

## **DETERMINANTS OF GROWTH IN INDONESIA: A SUB-NATIONAL STUDY**

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### **ABSTRACT**

This paper identifies the determinants of economic growth in Indonesia. To accomplish this, panel data for 33 provinces in Indonesia, for the years of 2006 through 2015, were analyzed. The empirical analysis involved two estimation methods: 1) Ordinary Least Squares (OLS) with a Fixed Effects Model, and 2) Generalized Method of Moments (GMM). The results reveal that investment ratio as the stock of physical capital, education level as the stock of human capital, population growth, decentralization, and trade across the provinces have a significant positive impact on the income per capita. Government expenditures and the proportion of adherents to the Islam religion have a significant negative influence on the income per capita. However, the proportion of adherents to the Protestant and the Catholic religions do not affect the income per capita.

**Keywords: Determinants of economic growth, Indonesia.**

### **ABSTRAK**

Paper ini bertujuan untuk mengidentifikasi faktor-faktor penentu pertumbuhan ekonomi di Indonesia. Untuk itu, dilakukan analisis terhadap data panel dari 33 provinsi di Indonesia mulai tahun 2006 sampai 2015. Analisis empiris pada paper ini melibatkan dua metode estimasi: 1) *Ordinary Least Squares* (OLS) dengan *Fixed Effects Model*, dan 2) *Generalized Method of Moments* (GMM). Hasil penelitian menunjukkan bahwa rasio investasi sebagai akumulasi persediaan *physical capital*, tingkat pendidikan sebagai akumulasi persediaan *human capital*, pertumbuhan penduduk, desentralisasi, dan perdagangan memiliki dampak positif yang signifikan terhadap pendapatan per kapita. Selanjutnya, pengeluaran pemerintah dan proporsi penganut agama Islam memiliki pengaruh negatif yang signifikan terhadap pendapatan per kapita. Disisi lain, proporsi penganut agama Kristen Protestan dan Kristen Katolik tidak memiliki pengaruh terhadap pendapatan per kapita.

**Kata kunci: Faktor pertumbuhan ekonomi, Indonesia.**

## **I. INTRODUCTION**

Several studies have investigated the determinants of economic growth in Indonesia (Garcia and Soelistianingsih, 1998; Matsui, 2005;

Vidyattama, 2010). However, these studies have only investigated a few of the provinces using a few of the proximate determinants of economic growth. This paper uses a new dataset to identify the determinants of economic growth in Indonesia. Different from the previous studies, this paper considers all provinces of Indonesia and a variety of factors which potentially affect the economic growth of Indonesia. Therefore, this paper will contribute to the economic literature by illustrating new evidence of the determinants of economic growth in Indonesia.

Panel data for 33 provinces in Indonesia from the years of 2006 through 2015 were analyzed. The empirical analysis used two estimation methods: 1) Ordinary Least Squares (OLS) with a Fixed Effects Model, and 2) Generalized Method of Moments (GMM). These methods were used to identify the linkage between dependent variable: the Gross Regional Domestic Product (GRDP) per capita as a proxy for income per capita with several explanatory variables: investment ratio as the stock of physical capital, education level as the stock of human capital, population growth, decentralization, government expenditures, religions, and trade across the provinces.

The estimation results illustrate that if the investment ratio, education level, population growth, decentralization indicator, and trade across the provinces increase by 1 percent, then the GRDP per capita increases by 0.114 percent, 2.035 percent, 0.159 percent, 0.104 percent, and 0.053 percent, respectively. However, if government expenditures and the proportion of adherents to the Islam religion grow by 1 percent, then the GRDP per capita falls by 0.432 percent and 0.237 percent, respectively. In addition, if the proportion of adherents to the Protestant and the Catholic religions increase by 1 percent, then GRDP per capita decreases by 0.145 percent and 0.014 percent, respectively. Fortunately, these variables are not significant on the economic growth of Indonesia.

Two variables (i.e., the proportion of adherents to the Protestant religion and the proportion of adherents to the Catholic religion) do not affect the economic growth of Indonesia. An explanation for this counter-intuitive result is the secularization hypothesis. Barro and McCleary (2003) mentioned that, based on the hypothesis of secularization, economic development

makes the individual become less religious. Moreover, it also covers the idea that economic development causes religion to play less of a role in social and legal processes.

The rest of this paper is organized as follows. Section 1 presents the introduction. This is followed by Section 2, which discusses the literature review. Section 3 is methodology. It introduces the institutional details that describe the context between Indonesia and its several potential determinants of economic growth. Section 3 also explains the data and the definition of the variables. Then, it follows by providing the hypotheses. Section 4 presents the results and discussions and Section 5 summarizes the conclusions.

## **II. LITERATURE REVIEW**

The theoretical work of economic growth theory began with the monumental work of Solow (1956) and Swan (1956). In the Solow and Swan theories, capital and labor are determined as a factor of production. Hence, the variation in the capital input will account for a cross-country income per capita difference.

Then, Lucas (1988) constructed a theory of growth and international trade that is consistent with some of the main features of economic development. He considered and compared three models as evidence. He argued that a system with a given rate of population growth, physical capital, and human capital are crucial property to produce the growth rate of the stock of production

In empirical work, Mankiw, Romer, and Weil (1992) used an augmented Solow growth model, with an accumulation of human capital, to explain the cross-country difference in income per capita. Using Ordinary Least Squares (OLS), they found that a difference in savings, education, and population growth can explain cross-country differences in income per capita.

Akai and Sakata (2002) tested the effect of fiscal decentralization on economic growth. Using OLS and a fixed effects model for panel data, they examined the average annual growth of real Gross Domestic Product (GDP) per capita with several variables (e.g., fiscal decentralization). Data were

collected for all 50 states in the United States during the period of 1992–1996. They found that fiscal decentralization has a positive and significant impact on economic growth.

Barro and McCleary (2003) investigated the effect of church attendance and religious beliefs on economic growth. Using Instrumental Variables (IV), they examined years of education, life expectancy, urbanization rate, population share, the presence of state religion, the regulation of the religion market, and the composition of religious adherence on the per capita Gross Domestic Product (GDP). They also included an indicator of religious pluralism from 59 countries during 1981–1999. They found that religious beliefs have a positive significant impact on economic growth. However, church attendance has a negative influence on economic growth.

Iimi (2005) conducted another empirical work. Using Ordinary Least Squares (OLS) and Instrumental Variables (IV), he examined the average growth rate of the GDP per capita in relation to the average tax rate, fiscal decentralization, political freedom, average population growth, initial human capital, and initial GDP of 51 countries during 1997–2001. He found that fiscal decentralization has a significant positive impact on per capita GDP growth. He also showed that decentralization, on the fiscal expenditure side, is instrumental in economic growth.

In the Indonesian context, there are several studies that have been conducted on finding economic growth determinants. Garcia and Soelistianingsih (1998) investigated why the per capita income disparities among provinces still exist, despite provincial GDPs rising and inequalities falling, in per capita provincial GDPs, over the last 20 years. They found that investment in human capital (education) is the most effective way of increasing provincial income and reducing the disparities in provincial GDP per capita.

Matsui (2005) found that decentralization in Indonesia has positive influences on regional economies and on local government administrations. He argued that the share of Gross Regional Domestic Product (GRDP) and local government finance has increased in Java. He stated that

decentralization has transferred the administrative authority and many newly vested interests from the center to the regions.

Vidyattama (2010) investigated Indonesia's regional determinants using GRDP per capita. Using the Generalized Method of Moments (GMM), he examined investment, human capital, population growth, trade openness, infrastructure, and local government spending from 26 provinces during 1985–2005. He found that investment and population growth do not affect economic growth. Furthermore, human capital, transportation infrastructure, and openness have a significant positive impact on economic growth. On the other hand, local government spending has a negative impact on economic growth.

### **III. METHODOLOGY**

#### **a. Institutional Details**

This section presents various factors which potentially affect economic growth in Indonesia. Firstly, the average ratio of investment accounted for approximately one-third of the GDP, but it varied among the provinces. The pattern of investment in Indonesia was affected by the characteristics of a province that make it attractive, or unattractive, for investment. In other words, there is a high correlation between the investment ratio and the provincial characteristics.

Secondly, the Indonesian education system is based on a 12-year structure with 6 years of elementary school, 3 years of middle or junior high school, as a primary education level, and 3 years of high school, as a secondary education level. After that is higher education, as a tertiary education level.

Two ministries are responsible for managing the education system: the Ministry of National Education and the Ministry of Religious Affairs. Under the Law on National Education and the Constitution, all Indonesian citizens have the right to an education. The Government is mandated to allocate 20% of its expenditures on education. In Indonesia, the enrollment rate in higher education is considerably lower than that of the primary and secondary

school rates. In 2015, the enrolment rate was 90% for primary education, 76% for secondary education, and 24% for tertiary education.

Thirdly, the population growth of Indonesia has varied across the provinces. Initially, the population growth was 1.30% per annum in 2006. It gradually declined to 1.22% in 2009. However, it increased to 1.46% in 2010 and again decreased to 1.31 in 2015 (Statistical Yearbook of Indonesia, 2017).

Fourthly, on May of 1999, Law No. 22/1999 and Law No. 25/1999 were enacted. Law No. 22/1999 delegates several authorities and responsibilities from the central government to the local governments. Law No. 25/1999 alters the transfers received by the local governments from the central government. Before the decentralization, the transfer was largely used to pay the government officials salaries. It is currently revenue sharing used to support the process of transfer delegation and providing financial resources (Alm et al., 2001). In other words, before the decentralization, the central government determined the authorities, the responsibilities, and how the local governments used the money. After the decentralization, the local governments had much more freedom to make plans and priorities to spend the money, due to the implementation of their authority and responsibility.

Fifthly, government expenditures determine the local governments' size. It is one of the budget management issues in some developing countries, including Indonesia. Before the decentralization, Indonesia's provinces experienced overspending in budget management. Fortunately, Indonesia copes with the problem well after the decentralization was enacted.

Sixthly, some researchers have argued that explanations for economic growth should include a religion aspect (Barro and McCleary, 2003). Religion usually influences economic outcomes by affecting personal traits. Indonesia is constitutionally a secular nation with 6 religions: Islam, Protestant, Catholic, Hinduism, Buddhism, and Confucianism. That being said, almost 95% of the total adherents to religions in Indonesia are from the Islam, Protestant, and Catholic religions.

Seventh, trade across the provinces has affected Indonesia's provincial economies. Indonesia's provincial trade has increased over the past years. It has succeeded in supporting economic growth over the period.

### **b. Data And Variable Definitions**

Annual panel data of 33 provinces in Indonesia, from the years of 2006 through 2015, were analyzed. The data were obtained from the Central Bureau of Statistics Republic of Indonesia (BPS Indonesia).

The dependent variable used in this investigation is the Gross Regional Domestic Product (GRDP) per capita. The independent, or explanatory variables, include the investment ratio, education level, population growth, decentralization indicator, government expenditures, religions, and trade. The variable definitions are presented in Table 3.1.

Table 3.1 Variable Definitions

<b>Variables</b>	<b>Description</b>
<b>Dependent</b>	
GRDP Per Capita	The Gross Regional Domestic Product (GRDP) per capita is an income proxy. This variable is calculated by dividing the GRDP by the total population.
<b>Explanatory</b>	
Investment Ratio	The stock of physical capital. This variable is calculated by dividing the share of the gross fixed capital formation by the GRDP.
Education Level	The stock of human capital. This variable comes from the years of schooling.
Population Growth	This variable represents the annual population growth.
Decentralization	The decentralization indicator is defined by the autonomy indicator (degree of fiscal independence). According to Akai and Sakata (2002), this indicator is measured by the ratio of the region's own revenue to the total revenue.  The region's own revenue consists of local taxes, retributions, and other own revenues. The total revenue from the central government consists of the own revenue, balanced budget, and other legal

	revenues.
Government Expenditures	The size of the local governments. It is calculated by dividing the general government consumption expenditure by the GRDP.
Religions	A proportion of the three major religion adherents in Indonesia: Islam, Protestant, and Catholic.
Trade	The size of exports and imports divided by the GRDP.

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### **c. Expected Impact Of The Explanatory Variables**

The investment ratio represents the accumulation of physical capital in the economy. A robust positive impact of investment on economic growth is supported by various studies (Solow, 1956; Barro, 1991; Mankiw, Romer, and Weil, 1992; Levine and Renelt, 1992; Barro and Lee, 1994; Caselli, Esquivel, and Lefort, 1996).

A common economic characteristic, in addition to investment, is human capital, which is usually measured by the education level. The human capital increases the worker productivity and can result in a better contribution to production.

The impact of human capital accumulation affects knowledge accumulation and has led to better technological progress and a lowering of population growth. Some studies illustrate a positive impact of this variable to economic growth (Lucas, 1988; Barro, 1991; Mankiw, Romer, and Weil, 1992; Levine and Renelt, 1992; Garcia-Garcia and Soelistianingsih, 1998; Ferreira, 2000; Higgins, Levy, and Young, 2003; Vidyattama, 2010).

Population growth is another possible determinant of economic growth; it has also been predicted by the Solow-Swan growth model. However, the Solow-Swan growth model showed a negative impact of population growth on per capita growth. Different from the Solow-Swan growth model, endogenous growth theory has argued that an increasing in population growth will increase economic growth. Barro and Lee (1994) indicated that if the fertility rate is controlled, then population growth allegedly has a positive relationship on the income per capita growth.

Decentralization is predicted to have neither a positive nor a negative impact on economic growth. Several studies have confirmed the results. Lin



and Liu (2000), Akai and Sakata (2002), and Martinez-Vasquez et al. (2015) have revealed a positive relationship. Zhang and Zou (1996) and Davoodi and Zou (1997) revealed a negative relationship.

Furthermore, Qian and Roland (1998) examined the effect of fiscal decentralization and monetary arrangements on the government's behavior and the degree of the soft budget constraints in China. They found that fiscal decentralization prevents inefficient government spending and a change in public expenditures. Together with the monetary arrangement, it leads to lower inflation and hard budget constraints.

Ebel and Yimaz (2003) argued that selecting a variable for decentralization is an important decision in an empirical study because the result depends on the definition of the variable. This paper will use the indicator in Akai and Sakata (2002): the autonomy indicator (degree of fiscal independence). Therefore, this paper estimates a positive relationship between decentralization and economic growth

Government expenditures have a negative impact on economic growth (Aschauer, 1989). Barro (1990) mentioned that the main reason for this negative impact is due to the crowding out effect of taxation.

Weber (1930) argued that religious practices and beliefs have important consequences for economic development. He also argued that the impact of the Protestant and Catholic religions on economic growth is different, positive and negative. Several studies by Barro (1996), Sala-i-Martin (1997), and Barro and McCleary (2003) support that hypothesis and provide empirical evidence. However, for the Islam religion, there is no theoretical framework that mentioned the impact of it on economic growth.

Some empirical studies were undertaken to observe the impact of the Islam religion on economic growth. Barro (1996), Sala-i-Martin (1997), also Barro and McCleary (2003) showed that the Islam religion is positive for economic growth. Therefore, this paper will take a position that the Protestant religion, Catholic Religion, and Islam Religion will have a positive, a negative, and an unclear impact on economic growth, respectively.

Sachs and Warner (1995) argued that trade openness is another important determinant of economic growth; it captures the gains from trade.

Furthermore, it also determines Indonesia's provinces' income. Several studies have confirmed the positive impact of trade on economic growth (Levine and Renelt, 1992; Frankel and Romer, 1996; Amiti and Cameron, 2004; Vidyattama, 2010).

Table 3.2 Expected Impact of the Explanatory Variables

<b>Variables</b>	<b>Expected Impact (Hypotheses)</b>
Investment Ratio	Positive (+)
Education Level	Positive (+)
Population Growth	Unclear (+/-)
Decentralization	Unclear (+/-)
Government Expenditures	Negative (-)
Islam Religion	Unclear (+/-)
Protestant Religion	Positive (+)
Catholic Religion	Negative (-)
Trade	Positive (+)

#### **IV. RESULTS AND DISCUSSIONS**

The statistical summary of the variables used in this paper is presented in Table 4.1. The summary explains the correlation between income per capita and its potential determinants. The GRDP per capita of all of the provinces in Indonesia, during the years of 2006 through 2015, varied between 2.31 million rupiah and 142.87 million rupiah. It is 23.88 million rupiah, on average. There is a correlation in the average ratio of the investment to GRDP. The investment ratio is 0.27 per year. More specifically, the investment ratio is around 0.20 in 2006 and it increases to 0.22 for the next three years. However, starting in 2010, the ratio slightly increased to around 0.30, until it reached 0.32 in 2015.

Human capital also determines the level of income per capita. Human capital, in this paper, is represented by the education level. During 2006-2015, the data illustrated that the average years of schooling is 8.01 years.

Furthermore, the differences in the income per capita are also affected by the population growth. In Indonesia, the population was growing at 2.18% annually between 2006 and 2015. Indonesia is predicted to have a condition where the number of people within the productive age is higher than the number of elderly people and children. Hence, a change in the population's age structure has to be used as a stimulus for economic growth.

During the period of 2006 through 2015, the degree of fiscal independence, as a decentralization indicator, is 0.39, on average. This ratio shows that the degree of fiscal independence of the local governments from the fiscal transfer of the central government is less than 50%. The reason for this is that the share from the central government to the local governments is gradually decreasing.

Government expenditures determine the size of government spending. The ratio of government expenditures to the GRDP of all of the provinces in Indonesia is 0.14, on average. The lowest ratio is 0.03 and the highest ratio is 0.48.

Furthermore, the average proportion of the three major religions adherents in Indonesia, namely Islam, Protestant, and Catholic, are 0.76, 0.13, and 0.05, respectively. Almost 95% of the religious believers in Indonesia come from these three religions.

Last, but not least, is the trade across the provinces. From 2006 until 2015, the size of the exports and imports, as compared to GRDP, among the provinces, is 0.15, on average. The highest number is 0.68.

Table 4.1 Statistical Summary of Variables

<b>Variables</b>	<b>Mean</b>	<b>Std. Dev</b>	<b>Min</b>	<b>Max</b>
GRDP Per Capita	23.88	24.94	2.31	142.87
Investment Ratio	0.27	0.09	0.04	0.50
Education Level	8.01	0.93	5.76	11.00
Population Growth	2.18	2.49	0.04	6.21
Decentralization	0.39	0.20	0.00	0.80
Government	0.14	0.08	0.03	0.48

Expenditures				
Islam Religion	0.76	0.27	0.08	0.99
Protestant Religion	0.13	0.17	0.00	0.66
Catholic Religion	0.05	0.10	0.00	0.58
Trade	0.15	0.15	0.00	0.68

The empirical model will follow the regression with the specification given by Mankiw, Romer, and Weil (1992), Akai and Sakata (2002), Barro and McCleary (2003), and also Vidyattama (2010):

$$\begin{aligned} \ln GRDP_{it} = & \beta_0 + \beta_1 \ln Invest_{it} + \beta_2 \ln Educ_{it} + \beta_3 \ln PopGro_{it} \\ & + \beta_4 \ln Dec_{it} + \beta_5 \ln GovExp_{it} + \beta_6 \ln Religi_{it} \\ & + \beta_7 \ln Trade_{it} + \theta_t + \varepsilon_{it} \end{aligned}$$

where  $i$  refers to a province,  $t$  refers to a period of time,  $\theta_t$  is the time fixed effect,  $\varepsilon_{it}$  is the error term of the model, and  $\beta_j$  is the model's parameter.

For the estimation method, this paper will employ two techniques: 1) the Ordinary Least Squares (OLS) with a Fixed Effects Model, and 2) the Generalized Method of Moments (GMM).

This paper presents two estimation results from two estimation methods. The first results are obtained from the estimation technique (i.e., the OLS with a Fixed Effects Model). In this method, all explanatory variables are assumed to be exogenous. Table 4.2 presents the signs, significances, and magnitudes of the coefficients from the explanatory variables.

Table 4.2 Results of the OLS with a Fixed Effects Model

Variables	Coefficient	Std. Error
Investment Ratio	0.295***	0.060
Education Level	2.067***	0.212
Population Growth	0.012	0.035
Decentralization	-0.167***	0.035
Government	-0.612***	0.041

Expenditures		
Islam Religion	0.054	0.042
Protestant Religion	-0.033	0.027
Catholic Religion	0.104***	0.030
Trade	0.074***	0.017
Observations = 330	F (18,311) = 91.40	
R-squared = 0.841	Prob > F = 0.0000	
Note: *** = $p < 0.01$ , ** = $p < 0.05$ , * = $p < 0.1$		

The estimation results suggest that the explanatory variables (i.e., investment ratio, education level, the proportion of adherents to the Catholic religion, trade across the provinces) have significant positive impacts on the GRDP per capita in Indonesia from 2006-2015. The independent variables (i.e., decentralization, government expenditures) have negative significant coefficients on the GRDP per capita. Population growth, the proportion of adherents to the Islam religion, and the proportion of adherents to the Protestant religion do not affect the GRDP per capita.

In a logarithmic transformation regression model, the coefficient of an explanatory variable will be interpreted as the elasticity. This means that if one explanatory variable changes by one percent and the other explanatory variables are constant, then the dependent variable will change by the coefficient amount (also in a percentage). Therefore, the interpretations of the coefficients of the variables suggest that if the investment ratio, education level, the proportion of adherents to the Catholic religion, and trade across the provinces increase by 1 percent, then GRDP per capita increases by 0.295 percent, 2.067 percent, 0.104 percent, and 0.074 percent, respectively. However, if the decentralization indicator and government expenditures grow by 1 percent, then GRDP per capita falls by 0.167 percent and 0.612 percent, respectively.

In addition, if the population growth and the proportion of adherents to the Islam religion increase by 1 percent, then the GRDP per capita increases by 0.012 percent and 0.054 percent, respectively. However, these variables are not significant in relation to the economic growth of Indonesia. Moreover,

if the proportion of adherents to the Protestant religion grows by 1 percent, then GRDP per capita falls by 0.033 percent. Nonetheless, this variable also does not affect the economic growth of Indonesia.

The next set of results comes from the estimation technique with the GMM. In this method, not all explanatory variables are assumed to be exogenous. This paper will divide the independent variables into two groups. First are the explanatory variables that are treated as exogenous variables. These include population growth, government expenditures, and the proportion of adherents to the Islam religion. Second are the independent variables that are assumed to have reverse causality with the dependent variable (i.e., investment ratio, education level, decentralization, the proportion of adherents to the Protestant religion, the proportion of adherents to the Catholic religion, and trade across the provinces). Therefore, this paper will construct an instrumental variable for the endogenous variables. The results are shown in Table 4.3.

Table 4.3 Results of the Instrumental Variables

<b>Variables</b>	<b>Coef.</b>	<b>SE</b>	<b>Variables</b>	<b>Coef.</b>	<b>SE</b>
Lag (1) LnInvest	0.638***	0.062	Lag (1) LnEduc	0.606***	0.065
Lag (2) Ln Invest	0.052	0.058	Lag (2) LnEduc	-0.130**	0.061
<b>Variables</b>	<b>Coef.</b>	<b>SE</b>	<b>Variables</b>	<b>Coef.</b>	<b>SE</b>
Lag (1) LnDec	-0.144**	0.065	Lag (1) LnProtestant	0.497***	0.079
Lag (2) LnDec	-0.187***	0.065	Lag (2) LnProtestant	0.174**	0.081
<b>Variables</b>	<b>Coef.</b>	<b>SE</b>	<b>Variables</b>	<b>Coef.</b>	<b>SE</b>
Lag (1) LnCatholic	0.081	0.063	Lag (1) LnTrade	0.361***	0.064
Lag (2) LnCatholic	0.380***	0.066	Lag (2) LnTrade	0.018	0.070

Note: \*\*\* =  $p < 0.01$ , \*\* =  $p < 0.05$ , \* =  $p < 0.1$ , SE = Standard

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Error

Error

Based on Table 4.3, this paper will use the lag (1) investment ratio, lag (1) and (2) education level, lag (1) and (2) decentralization indicator, lag (1) and (2) the proportion of adherents to the Protestant religion, lag (2) the proportion of adherents to the Catholic religion, and lag (1) trade across the provinces, as the instrumental variables for the endogenous variables in the GMM estimation technique.

The estimation results from the GMM in Table 4.4 illustrate that the explanatory variables (i.e., investment ratio, education level, population growth, decentralization, trade across the provinces) have significant positive impacts on the GRDP per capita in Indonesia from 2006-2015. The independent variables (i.e., government expenditures, the proportion of adherents to the Islam religion) have negative significant coefficients on the GRDP per capita. However, the proportion of adherents to the Protestant and the Catholic religions do not affect the GRDP per capita.

In the GMM, we will have two tests of validity: the Sargan test and the Arellano and Bond test. Table 4.4 illustrates that the p-value of the Sargan test is 0.630. This means that the instrumental variables, as a group, are exogenous. Furthermore, the p-value of AR (2) is 0.806. This implies that no autocorrelation exists.

Table 4.4 Results of the GMM

<b>Variables</b>	<b>Coefficient</b>	<b>Std. Error</b>
Investment Ratio	0.114*	0.068
Education Level	2.035*	1.177
Population Growth	0.159***	0.032
Decentralization	0.104*	0.058
Government Expenditures	-0.432***	0.060
Islam Religion	-0.237**	0.135
Protestant Religion	-0.145	0.098

Catholic Religion	-0.014	0.092
Trade	0.053***	0.020

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Sargan test:

Chi2 = 38.40 Prob > Chi2 = 0.630

Arellano-Bond test for Autocorrelation:

AR (2): z = -0.25 Prob > z = 0.806

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\*\*\* =  $p < 0.01$ , \*\* =  $p < 0.05$ , \* =  $p < 0.1$

Similar to the case of estimation using the OLS with a Fixed Effects model, in a logarithmic transformation regression model, the coefficient of an explanatory variable can be interpreted as the elasticity. This means that if one explanatory variable changes by one percent and the other explanatory variables are constant, then the dependent variable will change by the coefficient amount (also in a percentage). Therefore, the interpretations of the coefficients of the variables suggest that if the investment ratio, education level, population growth, decentralization indicator, and trade across the provinces increase by 1 percent, then the GRDP per capita increases by 0.114 percent, 2.035 percent, 0.159 percent, 0.104 percent, and 0.053 percent, respectively. However, if government expenditures and the proportion of adherents to the Islam religion grow by 1 percent, then the GRDP per capita falls by 0.432 percent and 0.237 percent, respectively. In addition, if the proportion of adherents to the Protestant and the Catholic religions rise by 1 percent, then the GRDP per capita declines by 0.145 percent and 0.014 percent, respectively. Notwithstanding, these variables do not have a significant effect on the economic growth of Indonesia.

Two variables (i.e., the proportion of adherents to the Protestant religion and the Catholic religion) do not affect the economic growth of Indonesia. An explanation for this counter-intuitive result is the secularization hypothesis. Barro and McCleary (2003) mentioned that, based on the hypothesis of secularization, economic development leads an individual to be less religious. Moreover, it also covers the idea that economic development causes religion to play less of a role in the social and legal processes.



Based on the estimation results, this paper summarizes that both the OLS with a Fixed Effects Model and the GMM can predict the determinants of economic growth in Indonesia at the province level for the given period. However, the estimation technique using the GMM is relatively better, when compared to the OLS with a Fixed Effects Model, due to its ability to handle the endogeneity problem of the right-hand side variables.

## **V. CONCLUSIONS**

By presenting a new data set, this paper attempts to find the determinants of economic growth in Indonesia. 33 provinces of Indonesia and the various factors, which potentially affect the economic growth in Indonesia, are considered by this paper. Hence, this investigation is an important empirical work on growth in Indonesia.

This paper finds several determinants that account positively and negatively for economic growth in Indonesia. The presence of positive significant economic growth determinants illustrates that economic growth at the province level in Indonesia can still be improved upon. On the contrary, the existence of a negative significant economic growth determinant indicates the necessity of reducing that variable in Indonesia's economy.

This paper infers that both the OLS with a Fixed Effects Model and the GMM can predict the determinants of economic growth in Indonesia at the province level for the period provided. However, the estimation technique using the GMM is relatively better than the OLS with a Fixed Effects Model, due to the ability of the GMM method to deal with endogeneity and the reversible causality problem between the left-hand side and the right-hand side variables.

Furthermore, this paper concludes that the investment ratio as the stock of physical capital, education level as the stock of human capital, population growth, decentralization, and trade across the provinces have a significant positive impact on the income per capita. Government expenditures and the proportion of adherents to the Islam religion have a significant negative influence on the income per capita. However, the

proportion of adherents to the Protestant and the Catholic religions do not affect the income per capita.

This paper also reveals that the coefficients are 0.114, 2.035, 0.159, 0.104, and 0.053, for the investment ratio as the stock of physical capital, education level as the stock of human capital, population growth, decentralization, and trade across the provinces, respectively. In addition, the coefficients are -0.432 and -0.237 for the government expenditures and the proportion of adherents to the Islam religion, respectively; these variables have a negative influence on the income per capita. Furthermore, the coefficients are -0.145 and -0.014 for the proportion of adherents to the Protestant and the Catholic religions, respectively; these variables have an insignificant impact on economic growth.

This paper also argues that the positive influence of the determinants of economic growth, from the highest to the lowest, comes from the education level, population growth, physical capital, decentralization, and trade across the provinces. Conversely, the biggest to the smallest negative impact comes from government expenditures and the proportion of adherents to the Islam religion.

Based on the conclusions and findings of this investigation, this paper proposes three policy recommendations. Firstly, to achieve better economic performance, it is necessary for the provincial governments to increase their investment attractiveness to enhance the accumulation of physical capital, improve their education level to create better population quality, increase the provincial governments degree of fiscal independence by improving their own source of income, and open up economic access across the provinces to obtain better spillover effects of trade by reducing the gap of development between the west and east parts of Indonesia.

Secondly, the provincial governments should evaluate their budget management procedure to improve government efficiency in relation to spending budgets (e.g., reducing expenditure allocations to social welfare, subsidies, and transfers that are not related to the economic growth process).

Thirdly, for the proportion of the three major religions, the proportion of adherents to the Islam religion illustrated a negative significant impact, while the proportion of adherents to the Protestant and the Catholic religions was also negative but insignificant. This problem is perhaps more about the secularization hypotheses. Hence, the government should maintain its level of participation in the decision-making processes.

Future research, particularly at the sub-province levels (the municipal and the district levels), is still important. However, data availability will play a crucial role in finding new evidence of economic growth factors in Indonesia. Last but not least, the research about the relation between nations represented by the standard of living, i.e. economic growth, and religion are also important to be conducted.

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## **REFERENCES**

- Akai, N., and Sakata, M. (2002). Fiscal Decentralization Contributes to Economic Growth: Evidence from State-Level Cross-Section. *Journal of Urban Economics*, 52, 93-108.
- Alm, J., Aten, R.H., and Bahl, R. (2001). Can Indonesia Decentralize Successfully? Plans, Problems, and Prospects. *Bulletin of Indonesian Economic Studies*, 37 (1), 83-102.
- Amiti, M., and Cameron, L. (2004). Economic Geography and Wages. Discussion Paper No. 4234, *Centre for Economic Policy Research*, London.
- Aschauer, D. A. (1989). Is Public Expenditure Productive? *Journal of Monetary Economics*, 23, 177-200.
- Barro, R. J. (1990). Government Spending in a Simple Model of Endogenous Growth. *Journal of Political Economy*, 98(5), 103-125.
- Barro, R. J. (1991). Economic Growth in a Cross Section of Countries. *The Quarterly Journal of Economics*, 106(2), 407-443.
- Barro, R. J. (1996). Democracy and Growth. *Journal of Economic Growth*, 1(1), 1-27.
- Barro, R. J., and Lee, J.W. (1994). Sources of Economic Growth (with comments from Nancy Stokey), *Carnegie-Rochester Conference Series on Public Policy*, 40, 1-57.
- Barro, R.J., and McCleary, R.M. (2003). Religion and Economic Growth Across Countries. *American Sociological Review*, 68(5), 760-781.
- Caselli, F., Esquivel, G., and Lefort, F. (1996). Reopening the Convergence Debate: A New Look at Cross-Country Growth Empirics. *Journal of Economic Growth*, 1(3), 363-389.
- Davoodi, H., and Zou, H. (1998). Fiscal Decentralization and Economic Growth: A Cross-Country Study. *Journal of Urban Economics*, 43, 244-257.
- Ebel, R.D., and Yilmaz, S. (2003). On the Measurement and Impact of Fiscal Decentralization. In Martinez-Vasquez, J., and J. Alm (ed.). *Public Finance in Developing and Transitional Countries* (101-119). Massachusetts: Edward Elgar Publishing Limited.
- Ferreira, A. (2000). Convergence in Brazil: Recent Trends and Long-Run Prospects. *Applied Economics*, 32(4), 479-489.

- Frankel, J. A., and Romer, D. (1996). Trade and Growth: An Empirical Investigation. Working Paper No. 5476, *National Bureau of Economic Research, Inc.*
- Garcia-Garcia, J., and Soelistianingsih, L. (1998). Why Do Differences in Provincial Incomes Persist in Indonesia? *Bulletin of Indonesia Economic Studies*, 34(1), 95-120.
- Higgins, M., Levy, D., and Young, A. (2003). Growth and Convergence Across the US: Evidence from County-Level Data. *Emory Economics 0306*, Department of Economics, Emory University (Atlanta).
- Iimi, A. (2005). Decentralization and Economic Growth Revisited: An Empirical Note. *Journal of Urban Economics*, 57, 449-461.
- Levine, R., and Renelt, D. (1992). A Sensitivity Analysis of Cross-Country Growth Regressions. *American Economic Review*, 82(4), 942-963.
- Lin, J. Y., and Liu, Z. (2000). Fiscal Decentralization and Economic Growth in China. *Economic Development and Cultural Change*, 43.
- Lucas, R. E. (1988). On the Mechanics of Economic Development. *Journal of Monetary Economics*, 22, 2-42.
- Mankiw, N. G., Romer, D., and Weil, D. (1992). A Contribution to the Empirics of Economic Growth. *Quarterly Journal of Economics*, 107(2), 407-437.
- Martinez-Vazquez, J., Lago-Peñas, S., and Sacchi, A. (2015). The Impact of Fiscal Decentralization: A Survey. *Working Papers No. 1505*. Universidad de Vigo and Governance and Economics Research Network (GEN).
- Matsui, K. (2005). Post-Decentralization Regional Economies and Actors: Putting the Capacity of Local Governments to the Test. *The Developing Economies*, XLIII (1), 171-189.
- Qian, Y., and Roland, G., (1998). Federalism and the Soft Budget Constraint. *American Economic Review*, 88(5).
- Solow, R. M. (1956). A Contribution to the Theory of Economic Growth. *Quarterly Journal of Economics*, 70(1), 65-94.
- Swan, T. W. (1956). Economic Growth and Capital Accumulation. *Economic Record*, 32(2), 334-61.
- Sachs, J. D., and Warner, A. (1995). Fundamental Sources of Long-Run Growth. *The American Economic Review*, 87(2), 184-188.

- Sala-I-Martin, X. (1997). I Just Ran Two Million Regressions. *AEA Papers and Proceedings*, 87, 178-183.
- Statistical Yearbook of Indonesia (2017). Jakarta: BPS-Statistic Indonesia.
- Vidyattama, Y. (2010). A Search for Indonesia's Regional Growth Determinants. *ASEAN Economic Bulletin*, 27(3), 281-294.
- Weber, M. (1930). *The Protestant Ethic and the Spirit of Capitalism*. London, England: Allen and Unwin.
- Zhang, T., and Zou, H. (1998). Fiscal Decentralization, Public Spending, and Economic Growth in China. *Journal of Public Economics*, 67, 221-240.