

# POPULIS

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**Governance, Fiscal Decentralization, And Growth In Indonesia**  
*Kumba Digdowiseiso*

**Analisis Komitmen Organisasi, Iklim Organisasi dan Kepuasan Kerja Pegawai Di Sekretariat Jenderal Kementerian Agama RI**  
*Eko Sugiyanto*

**Kebijakan Ekonomi dan Peningkatan Daya Saing Indonesia Menghadapi Masyarakat Ekonomi ASEAN 2015**  
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*Atep Abdurofiq*

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## **GOVERNANCE, FISCAL DECENTRALIZATION, AND GROWTH IN INDONESIA**

**Kumba Digdowiseiso**

Fakultas Ekonomi, Universitas Nasional Jakarta

[kumbadigdo@yahoo.com](mailto:kumbadigdo@yahoo.com)

### **ABSTRAK**

Kajian ini mencoba mengupas apakah governance dan desentralisasi fiskal di Indonesia telah meningkatkan pertumbuhan ekonomi dalam kurun 1984-2014. Juga melakukan selidik kausalitas governance-desentralisasi fiskal-pertumbuhan. Walaupun ada perbedaan hasil interpretasi dengan metode OLS dan metode VECM, namun dapatlah dinyatakan bahwa hasil VECM menggambarkan dengan baik kaitan pertumbuhan dengan governance maupun dengan desentralisasi, baik jangka pendek maupun jangka panjang; OLS sederhana Cuma berguna apabila semua variabelnya bercoral ajeg pada semua level.

**Kata kunci :** Governance, fiskal, desentralisasi, pertumbuhan ekonomi, Indonesia.

### **ABSTRACT**

This study tries to disentangle whether governance and fiscal decentralization in Indonesia improves economic growth in 1984 – 2014. Also, it investigates whether there is causality in governance-fiscal decentralization-growth in Indonesia. The results run by OLS (Ordinary Least Square) and VECM (Vector Error Correction Model) method provide different intrepretation, however one could argue that VECM can best describe the relationship between growth and governance as well fiscal decentralization both in short and long run since simple OLS are usefull when all variables are stationary at level

**Keywords :** Governance, Fiscal, Decentralization, Growth, Indonesia

## **1. INTRODUCTION**

Governance has become a central issue in the literature of development theory, public policy and economics. This issue has attracted the attention of diverse group of scholars and researchers. Economist, developmentalist, and other social scientists have attempted to measure whether some countries have better governance than the others, whether sub-national governments within countries' jurisdictions perform better than the others, and how does governance link with levels of socio-political development, size of a region or country, social trust within countries, and levels of decentralization.

The conceptual foundations for governance research can be traced back to the institutional theory which were already rose as early as the 1980s. Starting with the seminal work of Douglass North (1989), the New Institutional Economics attempts to extend neoclassical economics by incorporating institutional analysis, focusing on the role of institutions in explaining long-term economic performance. North defines institutions as formal and informal rules that influence all actors and sectors in a society. At the center of such rules are governments, who not only create, administer, and enforce the rules, but their operations are also legitimized by some and constrained by others (Andrews, 2013). These "rules of the game" affect the size, procedures, and reach of governments. For example, formal budget rules, property rights, taxation systems, regulation on access to information, and also the corresponding informal rules, such as social trust, political legitimacy and norms about information disclosure. These institutions are all connected to governments in one way or the other.

This growing interest in institutions was then triggered by concern over structural factors that attribute today's development levels to various forms of structural determinants. Acemoglu *et al.* (2001) found that former colonies that had high levels of settler mortality, high concentration of indigenous population, and natural resources, prompted the colonizers to set up extractive institutions that were harmful to local development. In contrast, areas that were sparsely populated, with low endowment of resources, and a mild disease environment, allowed for western colonizers to settle down leading to the establishment of what they call inclusive institutions, such as, property rights, and the rule of law, that foster economic growth.

Recent work by Kauffman and Kraay (2010) reinforces the idea that the relationship between governance and growth may be bi-directional. They find a strong positive causal relationship running from governance to growth, competing against a negative feedback relationship from income to governance. They argue that this can lead to low income governance traps, in which poor governance causes weak economic performance which in turn reinforces poor governance. However, one of the weaknesses in this study is

that they have focused on cross-country data. Whilst this provides a large sample of countries and a relatively long time span, such studies are open to the criticism that there are important unobserved factors such as fiscal decentralization which may have an important influence upon economic performance.

Concerning this situation, the purpose of the present study is to freshly explore as follows: (i) whether governance and fiscal decentralization underpins the growth in Indonesia; (ii) whether there is causality in governance-fiscal decentralization-growth in Indonesia. To obtain the result, I introduce a governance and fiscal decentralization variable into the Solow augmented Mankiw-Romer-Weil (MRW) structural model for Vector Error Correction Model (VECM) and Vector Autoregressive (VAR) estimation for the period of 1984-2014. The following parts of this paper are organized as follows: Chapter two, based on literature review, discusses the relationship between governance, fiscal decentralization, and growth. Chapter three describes the data, methodology, and specification used in this study. Chapter four explores and analyzes the result. Finally, chapter five provides the conclusion.

## **2. LITERATURE REVIEW**

### **2.1. Decentralization in Indonesia**

Empirical studies suggest that the stage of development, the size of the country, the population diversity, and the “crisis effect” are primary driving forces for fiscal decentralization (Bahl and Linn, 1992). These forces also appear to drive Indonesia to embark on a decentralization strategy. Prior to the Asian financial crisis in 1997, Indonesia was regarded as the next “Asian Tigers” or one of the “Asian Miracles” along with South Korea, Hong Kong, Taiwan and Singapore. Indonesia’s development features at that time (i.e., consistent high economic growth during the late 1980s and the early 1990s, accompanied with much improved social-economic indicators yet with relatively high inequalities among regions) made Indonesia a good candidate for decentralization.

With a large population and high cultural diversity, decentralization would allow the Government of Indonesia (GOI) to take into account regional differences and to meet the local preferences in better ways, a central argument in fiscal decentralization theorem laid out by Oates (1972). Finally, the economic crisis that hit Indonesia in 1997, followed by a political crisis in 1998 and afterwards (e.g., turmoil and the resurgence of separatism tendencies in such provinces as Aceh, Papua, and East Timor) and the subsequent downfall of the Soeharto regime seemed to accelerate the process of decentralization (Silver *et al.*, 2001).

## **2.2. Fiscal Decentralization and Growth**

There are several scholars who attempt to directly link fiscal decentralization and economic growth. For research dealing with cross-countries data, Davoodi and Zou (1998) found that the negative contribution of fiscal decentralization to economic growth exists in developing countries, but there is an insignificant contribution in developed countries. Martinez-Vazquez and McNab (2003) pointed out that there are multiplicities of potentially indirect effects of decentralization on growth. However, in the next study, Martinez-Vazquez and McNab (2006) failed to observe evidence of a direct relationship between decentralization and growth, but found that fiscal decentralization appears to have a positive indirect effect on economic growth through its beneficial impact on price stability.

In contrast, there is also a mixed picture of existing evidence of fiscal decentralization on economic growth in a single country. Xie *et al.* (1999) found that fiscal decentralization may be detrimental to growth. However, Akai and Sakata (2002) both achieve consistent empirical results with the theoretical viewpoint which is that decentralization enhances economic growth.

In the case of Indonesia, Ismail and Hamzah (2006) found that the fiscal decentralization variables (expenditure indicator) show the positive and significant coefficients, while the revenue indicator shows the negative relationship with economic growth. While Fadli (2014) found that fiscal decentralization has a positive impact on regional economic growth and fiscal decentralization has the ability to reduce regional disparities in the eastern and western Indonesia.

## **2.3. Governance and Growth**

There are several arguments that governance do matter for economic performance. First, the quality of economic governance, measured by the security of property rights and the level of contract enforcement, is crucial to growth and investment (Knack and Keefer, 1995). Second, the subjective indexes of corruption are negatively linked with investment and economic growth (Mauro, 1995). Third, efficiency in bureaucracy couples with the absence of corruption, the rule of law, and protection of property rights are important for growth (Alesina, 1998).

In the case of Indonesia, recent study conducted by McCulloch and Malensky (2011) found that there is little or no statistically significant association between many typical measures of local economic governance and the growth performance of the district. But, there is a positively and statistically significant association between overall governance and district growth when instrumenting growth with mudslides. Meanwhile, Hamid

(2013) found that there is a positive relationship between the mayor/regent's quality and the change of local road infrastructure.

### 3. DATA, METHODOLOGY, AND SPECIFICATION

#### 3.1. Data

Measuring governance for longer time period in a country can be problematic. The World Bank Governance Indicator is established on 1996, while corruption perception index of the Transparency International is firstly launched on 1995. To bridge this gap, I used Dahlberg *et al.* (2016) on the basic quality of government dataset for the period of 1984-2014 (see Table 1). They basically compiled the ICRG variables of corruption, law and order, and bureaucracy quality and take the mean value of them in 0-1 scale. Higher value indicates higher quality of government.

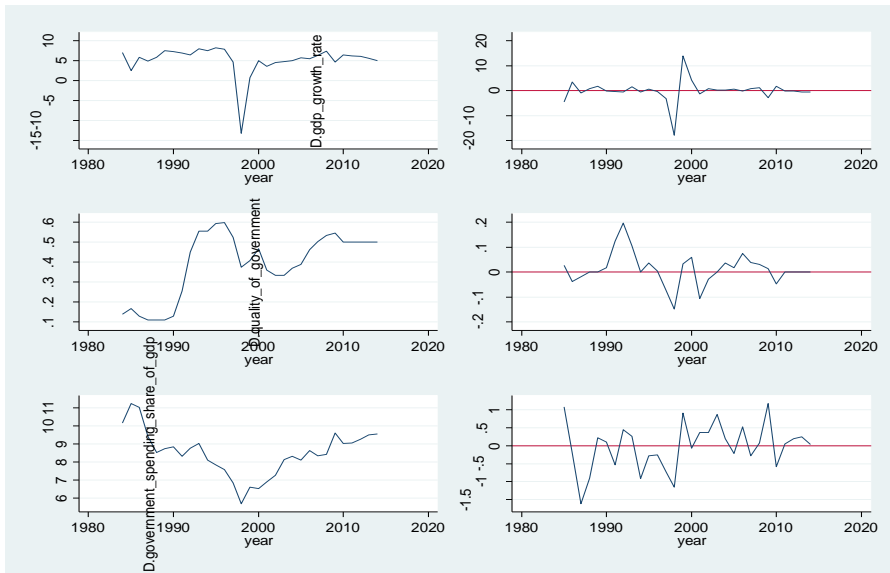
In addition, Dahlberg *et al.* (2016) also compiled population growth rate from the World Bank Indicators. Meanwhile, I use trade and investment share of GDP, GDP growth rate and GDP per capita from the IMF database based on the 2015 World Economic Outlook. Also, I use the same source to obtain government expenditure share of GDP as a proxy of fiscal decentralization. Murshed *et al.* (2009) stated that fiscal decentralization related to devolution which is given to local government and they defined the size of devolution as a capacity of state. In terms of national level, this indicator can best measure the size of government relative to the national economy and it is stated as ratio central government expenditure to total income (GDP). Meanwhile in measuring human capital, I use human capital index based on your schooling and return to education. This data is constructed by Feenstra *et al.* (2015) on Penn World Table Version 9.0.

**Table 1 : Summary of Statistic**

Variable	Obs	Mean	Std. Dev.	Min	Max
year	31	1999	9.092121	1984	2014
quality_of~t	31	.3873955	.1630552	.1111111	.5972222
population~e	31	1.536282	.2757284	1.260193	2.197361
trade_shar~p	31	54.17376	10.74448	39.97386	96.1862
government~p	31	8.491936	1.244718	5.69	11.23
investment~p	31	32.15906	6.817063	13.64	44.62
gdp_growth~e	31	5.156871	3.75712	-13.127	8.22
gdp_per_ca~a	31	2.11e+07	6198423	1.23e+07	3.41e+07
human_capi~x	31	2.118407	.2308587	1.68166	2.41677

Overall, Figure 1 shows that growth rate and government size provide a wider range of variation than quality of government and they have more variance from one time period to the next. However, we do not know whether the variable is non-stationary or not.

**Figure 1 : Growth Rate, Quality of Government, and Government Size, 1984-2014**



**3.2. Methodology**

Mankiw, Romer and Weil (MRW) (1992) showed that with the inclusion of human capital in the production function, the explanatory power of the traditional Solow growth model is significantly improved. I use the MRW work and extend the Solow model to include governance and fiscal decentralization as a determinant of the multifactor productivity.

For simplicity, I will consider an economy that produces only one good. Output is produced with a well-behaved neoclassical production function with positive and strictly diminishing marginal product of physical capital. This condition ensures that the marginal products of both capital and labor approach infinity as their values approach zero, and approach zero as their values go to infinity.

The Solow augmented Mankiw-Romer-Weil (MRW) model is used as a basis for this study. The production function incorporating the size and quality of the government is of the Cobb-Douglas form:

$$Y(t) = K(t)^\alpha H(t)^\beta [G(t) QoG(t) L(t)]^{1-\alpha-\beta}$$

where Y(t) is the aggregate level of real income, K(t) is the level of physical capital, and H(t) is the level of human capital. The size dimension of the government G(t) is measured by the level of government expenditure, L(t) is the amount of labour employed, and QoG(t) measures the quality dimension of the government.



Let  $0 < \alpha < 1$ ,  $0 < \beta < 1$ , and  $\alpha + \beta < 1$ . These conditions ensure that the production function exhibits constant returns to scale and diminishing return to each point. Time is indexed by a continuous variable ( $t$ ). With the omission of the governance term, the model yields standard neoclassical results. That is, the growth rate of output per capita is accelerated with increases in investments in physical capital and decreases in population growth, depreciation rate of capital, and the initial level of output per capita.

### **3.3. Specification**

This paper adopts Solow Augmented Mankiw-Romer-Weil (MRW) model because it permits the inclusion of more policy variables in economic growth equation. Specifically, the model was modified to include governance and fiscal decentralization as one of its explanatory variables. There are various channels through which governance and fiscal decentralization affects economic growth. But this study adopts five (5) transmission channels which are investment, human capital, trade, population growth and initial level of GDP per capita. Thus, my specification is formulated as follows:

$$\text{GROWTH}_t = \alpha_0 + \alpha_1 \text{LGDPPC}_t + \alpha_2 \text{QOG}_t + \alpha_3 \text{GOV}_t + \alpha_4 (\text{QOG} * \text{GOV})_t + \alpha_5 \text{INV}_t + \alpha_6 \text{TRADE}_t + \alpha_7 \text{HC}_t + \alpha_8 \text{POP}_t + \mu t \quad (1)$$

Where  $\text{GROWTH}_t$  is GDP growth rate at time  $t$ ,  $\text{LGDPPC}_t$  is natural logarithm of GDP per capita at time  $t$ ,  $\text{QOG}_t$  is quality of government as a proxy of governance at time  $t$ ,  $\text{GOV}_t$  is government size as a proxy of fiscal decentralization at time  $t$ ,  $\text{INV}_t$  is total investment share of GDP at time  $t$ ,  $\text{TRADE}_t$  is total trade share of GDP at time  $t$ ,  $\text{HC}_t$  is human capital index at time  $t$ , and  $\text{POP}_t$  is population growth rate at time  $t$ . To capture indirect effect of governance on economic growth through fiscal decentralization, I put interaction term between quality of government and government size.

Since this study will employ quantitative tools of data analysis, there are several estimation techniques, as follows: First, The Augmented Dickey-Fuller (ADF) unit root test will be used to test for stationarity; Second, a cointegration test will be conducted to determine if the time series variables have a long-term or equilibrium relationship between them; Third, the Vector Error Correction Model (VECM) will then be used to reveal the short-run dynamics in the economic growth function; Fourth, the Vector Autoregressive (VAR) Granger Causality test will be conducted to ascertain the causal relationship between governance, fiscal decentralization, and economic growth; and Lastly, impulse-response analysis is performed based on VAR estimation.

## 4. RESULTS

### 4.1. Test for stationarity

The univariate characteristics of the data was analysed using the Augmented DickeyFuller (ADF) tests to establish the order of integration, since the actual datagenerating process is not known. The result of the ADF test for all the variables used in our estimations is reported in Table 2. The first column shows the list of all the variables that are tested. The second column (model) shows whether the equation that is estimated for the testing purpose involves a trend and a constant, a constant only, or neither a constant nor a trend. The third column shows the number of lags that are used for each model and they are significant at the 5 percent level. The fourth and fifth column is the ADF level and ADF first difference. To sum up, our variable is mostly unit root and non stationary. The first differencing of variable will make stationary of the data.

**Table 2 : ADF Test**

Series	Model	Lags	ADF level	ADF first difference
Growth	Intercept	0	-0.7060854*	-1.279816*
	Trend + Intercept	0	-0.7059555*	-1.27895*
	None	0	-0.252788*	-1.279992*
Gdppc	Intercept	0	-0.0028099	-0.7494067*
	Trend + Intercept	0	-0.1670036	-0.7488835*
	None	0	0.0020116*	-0.4072733*
Qog	Intercept	0	-0.1096143	-0.5595906*
	Trend + Intercept	1	-0.2146766	-0.7164658*
	None	0	0.0101048	-0.5423137*
Gov	Intercept	0	-0.1525986	-0.92589*
	Trend + Intercept	0	-0.1298563	-1.025022*
	None	0	-0.0055128	-0.9228597*
Qog*Gov	Intercept	0	-0.1148616	-0.6868317*
	Trend + Intercept	0	-0.2051053	-0.6866055*
	None	1	-0.0054604	-0.7684044*
Inv	Intercept	0	-0.1987467	-1.012078*
	Trend + Intercept	0	-0.2245747	-1.015787*
	None	0	-0.0083892	-1.012122*
Trade	Intercept	0	-0.493702*	-1.451073*
	Trend + Intercept	0	-0.5063325	-1.460634*
	None	0	-0.0180472	-1.451006*
HC	Intercept	0	-0.0469085*	-0.044225
	Trend + Intercept	0	0.193482*	-.2438141
	None	0	0.0100384*	-0.06949
Pop	Intercept	0	-0.0892034*	-0.0894816
	Trend + Intercept	0	-0.0729511*	0.2222373
	None	0	-0.0222699*	-0.067312*

#### 4.2. Cointegration test

Most of the estimated coefficient in equation 1 are statistically significant, particularly related to variable of interest such as governance. However, the variable of government size as measure of fiscal decentralization is negative and insignificant. In addition, the inclusion of interactive term (QoG\*Gov) changes the size and magnitude of primary variable such as quality of government, while coefficient of government size remains negative and insignificant. Overall, there is clear evidence of no autocorrelation in the residuals of all model, the data are homoskedastic in all model, but growth has non-normal characteristic.

**Table 3 : Simple Growth Regression Result**

Variable	Growth (1)	Growth (2)
Lgdppc	-14.39826** (6.64201)	-14.60747** (6.719124)
Qog	11.74208** (4.842736)	32.93195 (29.86545)
Gov	-0.966447 (0.9256742)	-0.0705299 (1.557848)
Qog*Gov	-	-2.524565 (3.51007)
Inv	0.1950334** (0.0964562)	0.2236059** (0.1052684)
Trade	-0.3534769* (0.075016)	-0.3539368* (0.0758184)
HC	15.69284 (13.20575)	16.09193 (13.35808)
Pop	-0.7965957 (11.65478)	-2.324549 (11.96908)
Resid	-0.8821708* (0.1729885)	-0.8647713* (0.1703678)
Adjusted R2	0.6601	0.6529
LM tests (Prob>Chi2)	0.4898	0.4250
White test	0.4154	0.4154
Normality Test		
Skewness	0.0000*	0.0000*
Kurtosis	0.0000*	0.0000*
J-B	0.0000*	0.0000*
No. of Observation	31	31

Note : Number of parentheses are standard error

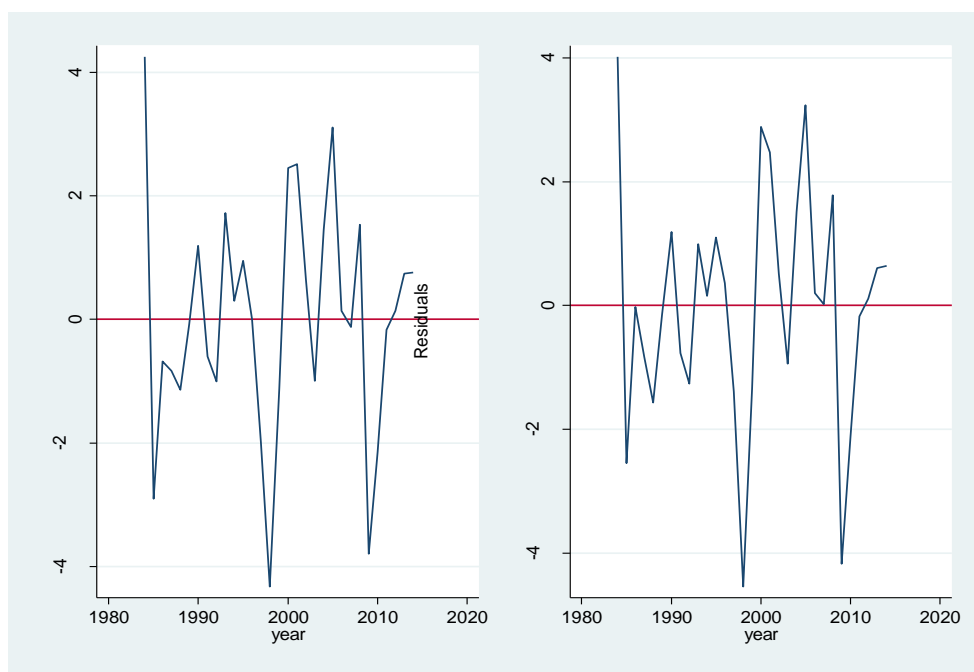
\*\*\* = significant at 10 percent level

\*\* = significant at 5 percent level

\* = significant at 1 percent level

Meanwhile, in figure 2, the essence of co-integration test is to find out if there is a long term relationship between variables that are stationary at different levels of integration. The cointegrating relation is found to be appropriate since the graph reverts to the equilibrium. Also, the evident from Table 3 on the estimated coefficient of Resid confirms that the relationship between Growth and other explanatory variables are valid (no spurious regression) in the long run.

**Figure 2 : Cointegrating Relation in Growth Equation**



### 4.3. Vector Error Correction Estimates

Arming with the message from Table 3, the lag order selection criteria was conducted and can be seen in table 4. The maximum lag structure that is used follows Said and Dickey (1984), who suggested a lag order equal to  $T^{1/3}$ .  $T$  is the number of observations, which in this case is 31 (years 1984 to 2014). Therefore, the maximum lag structure of 3 is used in the testing procedure. From the selection criteria, it is seen that the lag of three (3) had more number of selection as it was selected by five (5) criteria in all models. Therefore, the number of lagged terms included was three (3).

**Table 4 : Lag Order Selection Criteria**

Growth (1)	Lag	LL	LR	FPE	AIC	HQIC	SBIC
	0	-52.8614		4.59848	4.34725	4.46361	4.72788
	1	-52.7194	0.28413	4.92474	4.40853	4.53943	4.83673
	2	-48.8835	7.6716*	4.05934	4.20597	4.35142	4.68176
	3	-47.0741	3.619	3.87639*	4.14815*	4.30815*	4.67151*
Growth (2)	Lag	LL	LR	FPE	AIC	HQIC	SBIC
	0	-50.6697		4.25402	4.26212	4.39303	4.69033
	1	-50.3887	0.56196	4.52008	4.31348	4.45893	4.78927
	2	-47.95	4.8774	4.12668	4.21072	4.37071	4.73408
	3	-43.905	8.0901*	3.36855*	3.99321*	4.16776*	4.56416*

By using the lag order selection criteria, I will test whether I use VECM as my estimation model. To do this, I have to employ Johansen cointegration technique in standard growth model 1. If the variables are non cointegrated, we cannot run VECM model, instead we deploy unrestricted VAR model. From Table 5, it is clear that there are approximately five and six cointegration among variables by looking at trace statistic and maximum statistic.

**Table 5 : Johansen Tests for Cointegration**

Trend: constant		Number of obs = 28				
Sample: 1987 - 2014		Lags = 3				
maximum		trace	5% critical	1% critical		
rank	parms	eigenvalue	value	value		
0	105	130.10526	1035.8242	124.24	133.57	
1	118	502.90878	290.2172	94.15	103.18	
2	129	576.50137	0.99479	143.0320	68.52	76.07
3	138	602.49377	0.84380	91.0472	47.21	54.46
4	145	623.9834	0.78454	48.0679	29.68	35.65
5	150	639.04274	0.65893	17.9493*1	15.41	20.04
6	153	647.55329	0.45550	0.9282*5	3.76	6.65
7	154	648.01737	0.03261			
maximum		max	5% critical	1% critical		
rank	parms	eigenvalue	value	value		
0	105	130.10526	745.6070	45.28	51.57	
1	118	502.90878	147.1852	39.37	45.10	
2	129	576.50137	0.99479	51.9848	33.46	38.77
3	138	602.49377	0.84380	42.9793	27.07	32.24
4	145	623.9834	0.78454	30.1187	20.97	25.52
5	150	639.04274	0.65893	17.0211	14.07	18.63
6	153	647.55329	0.45550	0.9282	3.76	6.65
7	154	648.01737	0.03261			

From Table 6, the results from the core specification confirm that natural logarithm of GPD per capita, governance, fiscal decentralization, investment, and trade are highly significant determinants of economic growth in Indonesia. Adding the interactive effect between governance and fiscal decentralization will make all variables become statistically significant.

Related to our variable of interest, both governance and fiscal decentralization are negatively correlated with economic growth in model I. However, after adding interactive term, both the estimated coefficient of governance and fiscal decentralization are positively correlated. Thus, the need to incorporate better governance in fiscal decentralization is very essential for stimulating economic growth in Indonesia.

**Table 6 : VECM results**

Variable	Growth (1)	Growth (2)
Lgdppc	19.12395* (5.468267)	2.504142* (0.0262903)
Qog	-9.569524* (1.73925)	21.03887* (0.0477763)
Gov	-1.68108** (0.8861396)	1.090431* (0.0029079)
Qog*Gov	-	-2.462301* (0.0051345)
Inv	-0.3178941* (0.0651215)	0.0138242* (0.0002147)
Trade	-0.1351246*** (0.0815683)	-0.0158006* (0.0004876)
HC	-3.157209 (15.90527)	-10.55991* (0.0731121)
Pop	20.71827 (6.44787)	-6.791041* (0.0196513)
No. of Observation	28	28

Note : Number of parentheses are standard error

\*\*\* = significant at 10 percent level

\*\* = significant at 5 percent level

\* = significant at 1 percent level

#### 4.4. Granger Causality Test

There is empirical evidence that growth is contemporaneously correlated with governance and fiscal decentralization (see Kauffman and Kraay, 2010; Kyriacou and Roca-Sagales, 2011). However, many also believe that there is potential endogeneity on fiscal decentralization and government quality (see de Mello and Barenstein, 2001; Fisman and Gatti, 2002; Treisman, 2002; Altunbas and Thornton, 2012). This section to investigate whether there exists a causal relationship between these variables and if there exists such relationship, is it a unidirectional or bilateral causality?

We consider the following VAR equation such that

$$\text{GROWTH}_t = \alpha_0 + \alpha_1 \text{GROWTH}_{t-1} + \alpha_2 \text{QOG}_{t-j} + \alpha_3 \text{GOV}_{t-j} + v_{1t} \quad (2)$$

$$\text{QOG}_t = \alpha_0 + \alpha_1 \text{QOG}_{t-1} + \alpha_2 \text{GROWTH}_{t-j} + \alpha_3 \text{GOV}_{t-j} + v_{2t} \quad (3)$$

$$\text{GOV}_t = \alpha_0 + \alpha_1 \text{GOV}_{t-1} + \alpha_2 \text{GROWTH}_{t-j} + \alpha_3 \text{GOV}_{t-j} + v_{3t} \quad (4)$$

And we start to use the same criterion in selecting the maximum lag order, which is three (3). From the selection criteria in Table 7, it is seen that the lag of three (3) had more number of selection as it was selected by three (3) criteria in all models. Therefore, the number of lagged terms included was three (3).

**Table 7 : Lag Order Selection Criteria**

(1)	Lag	LL	LR	FPE	AIC	HQIC	SBIC
Growth	0	-97.0298		.254474	-1.58293	-1.58293	-1.58293
QoG	1	-49.6398	94.78	.016492	-4.32507	-4.1942*	-3.8969*
Gov	2	-41.4099	16.46	.017894	-4.27007	-4.00825	-3.41365
	3	-28.5727	25.674*	.014537*	-4.5441*	-4.15143	-3.25953

The result from Table 8 indicates that the three lagged values of governance and fiscal decentralization does not cause economic growth. Similarly, the three lagged value of growth and governance does not cause fiscal decentralization. However, the three lagged values of economic growth cause governance.

**Table 8 : Granger Causality Wald tests (Three Lagged)**

Equation	Excluded	F	df	df_r	Prob > F
gdp_growth_rate	quality_of_gove~t	.8443	3	18	0.4874
gdp_growth_rate	government_spen~g	.77996	3	18	0.5204
gdp_growth_rate	ALL	1.09	6	18	0.4053
quality_of_gove~t	gdp_growth_rate	3.6338*	3	18	0.0329
quality_of_gove~t	government_spen~g	.6106	3	18	0.6168
quality_of_gove~t	ALL	1.8424	6	18	0.1471
government_spen~g	gdp_growth_rate	.79047	3	18	0.5149
government_spen~g	quality_of_gove~t	.58099	3	18	0.6351
government_spen~g	ALL	.51171	6	18	0.7917

When I change the number of lags into 7, clearly the results changes dramatically in terms of p-value. For example in Table 9, the seven lagged of governance and fiscal decentralization cause economic growth. Similarly, the seven lagged of growth and fiscal decentralization cause governance. So, there is a bi-directional relationship between growth and governance. Also, fiscal decentralization has unilateral relationship with growth and governance.

**Table 9 : Granger Causality Wald Tests (Seven Lagged)**

Equation	Excluded	F	df	df_r	Prob > F
gdp_growth_rate	quality_of_gove~t	156.98*	7	2	0.0063
gdp_growth_rate	government_spen~g	107.47*	7	2	0.0092
gdp_growth_rate	ALL	140.83*	14	2	0.0071
quality_of_gove~t	gdp_growth_rate	12.448*	7	2	0.0764
quality_of_gove~t	government_spen~g	8.5714*	7	2	0.1004
quality_of_gove~t	ALL	14.786*	14	2	0.0651
government_spen~g	gdp_growth_rate	.54609	7	2	0.7707
government_spen~g	quality_of_gove~t	.46857	7	2	0.8111
government_spen~g	ALL	.75158	14	2	0.7042

#### 4.5. Impulse Response Function

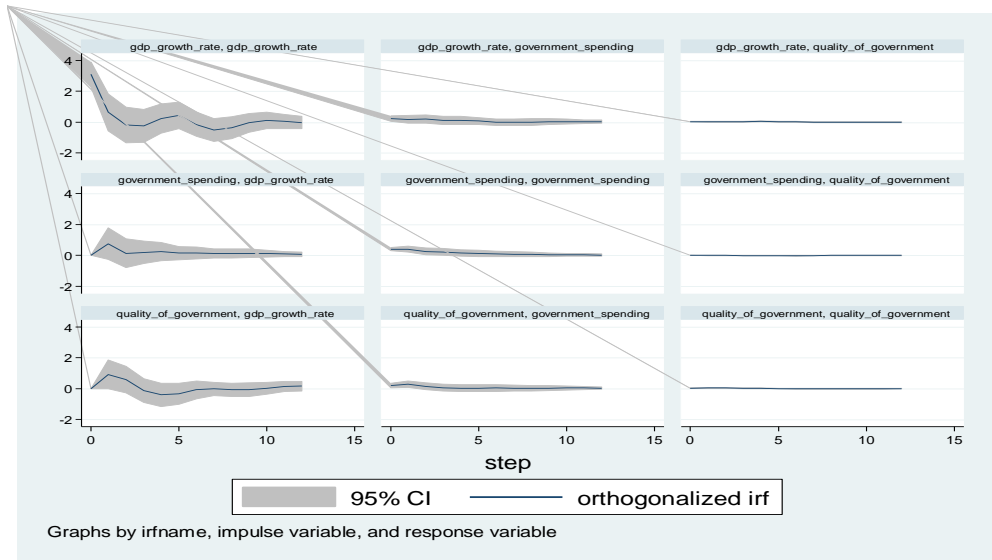
Impulse response function (IRF) in time series analysis is important in determining the effects of shocks on the variables of the system. Put it simply, IRF shows how changes in one variable at the beginning affect another variable through time. It also investigates the response of a variable to shocks from itself and other variables in the VAR model.

Of paramount importance in the analysis of IRF, is how variables respond to innovations or shocks in other variables and shocks from itself within the same VAR model. Thus, we set to investigate the relationship between growth and governance as well as fiscal decentralization by investigating the responses of these various time series variables to shocks from each other and also themselves.

Moving to Figure 3, fiscal decentralization responds positive to its innovations and shocks in the first period but as it enters the second period, it declines and is fairly constant till the end. Similar situation takes place in growth where it responds highly positive in the beginning to its innovations and shocks, before starts to decline in third and seven period. From eleven periods onward, growth is relatively stable. Meanwhile, governance response to its innovations and shocks is relatively constant from the beginning to the end. Similarly, economic growth and fiscal decentralization in Indonesia remain stable to innovations and shocks in governance at a fairly constant rate over periods of time. Also, governance and fiscal decentralization in Indonesia responds highly positive in the second period to innovations and shocks in economic growth, before starts to stable in the third period and seventh period, respectively.



**Figure 2 : IRF based on VAR estimation**



## 5. CONCLUSIONS

This study departed from two simple questions : Does governance and fiscal decentralization in Indonesia improves economic growth ? And is there any evidence of reverse causality between governance and growth, fiscal decentralization and growth, as well as fiscal decentralization and governance?

The simple OLS and VECM on growth regression provide different result. In the former, governance is positively correlated with growth. However, the estimated coefficient of fiscal decentralization is negative and insignificant. The inclusion of interactive term (QoG\*Gov) changes the size and magnitude of primary variable where governance becomes insignificant, while coefficient of government size remains negative and insignificant.

In the latter, both governance and fiscal decentralization initially are negatively correlated with economic growth. However, after adding interactive term, both the estimated coefficient of governance and fiscal decentralization are positively correlated. From this explanation, simple OLS are usefull when all variables are stationary at level. However, since some exogenous variables are stationary at the first difference, thus VECM can best describe the relationship between growth and governance as well fiscal decentralization both in short and long run.

The distinctive feature of this study is the significant role played by governance and fiscal decentralization in explaining the long-term pattern of economic growth in Indonesia. The results from the long-run estimation and the impulse responses revealed the fact that a good governance couple with

better implementation of fiscal decentralization will boost economic growth over the long-run period. Future research should attempt to correct some of the shortcomings of this study. The lack of available long-term series on governance rating must be addressed, and this may give a better parameter estimate of the effect of governance on economic growth.

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