

# Regional Economic Growth Analysis: A Comparative Study Between Regions in Indonesia

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## Abstract

The purpose of this study was to analyse regional economic growth in 6 (six) provinces in Java. The research method uses descriptive analysis, with analysis tools using panel data. The results of this study are 1) Total population, education index and agricultural output have a significant effect while the consumption of electrical energy sources does not have a significant effect on the GRDP of the Province in Java Island; and 2) Unemployment rate, inflation rate, poverty rate and government expenditure have a significant effect on economic growth.

**Keywords:** Panel data, economic growth, regional economics.

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## INTRODUCTION

Data from the Central Statistics Agency (BPS) shows that in 2021, national economic growth was 3.61%, with the highest economic growth occurring in Papua Province with growth of 8.22%, followed by Bali Province with growth of 7.07%. The lowest economic growth occurred in West Papua Province with a growth of -2.89%, followed by Aceh Province with a growth of 2.56%. In terms of contribution value, DKI Jakarta Province was 17.23% of GDP, and the lowest contribution value was Gorontalo Province at 0.26%. In 2022, the economic growth of all island groups was recorded to be conducive despite global geopolitical pressures due to increased community activities during the COVID-19 period. Cumulatively, the highest growth (c-to-c) was recorded in the Maluku and Papua Island group which grew by 8.65 per cent, followed by Sulawesi Island by 7.05 per cent, Java Island by 5.31 per cent, Bali and Nusa Tenggara Island by 5.08 per cent, and Kalimantan Island by 4.94 per cent. Furthermore, the group of provinces on Sumatra Island grew by 4.69 per cent.

One of the problems faced in increasing the economic growth of regions in Indonesia is the lack of investment in potential sectors in these regions. This is because investors tend to be more interested in investing in regions that are already developed and have large market potential, while underdeveloped regions

are still less attractive to investors. In addition to the factors previously mentioned, there are several other factors that also affect economic growth in Indonesia, such as the availability of infrastructure, the level of education and skills of the workforce, political stability and security, and government policies that support economic growth. Therefore, it is necessary to conduct an in-depth analysis of the factors that influence economic growth in each region in Indonesia.

## LITERATURE REVIEW

### Economic Growth Theory

This theory explains the factors that influence the economic growth of a region or country. In this study, this theory can be used to analyse the factors that influence regional economic growth in Indonesia, this theory is supported by studies such as [1-2].

### Endogenous Growth Theory

This theory states that internal factors of a region or country can influence economic growth. In this study, this theory can be used to analyse internal factors such as human resources, innovation, and government policies that affect regional economic growth in Indonesia. This theory states that economic growth is not only influenced by external factors such as capital and technology, but also by internal factors such as creativity and innovation. In this case, innovative and creative economic actors have an

important role in driving regional economic growth. This theory is supported by studies such as [3-4].

### **Human Capital Theory**

This theory states that qualified and educated human resources play an important role in driving regional economic growth. In this case, the level of education and school enrolment are important indicators to measure the quality of human capital. This theory is supported by studies such as [5-6].

### **Comparative Theory**

This theory states that a region or country can have a comparative advantage in the production of a particular good or service. In this study, this theory can be used to analyse regional comparative advantage in Indonesia in producing certain products or services. This theory is supported by research such as [7].

### **Spillover Theory**

This theory states that the economic growth of a region or country can have a positive effect on other neighbouring regions or countries. In this study, this theory can be used to analyse the impact of economic growth in a region on other adjacent regions in Indonesia. This theory is supported by studies such as [8-9].

### **Previous research**

The relationship between the population of a country or region and the total value of goods and services produced by the country or region in a given period of time. theoretically, EG can have two different directions of relationship. First, EG is positive, where an increase in population can increase GDP. This is possible because an increase in population can enlarge the domestic market and encourage industrial growth, as well as increase labour supply and domestic consumption. In addition, EG can also be negative, where an increase in population can decrease GDP. There have been many previous researchers on the effect of population on economic growth, including: [10-13], the results of the study were that population had a positive and significant effect on gross regional domestic product. The education index can have a positive impact on a country's Gross Domestic Product through EG. A higher education index can improve the ability of human resources to work more efficiently and introduce new technologies and innovations into production and business. In this case, education can open up opportunities for increased productivity and efficiency in production, which in turn can increase firms' output and income. In addition, education can increase people's purchasing power and enable them to buy more goods and services, which can increase demand and boost economic growth. Research related to the effect of education index on economic growth, among others: [14-15], showing that the average years of schooling has a significant positive effect on economic growth.

Agricultural sector output can have a significant impact on Gross Domestic Product. The agricultural sector can provide raw materials for the food and beverage industry, which can improve the sustainability of production in the supply chain. In addition, the agricultural sector can be a source of income for people and improve their welfare. Research on the effect of agricultural sector output on economic growth, among others: [16-17], found that the agricultural sector has a positive and significant effect on economic growth. Electrical energy consumption is closely linked to economic growth. An increase in a country's Gross Domestic Product is usually followed by an increase in electrical energy consumption, especially in the industrial, commercial, and domestic sectors. The industrial and commercial sectors require electrical energy to run machinery and production equipment, while the domestic sector requires electrical energy to fulfil daily needs such as lighting, air conditioning, and other electrical needs. Therefore, higher electrical energy consumption can be an indicator of positive economic growth. Research related to the effect of energy consumption on economic growth, among others: [18-20], found that energy consumption has a significant effect on economic growth.

The unemployment rate and Gross Domestic Product also have a close relationship through the rate of economic growth. The unemployment rate can affect Gross Domestic Product, both directly and indirectly. Directly, a high unemployment rate can lead to decreased consumption and investment, which in turn can lead to a decrease in Gross Domestic Product. High unemployment can lead to increased social discontent, increased crime, and political instability, which can reduce investor confidence and hinder economic growth. Research on the effect of the unemployment rate on economic growth, among others: [21-23], show that only the unemployment variable has a significant effect on economic growth. Inflation and Gross Domestic Product also have a close relationship through the rate of economic growth. Inflation can affect Gross Domestic Product both directly and indirectly. Directly, high inflation can lead to reduced consumer purchasing power and lower aggregate demand in the economy. As prices of goods and services increase, consumers tend to reduce their purchases and investments. This can reduce national income and output, and ultimately reduce Gross Domestic Product. Previous research on the effect of inflation on economic growth, among others: [24-29], showing that inflation has a positive and significant effect on economic growth.

The poverty rate in a country can also affect the Gross Domestic Product. Although the relationship between the poverty rate and Gross Domestic Product is complex, there are generally several ways in which the poverty rate can affect Gross Domestic Product. Firstly,

the poverty rate can affect consumer purchasing power and aggregate demand in the economy. Second, the poverty rate can affect labour productivity. Thirdly, poverty can affect investment and long-term economic growth. This can hinder long-term economic growth and affect Gross Domestic Product. Previous research on the effect of poverty levels on economic growth includes: [30-33], found that poverty has a significant effect on economic growth. The level of government spending can also affect Gross Domestic Product. In general, the level of government spending can affect Gross Domestic Product in two ways, namely: Firstly, government spending can affect aggregate demand in the economy. Second, government spending can also affect investment and long-term economic growth. Previous research on the effect of the level of government spending on economic growth, among others: [12, 34], the results showed that regional expenditure had a positive and significant effect on Gross Regional Domestic Product.

**RESEARCH METHODS**

This research will use a descriptive method, which is to describe the characteristics of the area under study.

**Analysis Tool**

The analytical tool that will be used is panel data regression analysis to identify factors that affect regional economic growth. In selecting the panel data model, there are several tests that must be carried out [35], including:

**1. Chow Test**

The Chow test is a test to determine the Fixed Effect or Common Effect model that is most appropriate to use in estimating panel data. If the Chi-Square probability value > 0.05 then the selected model is Common effect, if the Chi-Square probability value < 0.05 then the selected model is Fixed Effect.

**2. Hausman Test**

The Hausman test is a statistical test to choose whether the Fixed Effect or Random Effect model is best used. If the cross-sectional random probability output value shows a value < 0.05 then the model chosen is Fixed Effect, while if the value is > 0.05 then the model chosen is Random Effect.

**3. Lagrange Multiplier Test**

This Lagrange Multiplier test is used to determine whether the Random Effect model is better

than the Common Effect method using the Lagrange Multiplier (LM) test. This test uses the Breusch-Pagan method by looking at the P-value if the Breusch-Pagan P-value < 0.05 then use Random Effect otherwise if > 0.05 use Common Effect.

**Research Model**

The panel data regression model that can be used in this study are:

**Model 1**

The main model equation for gross regional domestic product can be written as:

$$GRDP_{it} = \alpha + \beta_1 \text{Log POP}_{it} + \beta_2 \text{Log SMBR}_{it} + \beta_3 \text{EDU}_{it} + \beta_4 \text{Log AGR}_{it} + e$$

Description:

GRDP<sub>it</sub> : gross regional domestic product of province i in year t

Log POP<sub>it</sub>: the natural log of the population of province i in year t

Log SMBR<sub>it</sub> : the natural log of the Electric Energy Source Consumption of province i in year t

EDU<sub>it</sub> : education index of province i in year t

Log AGR : the natural log of the agricultural sector output of province i in year t

e : error term

**Model 2**

The control model equation for the dependent variable GDP can be written as:

$$GRDP_{it} = \alpha + \beta_1 PG_{it} + \beta_2 Inf_{it} + \beta_3 Kem_{it} + \beta_4 PP_{it} + e$$

Description:

GRDP<sub>it</sub> : gross regional domestic product of province i in year t

PG : the unemployment rate of province i in year t

Inf : the inflation rate of province i in year t

Kem : the poverty rate of province i in year t

PP : the level of government expenditure of province i in year t

e : error term

**RESULTS AND DISCUSSION**

**The effect of population, consumption of electrical energy sources, education index and agricultural output on GRDP of provinces in Java Island**

The first step in this panel data analysis is to test the model that will be used in answering the first problem identification, namely testing the model as follows:

**Table 1: Chow Test Results**

CHOW TEST	Effects Test	Statistic	d.f.	Prob.
		Cross-section F	36.355191	(5,20)
	Cross-section Chi-square	69.342770	5	0.0000
HAUSMAN TEST	Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
		Cross-section random	181.775954	4

Source: Data Processing Results

The chow test shows that the probability value of the cross-section F is 0.0000, which means that the value is less than  $\alpha = 0.05$  or P-value = 0.0000 <0.05, so the chosen estimation model is the Fixed Effect Model (FEM). The Hausman test shows that the probability value is 0.0000, which means that the value is less than

$\alpha = 0.05$  or P-value = 0.0000 <0.05. Then the selected estimation model is the Fixed Effect Model.

**Panel Data Analysis Model Results**

The model selected based on the results of data testing is the fixed effect model (FEM), resulting in the following equation:

**Table 2: Results of Panel Data Regression Analysis**

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	7.449011	0.026537	280.7054	0.0000
LOG(POP?)	0.012054	0.001311	9.196228	0.0000
LOG(SMBR?)	-0.002058	0.002459	-0.836953	0.4125
EDU?	2.42E-11	7.84E-12	3.092801	0.0057
LOG(AGR?)	0.004236	0.000850	4.985669	0.0001
Fixed Effects (Cross)				
_JAWABARAT—C	-0.006080			
_JAWATENGAH—C	-0.000564			
_JAWATIMUR—C	-0.007387			
_YOGYAKARTA—C	0.020354			
_JAKARTA—C	-0.012295			
_BANTEN—C	0.005973			

Source: Data Processing Results

Based on the table above, it can be interpreted as follows:

The constant value of each cross-section (6 provinces on the island of Java) which is the result of the sum of the constant value of all provinces on the island of Java with the constant value of each province on the island of Java. When the independent variables, namely population, consumption of electrical energy sources, education level, and total rice yield are not included in the model or equal to zero (independent variable = 0), then the highest Gross Regional Domestic Product P is in the province of Yogyakarta at 7.469365, Banten province at 7.454984, and Central Java province at 7.448447 while the smallest Gross Regional Domestic Product is in the province of East Java at 7.441624, Jakarta province at 7.436716, and West Java province at 7, 441624. The higher the constant value, this illustrates the better the Gross Regional Domestic Product in the province, otherwise the smaller the constant value of a province, the worse the Gross Regional Domestic Product. The population has a significant positive effect on the gross regional domestic product variable (probability value of 0.0000 <0.05), in line with research [10-13], stating that population has a significant positive effect on gross domestic product.

Electrical energy consumption (SMBR) has a negative and insignificant effect on the gross regional domestic product variable or GRDP. probability value of 0.4125 > 0.05), in line with research [18-20], it was found that energy consumption which has a significant effect on economic growth in the short term is road infrastructure. The education index has a significant positive effect on the gross regional domestic product variable (probability value of 0.0000 <0.05), in line with research [14-15], showing that RLS and HLS have a significant positive effect on economic growth. Agricultural sector output (rice) has a significant positive effect on the gross regional domestic product variable (probability value of 0.0001 <0.05.), in line with research: [16-17], found that the agricultural sector has a positive and significant effect on economic growth.

**The effect of unemployment rate, inflation rate, poverty rate and government expenditure on GRDP of provinces in Java Island**

The first step in this panel analysis is to test the model that will be used in answering the first problem identification, which is as follows:

**Table 3: Chow Test Results**

CHOW TEST	Effects Test	Statistic	d.f.	Prob.
	Cross-section F	9.240900	(5,20)	0.0001
	Cross-section Chi-square	35.910486	5	0.0000
HAUSMAN TEST	Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
	Cross-section random	46.204502	4	0.0000

## Source: Data Processing Results

The chow test shows that the probability value of the cross-section F is 0.0000, which means that the value is less than  $\alpha = 0.05$  or P-value = 0.0000 < 0.05, so the chosen estimation model is the Fixed Effect Model (FEM). The Hausman test shows that the probability value is 0.0000, which means that the value is less than

$\alpha = 0.05$  or P-value = 0.0000 < 0.05. Then the selected estimation model is the Fixed Effect Model.

**Panel Data Analysis Model Results**

The model selected based on the results of data testing is the fixed effect model (FEM), resulting in the following equation:

**Table 4: Results of Panel Data Regression Analysis**

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	7.593170	0.002677	2836.343	0.0000
UNEMPLYMENT?	7.18E-09	1.83E-09	3.920525	0.0008
INFLATION?	0.000211	7.89E-05	2.667486	0.0148
PROVERTY?	0.000169	6.51E-05	2.601154	0.0171
LOG (GOVERNMENT EXPENDITURE?)	0.003488	0.001332	2.618720	0.0164
Fixed Effects (Cross)				
_JAWABARAT--C	-0.002615			
_JAWATENGAH--C	0.000516			
_JAWATIMUR--C	-0.004027			
_YOGYAKARTA--C	0.006893			
_JAKARTA--C	-0.006696			
_BANTEN--C	0.005930			

Source: Data Processing Results

Based on the table above, it can be interpreted as follows

The constant value of each cross-section (6 provinces on the island of Java) which is the result of the sum of the constant value of all provinces on the island of Java with the constant value of each province on the island of Java. When the independent variables, namely the unemployment rate, inflation rate, poverty rate, and government expenditure are not included in the model or equal to zero (independent variable = 0), then the highest Gross Regional Domestic Product is in the province of Yogyakarta at 7.600063, Banten province at 7.5991, and Central Java province at 7.593686 while the smallest Gross Regional Domestic Product is in the province of West Java at 7.590555, East Java province at 7.589143, and Jakarta province at 7, 586474. The higher the constant value, this illustrates the better the Gross Regional Domestic Product in the province, on the contrary, the smaller the constant value of a province, the worse the Gross Regional Domestic Product.

The unemployment rate has a significant positive effect on the gross regional domestic product (GRDP) variable (probability value of 0.0008 < 0.05), in line with research [21-23], showing that only the unemployment variable has a significant effect on economic growth. The inflation rate has a significant positive effect on the gross regional domestic product (GRDP) variable (probability value of 0.0148 < 0.05), in line with research [24-29], showing that inflation has a positive and significant effect on economic growth. The poverty rate has a significant positive effect on the

gross regional domestic product variable (GRDP) probability value of 0.0171 < 0.05, in line with research [30-33], found that poverty has a significant effect on economic growth. Government spending has a significant positive effect on the gross regional domestic product (GRDP) variable (probability value of 0.0164 < 0.05), in line with research [12, 34], the results showed that local spending has a positive and significant effect on Gross Regional Domestic Product.

**CONCLUSIONS**

1. Population, education index and agricultural output have a significant effect while the consumption of electrical energy sources does not have a significant effect on the GRDP of provinces in Java Island.
2. Unemployment rate, inflation rate, poverty rate and expenditure have a significant effect on GRDP of provinces in Java Island.

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