

DETERMINANTS OF ECONOMIC GROWTH IN CENTRAL JAVA: INVESTMENT, LABOR FORCE, FISCAL INDEPENDENCE, AND HUMAN DEVELOPMENT

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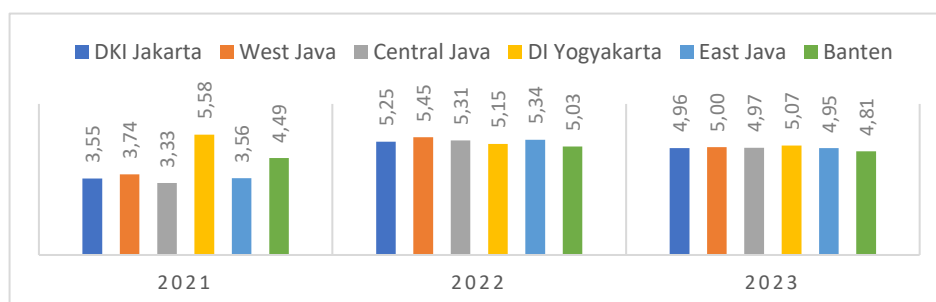
Abstract

In Central Java Province, economic growth between 2021 and 2023 remained the lowest among Java Island's provinces, despite being influenced by internal factors such as investment, labor force, fiscal autonomy, and the Human Development Index (HDI). This study investigates the effect of these variables on economic growth across 35 districts and cities using a panel data regression approach. Data were sourced from the Central Statistics Agency and the Directorate General of Treasury, and analyzed using the Fixed Effect Model (FEM) in EViews 10. The results indicate that investment has no significant impact, while the labor force and fiscal autonomy ratio both negatively and significantly affect growth. In contrast, HDI has a positive and significant effect. These findings suggest the need for improved investment climate, better workforce quality through education and training, efficient fiscal management, and prioritization of human development to support sustainable regional growth.

Keywords: Investment, Labor Force, Fiscal Independence Ratio, HDI, Economic Growth

INTRODUCTION

Economic growth can be understood as one of the indicators used to assess the success of a country. Economic growth is a sustainable increase in per capita output that must be faced by every country in the hope of a large economic improvement. The main goal of each country is to accelerate the pace of economic growth. Economic growth is defined as a process that takes place continuously in the long term in the form of an increase in output per capita (Purnamasari et al., 2021). Indonesia's economy spatially in the fourth quarter of 2023 showed positive growth in all regions. The contribution of Java Island to Indonesia's Gross Domestic Product (GDP) reached 57.05%. This shows that Java remains the main driver of the Indonesian economy, with economic growth reaching 4.96%.



Source: Indonesian Central Statistics Agency

Figure 1. Provincial Economic Growth in Java (Percent)

Figure 1 shows that Central Java Province recorded the lowest average economic growth among other provinces on the island of Java, although there was an upward trend in several important variables such as investment, labor force, fiscal independence ratio, and Human

Development Index (HDI). This condition shows that there is an inefficiency in the optimal use of regional economic resources. As one of the largest provinces on the island of Java with abundant natural resources, Central Java has great potential to encourage regional economic growth.

In addition, economic progress can be driven by investment which plays a role as one of the key elements. Economic growth can be positively influenced through capital allocation in various areas, especially when investment in infrastructure and public services is increased in the region (Isnowati et al., 2023). In recent years, investment, both Domestic Investment and Foreign Investment, has increased. However, its contribution to productive economic activities and job creation has not been maximized. Meanwhile, the ever-increasing number of labor force is not balanced by the availability of adequate employment, which indicates a mismatch between the labor market and the quality of human resources.

The increasing ratio of regional fiscal independence also does not fully reflect the effectiveness of regional financial management to support growth. On the other hand, HDI shows a positive trend and signals that the quality of human resources plays an important role in long-term development.

This study aims to analyze the influence of investment, labor force, regional financial independence ratio, and HDI on economic growth in Central Java Province during the 2021–2023 period. This study uses a quantitative approach with a panel data regression method and covers 35 districts/cities. Thus, this study is expected to provide a comprehensive overview of the factors that contribute to regional economic performance after the pandemic.

Theoretically, this research contributes to the development of development economics, especially in understanding the relationship between internal factors such as investment, labor, fiscal capacity, and the quality of human resources to regional economic growth. This research is also complementary to previous studies by providing the latest empirical evidence from the regional context of Central Java. Practically, the results of this research can be used as policy input by local governments in formulating more effective and data-based economic development strategies.

The novelty of this study lies in the use of the fiscal independence ratio variable as an indicator of regional fiscal capacity in encouraging economic growth, as well as a deeper understanding of the dynamics of the workforce which is not only seen from its number, but also from its quality and competitiveness. In addition, this research focuses on the post-pandemic period, which provides a new perspective on the effectiveness of regional economic policies in facing global challenges.

LITERATURE REVIEW AND HYPOTHESIS FORMULATION

A. Neoclassical Growth Theory (Solow-Swan)

The neoclassical Solow-Swan theory of growth, developed by Robert Solow and Trevor Swan in 1956, emerged as a correction to the limitations of the Harrod-Domar model in explaining long-term growth. This theory emphasizes the important role of technological advancement, and assumes diminishing returns on capital and labor. This model uses the function of production that allows substitution between capital (K) and labor (L), as well as introducing technology (A) as the main factor of production efficiency. Economic growth in this model comes from three main sources: capital accumulation, an increase in the number of labor, and technological advances, which are formulated with the production equation $Y = Af(K, L)$.

The Solow-Swan model also explains that in the long run, an economy will reach a steady-state state, which is a state in which output and capital per capita grow constantly without fluctuations. Under these conditions, the increase in productivity is mainly dependent on technological advancements. Capital growth is determined by the level of savings and investment, while the labor force is represented by the number of productive population.

Technological improvements, for example through the adoption of machines and innovation, are the main keys in driving long-term output.

B. Theory endogenous

The theory of endogenous growth was developed in response to the limitations of classical and neoclassical theory, especially in explaining the long-term growth variation between countries. This theory emphasizes that economic growth is influenced by internal (endogenous) factors such as technology, knowledge, and human capital. Paul Romer, the main pioneer of this theory, stated that investment in science and technology, especially through research and development, can drive sustainable growth. He introduced the concept of increasing returns to scale, in contrast to neoclassical theories that assume diminishing returns. In mathematical formulations, Romer states the following production functions:

$$Y(t) = K(t)^{\alpha} H(t)^{\gamma} [A(t)L(t)^{1-\alpha-\gamma}]$$

Information:

K : Physical capital

H : Human capital

A : Technological developments

L : Labor

This theory also highlights the role of knowledge spillover, which is the spread of ideas and innovations from one entity to another, which strengthens economic growth. This explains why developed countries tend to grow faster. However, this theory has been criticized for assuming ideal conditions such as perfect markets and homogeneity of the production sector, which are not entirely in line with the conditions of developing countries. However, endogenous growth theory provides a new understanding that technological advances and the improvement of the quality of human resources can be designed and produced from within the economic system itself, not just from outside.

C. Investment

Investment is the process of allocating funds to various types of assets over a certain period of time to earn income or increase the value of assets. In the context of economic development, investment has a strategic role because it is able to expand businesses, improve production facilities, create jobs, and encourage sustainable economic growth (Paramita & Christianingrum, 2022). According to Law No. 25 of 2007, investment includes all activities carried out by domestic and foreign investors to run a business in Indonesia, and is an important component in the Gross Regional Domestic Product (GDP) of a region.

Domestic Investment is carried out by local investors with their own resources and has a number of benefits such as saving foreign exchange, reducing import dependence, encouraging local industries, and absorbing labor (Wiganepdo & Soegoto, 2022). Meanwhile, Foreign Investment (FDI) is an investment by foreign investors that brings benefits in the form of job creation, technology transfer, and contribution to foreign exchange acquisition (Hadi et al., 2018). Synergy between FDI and PMDN can strengthen regional development, especially in disadvantaged and border areas, although its implementation requires regulatory support and investment-friendly government policies (C. S. Dewi & Hutomo, 2021).

Investment plays an important role in driving economic growth through increased production, job creation, infrastructure improvement, and increased regional income (Murti & Sahara, 2019; Prabawati & Moh. Dian Qurnia, 2021). Research shows that optimal investment allocation, such as in Batang Hari Regency, is able to drive economic growth significantly, so a combination of infrastructure and industrial investment and policies that support the investment climate are needed (Habriyanto et al., 2022; Sopian et al., 2021).

Hypothesis 1: Investment has a positive effect on economic growth

D. Labor Force

The workforce includes all individuals in the productive age range of 15–64 years who are working, looking for work, or starting a business (Sondakh et al., 2024). Individuals who belong to the labor force are not only those who work, but also those who have the desire and ability to work physically and mentally, as well as juridical freedom in choosing work (Adriyanto et al., 2020; Loka et al., 2024).

According to Central Java Statistics Agency (2024), the labor force is divided into two main groups: those who work and those who are unemployed. Employed individuals are those who, for at least one hour in the week prior to the survey, engage in productive activities to earn an income. This includes permanent workers who are inactive due to leave, illness, or other reasons. They are still counted as part of the active workforce because they are tied to work.

Meanwhile, the unemployed group consists of individuals who do not have a job yet but are looking for, or those who are in a transition period to get a new job. This includes those who have worked but are currently looking for a job. Thus, the labor force includes all economically active individuals of productive age, both those who are working and those who are looking for work.

The workforce is a key element in economic growth because increased participation can drive the productivity, efficiency, and competitiveness of local industries in a sustainable manner (Kurniawan et al., 2023; Syamsuddin et al., 2021). The quality of the workforce supported by education and training plays an important role in increasing economic competitiveness, so human resource development must be a priority in long-term development strategies (Insana & Mahmud, 2021; Rabbani & Hasmarini, 2024).

Hypothesis 2: The labor force has a positive effect on economic growth

E. Regional Financial Independence Ratio

The Regional Fiscal Independence Ratio (RFIR) describes the ability of local governments to finance the implementation of government, development, and public services independently without over-relying on funds from the central or provincial governments. The higher the ratio value, the more fiscally independent the region will be, which reflects the effectiveness of financial management and community participation in paying taxes and levies (Fathah, 2017; Hariani, 2021). The formula used to calculate RFIR is:

$$\text{Independence Ratio} = \frac{\text{Local Government Revenue}}{\text{Transfer Revenue}} \times 100\%$$

The low ratio indicates high dependence on central funds and weak public tax awareness (Karenina et al., 2021). In the context of the financial relationship between the central and the regional governments, the value of this ratio determines the pattern of the relationship:

Table 1.1 Relationship Patterns and Ability Levels of Regions

Financial Ability	Independence (%)	Relationship Patterns
Very Low	0% - 25%	Instructive
Low	25% - 50%	Consultative
Keep	50% - 75%	Participatory
Tall	75% - 100%	Delegative

Source: Fathah (2017)

Thus, increasing the ratio of regional financial independence not only accelerates regional progress, but also strengthens the implementation of fiscal decentralization and regional autonomy in a sustainable manner (Fathah, 2017).

Regions with high fiscal independence have greater budgetary flexibility to allocate public investment in strategic sectors such as infrastructure, education, and health, which contributes to long-term economic growth (Prakoso et al., 2019). Conversely, a high reliance on

transfer funds can limit regional fiscal autonomy and hinder strategic investment. Therefore, increasing the ratio of regional financial independence is an important factor in encouraging local economic growth (Woestho et al., 2020).

Hypothesis 3: The ratio of regional financial independence has a significant positive effect on economic growth.

F. Human Development Index

HDI or Human Development Index (HDI) is a composite indicator introduced by UNDP in 1990 to measure overall human development achievements. HDI includes three main dimensions: (1) health and longevity, measured by Life Expectancy (AHH); (2) education, measured from Expected School Length (HLS) and Average School Length (RLS); and (3) a decent standard of living, measured through Gross National Product (GNP) per capita. The HDI score is in the range of 0–100, the higher the value indicates the better the quality of human development. The HDI calculation formula is as follows:

$$HDI = \sqrt[3]{I_{Health} \times I_{Education} \times I_{Expenditure}} \times 100$$

Information:

HDI = Human Development Index

I_{health} = Health Index

I_{education} = Education Index

I_{expenditure} = Expenditure Index

Increasing HDI is highly dependent on the quality of human resources, which requires sustainable development in the areas of health, education, and the economy. The government needs to create an environment that supports a healthy lifestyle, expands access to quality education, and increases people's income and skills, especially the poor (Dewi, 2017).

Areas with high HDI tend to experience faster economic growth because they have quality human resources in the aspects of education and health, which encourages productivity (Mahroji & Nurkhasanah, 2019; Nahak, 2022). HDI also reflects the success of development policies, where improving access to education and health services not only improves the quality of the workforce, but also attracts investment and creates a conducive economic climate (Lutfi & Fitria, 2023). Thus, there is a reciprocal relationship between increased HDI and sustainable economic growth.

Hypothesis 4: HDI has a positive effect on economic growth

RESEARCH METHODS

A. Types of Research

This research uses a descriptive quantitative approach based on the positivism paradigm, with the aim of describing the phenomenon systematically and objectively. This method focuses on investigating a population or sample through data collection using a predetermined instrument, then statistically analyzed to test the hypothesis (Darna & Herlina, 2019).

B. Research Object and Research Subject

The object of this research is economic growth in Central Java Province. Meanwhile, the research subjects cover various aspects, such as investment data, the number of labor force, the ratio of regional financial independence, and the HDI in the province. Data collection will be carried out over a certain period of time to ensure in-depth and comprehensive analysis.

C. Research Data Collection Techniques

The information collection technique will be carried out through documentation methods and observation of data in BPS, DJPb and other administrative documents. The goal is

to ensure the accuracy and reliability of the data that will be used in the analysis (Safitri & Susilo, 2024).

D. Panel Data Regression Analysis

Panel data regression analysis, which combines cross section and time series data, was chosen in this study because it was able to increase the degree of freedom and produce more accurate estimates and overcome the problem of missing variables (Nikmah, 2023):

$$PE_{it} = \alpha + \beta_1 LNI_{it} + \beta_2 LNA_{it} + \beta_3 RK_{it} + \beta_4 IPM_{it} + e_{it} \dots \dots \dots (1)$$

Information:

PE = Economic Growth

α = Konstanta

β = Independent Variable Coefficients

Inv = Investment

AK = Workforce

RK = Independence Ratio

IPM = Human Development Index

i = Territorial units (cross section)

t = Time unit (time series)

e = error term

E. Classic Assumption Test

- 1) The Heteroscedasticity test is performed to ensure that the residual variance is constant; The Glejser method is used, and if the significance ≥ 0.05 then heteroscedasticity does not occur (Fuada, 2023; Novianingtyas & Bagana, 2022).
- 2) The Multicollinearity test aims to detect high correlations between independent variables using VIF, where the VIF values < 10 and Tolerance > 0.1 indicate the absence of multicollinearity (Andriani, 2017; Awaludin et al., 2023)
- 3) The Autocorrelation test is used to determine the relationship between residuals in different periods using the Breusch-Godfrey test, and autocorrelation does not occur if the probability value is $> 5\%$ (Nurianti et al., 2024).

F. Coefficient of Determination (R^2)

The determination coefficient (R^2) is used to measure how much variation of dependent variables can be explained by independent variables in a regression model, with values ranging from 0 to 1 (Fuada, 2023). A value of R^2 close to 1 indicates that the model is able to explain most of the data variability, while a low value indicates that the model's predictive ability of dependent variables is still limited (Zaka & Sutopo, 2017).

G. F Test

The F test is used to test whether an independent variable simultaneously has a significant effect on the dependent variable in a regression model (Sasmita et al., 2023). This test helps determine the overall significance of the model, where significant results show that at least one independent variable has an influence on the dependent variable, namely economic growth.

- 1) If the significant value of $F \leq 0.05$ (α) then H_0 is rejected and H_1 is accepted. This means that it shows that all independent variables have a significant influence on the dependent variables.
- 2) If the significant value of $F > 0.05$ (α) then H_0 is accepted and H_1 is rejected. This means that all independent variables have no significant effect on the dependent variables.

H. T test

The t-test is used to measure the influence of each independent variable partially on the dependent variable, by comparing the calculated t-value with the t table or looking at the significance value (Rudini, 2017).

- 1) If the value t calculates t of the table then H_0 is rejected. This means that partially independent variables have an effect on dependent variables.
- 2) If the value t is calculated $> t$ of the table then H_0 is accepted. This means that partially independent variables have no effect on dependent variables.

RESULTS AND DISCUSSION

A. Classic Assumption Test

Based on the results of the classical assumption test, the regression model in this study meets the required criteria. The heteroscedasticity test showed that all variables had a probability value (Prob.) greater than 0.05, namely: LNINV of 0.1207, LNAK 0.9426, RK 0.9622, and HDI of 0.7779, so it can be concluded that there were no symptoms of heteroscedasticity.

In the multicollinearity test, all independent variables had a Variance Inflation Factor (VIF) value of less than 10, namely: LNINV of 1.4836, LNAK of 1.4787, RK 1.6469, and HDI of 1.5944, which means that there is no problem of multicollinearity between variables.

Meanwhile, the results of the autocorrelation test using the Breusch-Godfrey method showed that the probability value of Obs*R-squared was 0.6803 (> 0.05), and the probability of $F(2.98)$ was 0.6971, so it can be concluded that there are no symptoms of autocorrelation in the model. With the fulfillment of these three classical assumption tests, the regression model is feasible to use for further analysis.

B. Panel Data Regression Analysis

The study was conducted to analyze the influence of independent variables on dependent variables. The following are the results of the regression of panel data with the best Fixed Effect Model (FEM) model in this study:

Table 1.5 Statistical Test Estimation Results

Variable	Coefficient	t-Statistic	Prob.
C	-1,964,928	-1,047,725	0,2986
LNINV	0,022034	0,152211	0,8795
LNAK	-6,790,766	-3,709,342	0,0004
RK	-0,064580	-2,190,218	0,0320
IPM	1,570,762	7,648,016	0,0000
R-squared	0.754947		
F-statistic	5,350,787		
Prob(F-statistic)	0,000000		

Source: Data processed, Eviews 2025

Based on Table 1.5 The results of the panel data regression estimation with the FEM model can be obtained an equation as follows:

$$PE_{it} = -19,649 + 0,022LNINV_{it} - 6,790LNAK_{it} - 0,064RK_{it} + 1,570IPM_{it} \dots \dots \dots (2)$$

Coefficient of Determination

Based on Table 1.4, the value of the R-squared determination coefficient is 0.754947. This means that 75.49% of the variation in the Economic Growth variable can be explained by the variables Investment, Labor Force, Independence Ratio, and HDI.

Test F

The value of F_{cal} is 5.350787 and F_{table} is 2.46, so $F_{cal} > F_{table}$. While the value of Prob(F-statistic) is 0.000000 which is smaller than the significance of 0.05. Because the Prob(F-statistic) value < 0.05 , H_0 is rejected, meaning that independent variables, namely Investment, Labor

Force, Independence Ratio, and HDI have a significant influence simultaneously on Economic Growth in 35 Regencies/Cities in Central Java Province.

T test

- 1) The Investment variable has a $t_{\text{calculated}}$ value of $< t_{\text{table}}$ ($0.152211 < 1.984$), and a prob value of $0.8795 > 0.05$. This means that the investment variable does not have a significant influence on economic growth. In line with the Central Statistics Agency's report which noted the number of post-pandemic delayed investment projects and the dominance of investment in the non-productive stage (Central Statistics Agency, 2024). Although investment realization has increased, the impact on GDP has not been felt because funds have not been optimally channeled to the productive sector. These findings are supported by research Hellen et al. (2018) in Malinau Regency which also found that investment was insignificant to economic growth, among other things due to bureaucratic obstacles such as illegal levies.
- 2) Labor Force variable $t_{\text{calculated}}$ value $< t_{\text{table}}$ ($-3.709342 < 1.984$), prob value $0.0004 < 0.05$. This means that the labor force variable has a significant negative effect on economic growth. This is due to the high open unemployment rate, low absorption of the formal sector, and mismatch between labor skills and industrial needs (mismatch). Most of the labor is still absorbed in the informal and agricultural sectors with low productivity, so its contribution to the Gross Regional Domestic Product (GDP) is limited. These findings are in line with research Wicaksono (2022) which concludes that the increase in the number of workers does not have a significant impact on regional economic growth if it is not accompanied by an improvement in the quality of human resources. According to the theory of endogenous growth, the quality of human resources is the main key.
- 3) Independence Ratio variable The value of the $t_{\text{calculated}} < t_{\text{table}}$ ($-2.190218 < 1.984$), prob value $0.0320 < 0.05$. This means that the independence ratio variable has a significant negative effect on economic growth. Increasing PAD does not automatically drive productivity if it is not accompanied by effective budget management. Within the framework of the Solow-Swan theory, this shows a decrease in the efficiency of factor A (technology and institutional), where PAD is widely used for operational expenditure rather than productive expenditure. In fact, excessive tax intensification can reduce people's purchasing power and pressure the business sector. These findings are reinforced by research Hariani (2021) which states that fiscal independence does not necessarily boost growth without efficient and pro-development budget governance. Therefore, strengthening outcome-based fiscal management is indispensable so that the self-reliance ratio truly reflects inclusive and sustainable economic progress.
- 4) The HDI variable is $t_{\text{calculated}} > t_{\text{table}}$ ($7.648016 > 1.984$), and prob value $0.0000 < 0.05$. This means that the HDI variable has a positive and significant effect on economic growth. Areas with high HDI such as Semarang and Salatiga City recorded stable economic growth, while areas with low HDI such as Pemalang and Magelang City tended to experience slow growth. This shows that increasing HDI not only has a social impact but also is strategic in supporting regional economic growth. This research is in line with the findings Ginting & Setianingtias (2022) which states that areas with high HDI tend to have higher economic growth because they are supported by healthy, educated, and strong purchasing power. Therefore, increasing HDI must be a development policy priority to achieve inclusive and sustainable economic growth.

CONCLUSION

A. Conclusion

This study concludes that of the four variables analyzed, only the Human Development Index (HDI) has a positive and significant effect on economic growth in Central Java Province for

the 2021-2023 period, while investment does not have a significant influence, and the labor force and regional financial independence ratio have a significant negative effect. These findings show that the quality of human resources is the most dominant factor in driving economic growth, while increased investment, labor force, and fiscal autonomy have not been accompanied by adequate effectiveness and productivity.

B. Implication

Based on the results of the research, local governments need to focus on improving the quality of economic growth through four main strategies: strengthening investment promotion by creating a conducive climate, simplifying licensing, and infrastructure development; improving the quality of the workforce through vocational training, education, and skills certification; optimize regional financial management efficiently and independently by encouraging the improvement of PAD; and strengthening the key dimensions of HDI—education, health, and decent living standards—through access to basic services and evaluation of social assistance programs such as KIP and KIS to be more targeted.

C. Research Limitations

This study has several limitations, including not including external variables such as political stability, national fiscal policy, and the impact of the COVID-19 pandemic that can affect the relationship between investment and economic growth. In addition, the use of the logarithm of the value of the investment may not fully represent the effectiveness of the investment. Therefore, the results of this study need to be interpreted carefully and can be used as a reference for further research with a wider scope of variables and periods.

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