW)	Previous growth of GDP (percentage)
Inflation (INF)	Inflation, GDP deflator (annual %)
Voice and accountability (VOA)	The degree of citizen participation in governmental selection processes encompasses freedoms of expression, association, and access to media.
Political stability and absence of Violence/Terrorism (PSV)	The risk of political instability and politically driven violence, encompassing terrorism.
Government Effectiveness (GOE)	The degree of civil service independence from political influence, in relation to the quality of public service delivery, policy formulation, and implementation.
Regulatory Quality (REG)	Perceptions of the government's capacity to create and enforce policies and regulatory measures designed to foster private sector growth.
Rule of Law (ROL)	The degree of public confidence in and compliance with legal and institutional rules, specifically the quality of contract enforcement, property rights protection, police and judicial effectiveness, and the incidence of crime and violence.
Control of Corruption (COC)	The misuse of public power for personal gain and the level of influence or control that elites and private interests have over state institutions.
Dummy Year	1: Crisis 0: Not crisis Dummy variables typically assume values of 1 or 0, where 1 signifies the presence of a particular attribute, and 0 denotes its absence.

4.2. Model Specification

To explain the first and second questions, we use pooled ordinary least squares regression, fixed-effects models, and random-effects models to analyze panel data and investigate causality between economic growth and governance.

4.3. Pooled Ordinary Least Squares (Pooled OLS) Regression Model

The analysis begins by estimating the time series data using the POLS method. This model assumes that the relationship between variables is uniform across all entities (countries) and over time. It does not account for differences in behavior among entities, nor does it consider potential changes in behavior over time. The pooled OLS model treats all entities as homogeneous and does not allow for measuring individual heterogeneity.

$$Yit = \alpha i + \theta Yit - h + \lambda t + \delta uit + Xit' \beta + \varepsilon it \quad (4)$$

4.4. Fixed-Effect (FE) Model Estimation

Fixed-effects models examine the association between predictor and outcome variables within an individual entity. These statistical procedures are specifically designed to address the endogeneity problem and enable conditional inferences (Hedges & Pigott, 2001). The model assumes that intrinsic factors of the agent entity could affect or mislead the predictor and the dependent variables.

$$Yit = Xit \beta + ci + uit \; t = 1, \dots t \quad (5)$$

Where X_{it} comprises observable variables that change across t but remain constant across j variables, variables that differ across i but are constant over t, and variables that vary both across it and over t.

4.5. Random-Effect (RE) Model Estimation

The random-effects (RE) model differs from the FE model in its treatment of variability across entities. In this model, the real effects are considered to follow a normal distribution or to vary randomly.

$$C_{it} = \beta_{1i} + \beta_2 Q_{it} + \beta_3 PF_{it} + \beta_4 LF_{it} + u_{it} \quad (6)$$

Rather than assuming β_{1i} as fixed, the research infers that it functions as a random variable with an expected value of β_1. That is, $\beta_{1i}=\beta_1+\epsilon_i$. Thus, Equation 1 can be reformulated as the following RE model:

$$C_{it} = \beta_1 + \beta_2 Q_{it} + \beta_3 PF_{it} + \beta_4 LF_{it} + w_{it} \quad (7)$$

Where $w_{it} = \epsilon_i + u_{it}$

The combined error term w_{it} consists of two elements: ϵi, which represents the cross-sectional error component, and uit, which accounts for the combined time-series and cross-sectional error components. The common intercept

(β_1) represents the mean value of all the cross-sectional intercepts, while the error component ϵ_i captures the random deviation of individual intercepts from this mean value.

4.6. Breusch-Pagan Lagrange Multiplier Test

To test random effects versus common effects (Pooled OLS), a Lagrange Multiplier (LM) test can be conducted. For the LM test, the null hypothesis is that the variance between cross-sectional units is equal to zero. If the null is rejected, it indicates that heterogeneity can be explained by random effects. If the p-value is significant (<0.05), Ho is rejected, and the RE is appropriate. However, if the p-value is not significant (>0.05), Ho is not rejected, therefore POLS is sufficient.

4.7. Hausman Test

This test is used to evaluate the consistency of an estimator.

$$H = (b1 - b0)\,'(Var(b0) - Var(b1))t\ (b1 - b0)$$

Where:

b is the OLS estimate.

b is the IV estimate.

$Var\ (b_1)$ and $Var\ (b_0)$ are the variance-covariance matrices of the OLS and IV estimates, respectively.

An important note: the Breusch-Pagan LM test as well as the Hausman test are provided in Appendix 1.

4.8. Difference-In-Difference (DID) Estimation

Lastly, we employed the Difference-in-Difference (DID) model specification and the estimation outlined by Angrist and Pischke (2009). The DID approach is based on an additive structure of potential outcomes without treatment and the parallel trend assumption. Let D_{it} be a dummy for a country with an economic crisis during the period t. Then,

$$E(s,t) = Y_s + \lambda_t \qquad (8)$$

We assume $E\ (c,t)$ is constant, denoted by δ, observed inflation $\pi_{it,}$ and economic growth $Y_{it,}$ which can be expressed.

$$Y_{it} = \gamma_c + \lambda_t + \delta\, D_{ct} + \epsilon_{it} \quad (9)$$

Where $E\ (c,t)$ =0. From here, we got.

$$E[(c = THA, t = 2000)] - E[(c = THA, t = 1999)]$$
$$= \lambda_{2000} - \lambda_{1999}$$

THA or Thailand, as an example.

$$E[(c = JPN, t = 2000)] - E[(c = JPN, t = 1999)]$$
$$= \lambda_{2000} - \lambda_{1999} + \delta$$

JPN or Japan as an example.

C = country treatment under the assumption that 2000 is not a crisis year, and 1999 is a crisis year. This study is designed to use an economic crisis as the treatment variable for two groups of countries. Accordingly, the first group serves as the treatment group, while the second group functions as the control group.

5. EMPIRICAL FINDINGS

Table 3 reports a summary description of the study variables and indicators, such as the number of observations, mean, standard deviation, minimum, and maximum.

Table 3. Descriptive statistics.

Variables	Mean	Std. dev.	Min.	Max.
Country = i	7	3.755	1	13
GRW	4.851	3.775	-13.127	12.719
PGRW	4.927	3.811	-13.127	11.396
INF	3.688	6.020	-6	58
VOA	0.107	0.841	-1.749	1.507
PSV	0.154	0.946	-2.095	1.396
GOE	0.615	0.829	-0.705	2.212
REG	0.540	0.869	-0.796	2.231
ROL	0.491	0.809	-0.914	1.882
COC	0.407	1.004	-1.176	2.326

The descriptive statistics above relate to the key variables of international economic performance and institutional quality as tested through the study. The sample represents thirteen countries (variable) with a mean of 7, suggesting a median country-size sample with extended representativeness across nations. The economic growth rate (GRW) averages 4.85 percent with a high standard deviation (SD=3.78), indicating significant differences in growth levels, with minimum and maximum values of -13.13 to 12.72 percent. The per capita growth rate is identical (4.93 percent) with a standard deviation of 3.81. The minimum and maximum values are -13.13 and 11.40.

With an overall mean of 3.69 percent, the inflation rate (INF) for macroeconomic stability is fairly disparate (SD = 6.02). This means that the average percent change for relative price stability in these nations varies from -6 to 58. Mean averages for governance indicators in six institutional variables are: Voice and Accountability (VOA = 0.11), Political Stability and Absence of Violence (PSV = 0.15), Government Effectiveness (GOE = 0.62), Regulatory Quality (REG = 0.54), Rule of Law (ROL = 0.49), and Control of Corruption (COC = 0.41), which show slight positivity in mean (STDEV = 0.81–1.00).

5.1. First Panel Regression

For the first panel regression, we present Table 4 to explain the results for economic growth (dependent variable), which are driven by previous growth, inflation, voice and accountability, political stability, and absence of violence/terrorism, government effectiveness, regulatory quality, rule of law, and control of corruption. Each table below presents the results from pooled OLS, fixed, and random effects techniques, with the number of observations, R-squared, Hausman test. The results show that PGRW is positively and significantly related to growth in both the pooled OLS and random-effects models. The fixed-effect model shows an insignificant coefficient, indicating that country-level changes in per capita growth do not strongly explain short-run changes in aggregate growth. Conversely, inflation (INF) has a negative and significant effect in all models. Such findings imply that inflation impacts growth negatively, which aligns with the classical macroeconomic assumption that price instability is detrimental to investment and consumption choices (Barro, 1997). On the other hand, governance and institutional indicators are not found to have statistically significant effects on growth across any of the models. The fixed-effect model shows positive coefficients for VOA, GOE, REG, and ROL, but they are not statistically significant. It implies that, in the short run, these factors are also subject to change depending on institutions and do not impact growth. Negative coefficients for VOA and REG in the pooled and random models may indicate potential inefficiencies associated with transitional costs of institutional reforms in certain developing economies.

Our findings on governance quality with institutional variables do not align with the strand of literature on governance and growth (Afolabi, 2019; Gani, 2011; Olson et al., 2000; Sima & Huang, 2023). This research shows that economic growth rises when political stability and government effectiveness improve and when corruption declines, alongside stronger measures of voice and accountability. However, our article revealed that some governance variables are insignificant in growth regressions. We think it is due to the quality of the institutions being constant

while economic growth changes in response to external shocks. Governance typically influences growth indirectly through investment, productivity, and human capital rather than exerting an immediate effect.

Table 4. Impact of governance quality on economic growth.

Variables	Pooled	Fixed	Random
PGRW	0.212**	0.0833	0.212**
	(2.83)	(1.08)	(2.83)
INF	-0.303***	-0.315***	-0.303***
	(-5.88)	(-5.45)	(-5.88)
VOA	-1.322	1.363	-1.322
	(-1.66)	(0.74)	(-1.66)
PSV	-0.872	-0.802	-0.872
	(-1.41)	(-0.58)	(-1.41)
GOE	0.670	1.921	0.670
	(0.48)	(1.02)	(0.48)
REG	-1.363	0.827	-1.363
	(-1.28)	(0.45)	(-1.28)
ROL	0.321	2.080	0.321
	(0.17)	(0.74)	(0.17)
COC	0.368	-3.903	0.368
	(0.28)	(-1.20)	(0.28)
Cons	5.216***	4.522**	5.216***
	(7.06)	(3.06)	(7.06)
Number of obs.	143	143	143
R-squared	0.299	0.244	
Hausman Test Prob>Chi2		0.0025	

Note: t statistics in parentheses.
** p<0.01, *** p<0.001

5.2. Second Panel Regression

The second panel regression is reported in Table 5. It differs from Table 4. The result of economic growth is explained by previous growth, inflation, and WGI, with an additional control variable-year dummy.

Table 5. Impact of governance quality on economic growth with a dummy year.

Variables	Pooled	Fixed	Random
PGRW	0.131*	0.0222	0.131*
	(2.42)	(0.41)	(2.42)
INF	-0.154***	-0.147***	-0.154***
	(-3.94)	(-3.43)	(-3.94)
VOA	-1.768**	0.890	-1.768**
	(-3.09)	(0.70)	(-3.09)
PSV	-0.596	-0.397	-0.596
	(-1.34)	(-0.42)	(-1.34)
GOE	-0.453	-0.350	-0.453
	(-0.45)	(-0.26)	(-0.45)
REG	-0.243	0.694	-0.243
	(-0.31)	(0.54)	(-0.31)
ROL	1.437	2.810	1.437
	(1.05)	(1.45)	(1.05)
COC	-0.0379	-3.060	-0.0379
	(-0.04)	(-1.36)	(-0.04)
Dummy year	-8.103***	-7.943***	-8.103***
	(-11.27)	(-11.47)	(-11.27)
Cons	5.513***	5.681***	5.513***
	(10.38)	(5.51)	(10.38)
Number of obs.	143	143	143
R-squared	0.639	0.638	
Hausman Test Prob>Chi2		0.0046	

Note: t statistics in parentheses.
* p<0.05, ** p<0.01, *** p<0.001

The coefficient for per capita growth (PGRW) showed a positive and significant relationship in both pooled and random-effects estimations, but not in the fixed-effects model. This suggests that cross-country differences in income growth significantly contribute to variations in overall economic growth, while within-country changes over time

are less pronounced. This aligns with endogenous growth theory (Barro, 1997; Romer, 1986), which states that productivity and income improvements at the individual level promote economic expansion through human capital accumulation and technological spillover. However, inflation (INF) maintains a negative and statistically significant link to economic growth across specifications. This supports macroeconomic expectations that sustained inflation undermines price stability, increases uncertainty in investment forecasts, and reduces purchasing power.

Voice and Accountability (VOA) is the only governance indicator that produces statistical significance. Across the pooled and random effects models, the coefficient is negative and significant, which signals that greater political freedoms and citizen participation could, somewhat, diminish economic output in the short term. The remaining governance indicators are not statistically significant across estimations. Sure, the variables' coefficients follow the expected theoretical directions, but they are not enough to make a difference in growth in the short term. The real value of the quality of governance tends to unfold over the long run, not in the immediate future. We report dummy year, and all estimations (pooled, FE, and RE) result in a negative association between the crisis year and economic growth. This result indicates that when a country enters a crisis year, its economic growth also goes negative. While economic growth improved and entered positive territory, the crisis year has already passed.

The three empirical strategies applied (pooled OLS, FE, RE) yield econometric results that fail to reject H1, indicating a higher real GDP growth rate is positively correlated with the previous year's growth and negatively correlated with inflation. The models explain 29-34% of real GDP growth at best but fail to establish a significant link to economic growth, except for Voice and Accountability, suggesting that other variables play an essential role in influencing economic growth indirectly or over the long term.

These findings are consistent with Khan and Ssnhadji (2001); Gylfason and Herbertsson (2001); Gillman, Harris, and Mátyás (2004); Tung and Thanh (2015), and Barro (1997). Their studies consistently show that last year's growth predicts current economic output and that inflation has a negative effect. This suggests that many growth determinants are at play, and we require extensive practical testing to identify which ones have the greatest and most impactful influence. The econometric results indicate that, contrary to the null hypotheses, the year of crisis significantly affects real GDP growth. It emphasizes the critical role of external shocks, such as economic crises, even when governance indicators, inflation, and prior growth rates are considered.

5.3. Diagnostic Test Results

Table 6 reports a series of diagnostic test results that were run in the study.

Table 6. Diagnostic test results.

Test	Null Hypothesis	Model Regression (1)	Model Regression (2)	Decision
Modified Wald	Variance of the error term is homoskedasticity	2394.74	343.92	Reject the null hypothesis
Wooldridge Test for autocorrelation	No first-order autocorrelation in the errors	27.988	29.365	Reject the null hypothesis.
Pesaran CD	Cross-sectional independence	11.991	6.026	Reject the null hypothesis.
Jarque–Bera (JB)	Residuals are normally distributed	76.59	76.59	Reject the null hypothesis.

5.3.1 Interpretation of the Modified Wald Test

We use this test to assess if the error variance is constant across cross-sectional units in a fixed-effects panel regression.

Model regression (1)

- Null hypothesis (H_0): All groups have equal error variances.
- Test result: $\chi^2 (13) = 2394.74$, p-value = 0.0000.

Model regression (2)

- Null hypothesis (H_0): The error variance is equal across all groups (homoskedasticity).
- Test result: χ^2 (13) = 343.92 with a p-value = 0.0000.

It was found that the P-value is below the usual significance levels (1%, 5%, and 10%), and the null hypothesis is rejected in both models. There is strong evidence of group-wise heteroskedasticity in the fixed-effects model; the error variances are not constant across cross-sectional units.

5.3.2 Interpretation of the Wooldridge Test

This test examines first-order autocorrelation in the error terms of a panel data model.

Model regression (1)

- Null hypothesis (H_0): No first-order autocorrelation in the errors.
- Test result: F(1, 12) = 27.988, with p-value = 0.0002.

Model regression (2)

- Null hypothesis (H_0): No first-order autocorrelation in the error terms.
- Test result: F(1, 12) = 29.365, with p-value = 0.0002.

P-value is below conventional significance levels; the null hypothesis is rejected for both models.

5.3.3. Interpretation of Pesaran's CD Test

This test checks for cross-sectional independence in a panel data set.

Model regression (1)

- Null hypothesis (H_0): Cross-sectional independence (no correlation across units).
- Test result: CD statistic = 11.991, with p-value = 0.0000.

Model regression (2)

- Null hypothesis (H_0): Cross-sectional independence (no correlation across units).
- Test result: CD statistic = 6.026, with p-value = 0.0000.

If the p-value is lower than conventional significance thresholds, we reject the null hypothesis.

5. Difference-In-Difference (DID) Regression

Table 7 presents the results of the DID regression. The result shows the outcome variable, the standard error, and the probability. The coefficient of the 'Diff-in-Diff' variable represents the average treatment effect on the treated. This effect is statistically significant at the 5% level, indicating that the treatment has a negative impact.

Table 7. DID regression results.

Outcome variable	GRW	S.Err.	|t|	P>|t|
Before				
Control	1.914			
Treated	5.552			
Diff (T-C)	3.638	1.159	3.14	0.002***
After				
Control	5.219			
Treated	5.444			
Diff (T-C)	0.225	0.710	0.32	0.752
Diff-in-Diff	–3.413	1.359	2.51	0.013**

Note: R-square: 0.11
**Inference: ***p<0.01; **p<0.05;

Before the crisis (1996-1997), the treated group, troubled economies, exhibited a substantially higher average growth rate (5.552) compared to the control group, which was not troubled economies (1.914). The pre-treatment

difference of 3.638 demonstrates statistical significance (t = 3.14, p = 0.002), indicating that the treated group initially experienced stronger economic performance. The estimated DID coefficient, which measures the average treatment effect on the treated (ATT), is 3.413 with a standard error of 1.359. The parameter estimate shows statistical significance at 5% level (t = 2.51, p = 0.013**).

The negative and significant DID coefficient is associated with a short-term decline in economic performance. From an econometric standpoint, the statistical significance of the DID term suggests a causal effect, provided that the parallel trends assumption is satisfied, meaning that without treatment, the treated and control groups would have maintained comparable growth paths. A statistically significant negative DID effect suggests that the AFC reduced growth relative to the counterfactual scenario (when the crisis never happened).

6. CONCLUSION

Our study examines the interplay between economic growth and governance using a panel dataset of 13 countries with three panel-data estimation methods. In addition to statistical estimation, our study also employs a quasi-experimental method by taking AFC as the event timing and making it a natural experiment. Our study enforces a simple premise for harnessing crises as a good momentum for reforming institutions to have improved governance and resilience. To obtain a resilient future, every government needs to steer and direct its economy far from a dark economic crisis.

The findings illustrate that governance indicators have not all been statistically significant in determining actual GDP. Of all the econometric control variables tested, only inflation and the previous year's GDP growth were statistically significant. There is a negative link with inflation, meaning that when inflation is high, the economy slows down. However, there is a positive relationship between the GDP growth rate from the previous year and economic growth. This could indicate that periods of fast growth are followed by even faster growth.

Based on this finding, policymakers should focus on improving the governance framework of their country. Even if some governance indicators have no linear impact on GDP growth, good governance is still important for long-term economic stability.

Countries that invest in institutional quality, transparency, and regulatory frameworks attract more investment. Governments from developing countries need to take action and ensure their institutions follow both national and international standards.

All this is why it's so important to steady both inflation and growth: when inflation spikes, investors become uncertain, real incomes drop, people spend less, and everything becomes riskier. But if you can keep risk low and inflation in check, growth has a chance to take off. For these reasons, moderate levels of inflation are necessary to ensure the long-term health of families, businesses, and the economy.

6.1. Limitations

This study, akin to any empirical inquiry, possesses inherent limitations. The following section lists some potential limitations that may affect the analysis of the research. Endogeneity is not addressed in our research, which causes non-significant estimates of variables of interest and complaints from policymakers. In a theoretical sense, good governance improves the investment climate, institutional trust, and regulatory efficiency, and helps promote human capital and innovation.

But these are intermediate channels and not the ultimate drivers of economic growth. Future research should complement our work on the governance-growth relationship by including new variables such as technological innovation, human capital, trade policy, or global systemic risk.

REFERENCES

Abdelbary, I., & Benhin, J. (2019). Governance, capital, and economic growth in the Arab Region. *The Quarterly Review of Economics and Finance, 73*, 184-191. https://doi.org/10.1016/j.qref.2018.04.007

Acemoglu, D., Johnson, S., & Robinson, J. A. (2001). The colonial origins of comparative development: An empirical investigation. *American Economic Review, 91*(5), 1369-1401. https://doi.org/10.1257/aer.91.5.1369

Afolabi, J. O. (2019). The impact of governance on economic development in West Africa: A system GMM dynamic panel approach. *Acta Universitatis Danubius Œconomica, 15*(3), 217-231.

Agere, S. (2000). *Promoting good governance: Principles, practices and perspectives* (Vol. 11). United Kingdom: Commonwealth Secretariat.

Aikins, S. (2009). Global financial crisis and government intervention: A case for effective regulatory governance. *International Public Management Review, 10*(2), 23-43.

Alfano, V., Capasso, S., & Filoso, V. (2020). *The quality of governance in Europe: A guide for the perplexed. CSEF, center for studies in economics and finance, department of economics, University of Naples.* CSEF Working Paper Page for No. 592.

Angrist, J. D., & Pischke, J.-S. (2009). *Mostly harmless econometrics: An empiricist's companion.* United States: Princeton University Press.

Barro, R. J. (1997). *Determinants of economic growth: A cross-country empirical study.* NBER Working Paper No. 5698, National Bureau of Economic Research.

Berg, A. (1999). *The Asia crisis: Causes, policy responses, and outcomes.* United States: International Monetary Fund.

Chapsa, X., & Katrakilidis, C. (2022). Investigating the corruption-growth nexus for the EU-15: Does the quality of governance matter? *Journal of Economic Issues, 56*(3), 838-868. https://doi.org/10.1080/00213624.2022.2093579

Choi, J. P. (1983). Institutional structure and economic performance. *Journal of Economic Behavior & Organization, 4*(3), 347–360.

Corsetti, G., Pesenti, P., & Roubini, N. (1999). Paper tigers?: A model of the Asian crisis. *European Economic Review, 43*(7), 1211-1236. https://doi.org/10.1016/S0014-2921(99)00017-3

Gani, A. (2011). Governance and growth in developing countries. *Journal of Economic Issues, 45*(1), 19-40. https://doi.org/10.2753/JEI0021-3624450102

Garnaut, R., & McLeod, R. H. (2002). *East Asia in crisis: From being a miracle to needing one?* London: Routledge.

Gillman, M., Harris, M. N., & Mátyás, L. (2004). Inflation and growth: Explaining a negative effect. *Empirical Economics, 29*(1), 149-167. https://doi.org/10.1007/s00181-003-0186-0

Gylfason, T., & Herbertsson, T. T. (2001). Does inflation matter for growth? *Japan and the World Economy, 13*(4), 405-428. https://doi.org/10.1016/S0922-1425(01)00073-1

Hedges, L. V., & Pigott, T. D. (2001). The power of statistical tests in meta-analysis. *Psychological Methods, 6*(3), 203.

Jalilian, H., Kirkpatrick, C., & Parker, D. (2007). The impact of regulation on economic growth in developing countries: A cross-country analysis. *World Development, 35*(1), 87-103. https://doi.org/10.1016/j.worlddev.2006.09.005

Kaufmann, D., & Kraay, A. (2002). *Growth without governance.* Policy Research Working Paper No. 2928. Washington, DC: World Bank.

Kesar, A., & Jena, P. K. (2022). Corruption and economic growth: Empirical evidence from BRICS nations. In N. Yoshino, R. N. Paramanik, & A. S. Kumar (Eds.), Studies in international economics and finance: Essays in honour of Prof. Bandi Kamaiah. In (pp. 183–202). Singapore: Springer.

Khan, M. S., & Ssnhadji, A. S. (2001). Threshold effects in the relationship between inflation and growth. *IMF Staff Papers, 48*(1), 1-21. https://doi.org/10.2307/4621658

Krugman, P. (1994). The Myth of Asia's Miracle. *Foreign Affairs, 73*(6), 62–78. https://doi.org/10.2307/20046929

North, D. C. (1990). *Institutions, institutional change, and economic performance.* Cambridge, England; New York: Cambridge University Press.

Olson, J. M., Sarna, N., & Swamy, A. V. (2000). Governance and growth: A simple hypothesis explaining cross-country differences in productivity growth. *Public Choice, 102*(3), 341-364. https://doi.org/10.1023/A:1005067115159

Olson, M. (1982). *The rise and decline of nations: Economic growth, stagflation, and social rigidities.* New Haven, CT & London, England: Yale University Press.

Romer, P. M. (1986). Increasing returns and long-run growth. *Journal of Political Economy, 94*(5), 1002-1037. https://doi.org/10.1086/261420

Shadabi, L., & Adkisson, R. V. (2021). Natural resources, governance, and corruption. *Journal of Economic Issues, 55*(1), 246-263. https://doi.org/10.1080/00213624.2021.1877042

Sima, D., & Huang, F. (2023). Is democracy good for growth?—Development at political transition time matters. *European Journal of Political Economy, 78*, 102355. https://doi.org/10.1016/j.ejpoleco.2022.102355

Singh, B. P. (2019). Does governance matter? Evidence from BRICS. *Global Business Review, 23*(2), 408-425. https://doi.org/10.1177/0972150919861222

Tung, L. T., & Thanh, P. T. (2015). Threshold in the relationship between inflation and economic growth: Empirical evidence in Vietnam. *Asian Social Science, 11*(10), 119–126. https://doi.org/10.5539/ass.v11n10p105

Wilson, R. (2016). Does governance cause growth? Evidence from China. *World Development, 79*, 138-151. https://doi.org/10.1016/j.worlddev.2015.11.015

World Bank. (1993). *The East Asian miracle: Economic growth and public policy.* New York, Oxford, England: Oxford University Press for the World Bank.

World Trade Organization. (1997). *International trade statistics.* Geneva, Switzerland: World Trade Organization.

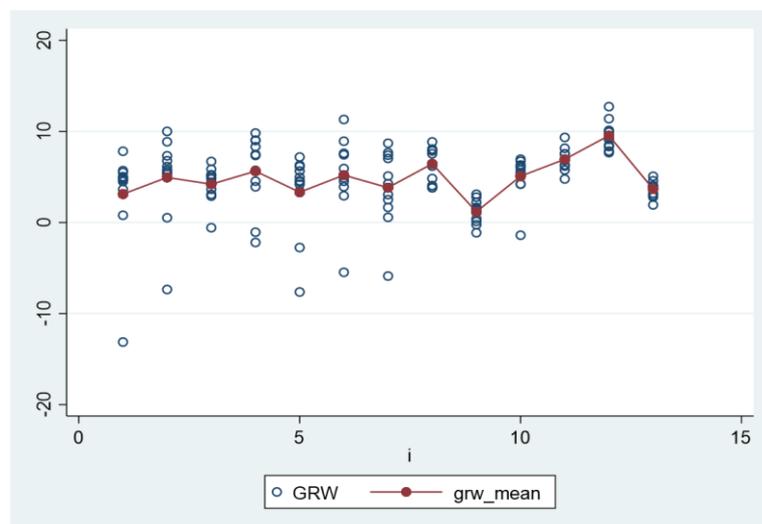**Appendix 1**: Supplementary test results are provided as an appendix.

Figure A. Scatter plot of growth and its means across periods.
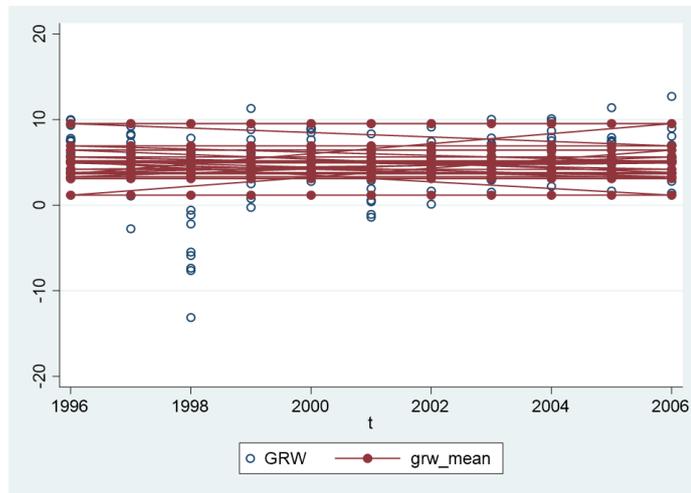
Figure B. Observed growth values and annual trend, 1996-2006.

We present two figures to illustrate heterogeneity across countries and years. Figure A shows considerable variation across units within each period alongside a relatively stable average trend. Individual values fluctuate around the period mean, illustrating differences in growth levels across units throughout. The scatter in Figure B indicates substantial cross-sectional dispersion within each year, while the mean line remains stable, suggesting limited long-term trends but persistent heterogeneity in growth outcomes.

Choosing a fixed effects (FE) or random effects (RE) model for panel data is determined by the Durbin-Wu-Hausman test, which compares estimators to assess their consistency with the true model. The decision depends on whether the unique errors (u_i) in a regression model are correlated with the regressors: 1) Not correlated, the RE estimator is appropriate. 2) Correlated, then the fixed-effects model should be used.

Table A. Hausman test estimation.

Test description	Chi-square (χ^2)	Degrees of freedom	Prob > χ^2
Hausman specification test (Fixed vs. random)	22.15	8	0.0046
Hausman specification test (Robust estimation)	23.81	8	0.0025

The first Table A represents the output of the Hausman test conducted for hypothesis one. Since the p-value is significant <0.05, the study rejects the random-effect model in favor of the fixed-effect model.

Table B presents the results of the Breusch-Pagan Lagrange Multiplier (LM) for Random Effect

Table B. Breusch-Pagan lagrange multiplier estimation.

Test description	Chi-square (χ^2)	Degrees of freedom	Prob > χ^2
Breusch–Pagan LM test for random effects	0.00	1	1.0000
Null Hypothesis (H_0): $Var_{ui} = 0$			

The chi-square value for the Breusch–Pagan LM test is 0.00, and the p-value is 1.0000. This indicates that the null hypothesis of no random effects cannot be rejected. Consequently, there is no substantial panel-level variation; thus, a pooled OLS model is preferred over a random-effects model.