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ANALYSIS OF CENTRAL JAVA'S ECONOMIC GROWTH IMPACT FACTORS

Metha Pramantha[1*], Suharno[2]

[12]Department of Economics and Development Studies, Universitas Jenderal Soedirman, Indonesia

[*]Email corresponding author: metha.pramantha@mhs.unsoed.ac.id

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Abstract

This study aims to analyze the influence of foreign direct investment (FDI), domestic investment (DI), skilled labour (SL) and unskilled labour (UL) on economic growth measured by Gross Regional Domestic Product (GRDP). This study uses a quantitative approach with secondary panel data from the regency areas in Central Java Province during 2017–2025. The data were analyzed using the panel data regression with Fixed Effect Model (FEM). The results show that FDI, Skilled Labour and Unskilled Labour has a positive and significant effect, while Domestic Investment has a positive but insignificant effect on GRDP. All four independent variables have a simultaneous significant impact on economic growth.

Keywords: Foreign Direct Investment, Domestic Investment, Skilled Labour, Unskilled Labour, Economic Growth.

INTRODUCTION

Economic growth is one of the main criteria for assessing the effectiveness of regional development. It is a measure of how an economy is getting more capable of producing goods and services over time. It is usually measured at a regional level using the Gross Regional Domestic Product (GRDP). An increase in GRDP means that the local economic growth, the capacity of production and the opportunities for the region to provide welfare, employment and revenue for the society are increasing. Therefore, economic growth is an important consideration in the regional development planning, especially for the regions that have the potential but have not yet reached their optimal growth.

As per Solow-Swan Neoclassical Growth Theory , economic growth is determined by factors like labour, capital accumulation and technological progress. This view allows for capital from domestic and foreign direct investment. Investment supports increased production capacity, increased economic activity and promotes job creation. Labour is as important as capital because industrial activities cannot be carried out without human resources. The quantity and quality of a region's personnel improves the region's output production.

Table 1. GRDP Growth by Province in Java Island, 2017-2025 (Billion Rupiah)

Province	2017	2018	2019	2020	2021
DKI Jakarta	1,635,359.15	1,735,208.29	1,836,240.55	1,792,291.09	1,856,000.70
Growth	-	6.11	5.82	-2.39	3.55
Jawa Barat	1,343,662.14	1,419,624.14	1,490,959.69	1,453,380.72	1,507,746.39
Growth	-	5.65	5.02	-2.52	3.74
Jawa Tengah	893,750.30	941,091.14	991,516.54	965,227.27	997,321.13
Growth	-	5.30	5.36	-2.65	3.33
DI Yogyakarta	92,300.24	98,024.01	104,485.46	101,698.52	107,372.56

Growth	-	6.20	6.59	-2.67	5.58
Jawa Timur	1,482,299.58	1,563,441.82	1,649,895.64	1,611,392.55	1,668,754.36
Growth	-	5.47	5.53	-2.33	3.56

Source: BPS (2026), processed by the author

Based on the average economic growth data in the above table, Central Java had the lowest average economic growth rate compared to the other provinces in Java Island, which was 3.99 percent. This indicates that although Java Island has a high GRDP and is the center of the economy of the country, the interprovincial economic growth in the island is not stable. The GRDP of Central Java has continued to grow every year, but its average economic growth is still below DKI Jakarta, West Java, DI Yogyakarta, and East Java. The low average economic growth in Central Java could be seen as an indication that the economic output has not yet reached its full potential. Thus, more studies are needed to identify the determinants of economic growth such as skilled and unskilled labour, domestic investment and foreign direct investment.

This study is conducted in Central Java regencies because they have relatively similar economic characteristics. Generally, regions still have greater potential for economic growth, especially in terms of absorption of the workforce, investment and the development of productive industries. Therefore, the analysis of regencies can provide a more realistic picture of the contribution of labour and investment to regional economic growth.

The data used in this study are 29 regencies in Central Java. This is because the regencies and cities have different economic characteristics. Such differences may result in residual variation turning non-constant when regencies and cities are combined in a single model, which will result in heteroscedasticity as the magnitude of GRDP, investment, and labour in the municipalities is usually considerably different from that in regencies. Regional Characteristics are more comparable if only regency level data are used. Therefore, the model is more likely to satisfy the homoscedasticity condition and the variance among data becomes more stable.

This study examines the impact of Foreign Direct Investment, Domestic investment, skilled labour and unskilled labour on economic growth. The debate is on the relationship between investment and quality of labour as determinants of regional economic growth. Therefore, in addition to the contribution of capital through FDI and DI, this study investigates the degree to which the quality of labour can add to or subtract from the effect of production factors on economic growth.

This paper contributes theoretically to the literature on development economics, particularly to the theory of economic growth taking into account the main factors of output growth, namely, labour and capital. Furthermore, this study contributes to the literature by differentiating labour in terms of educational quality which allows more specific labour analysis than studies using total labour in general. The practical significance of this study is to help local governments to formulate labour and investment strategies. The government has to make sure that besides attracting FDI and DI, these investments are channeled into profitable industries and supported by labour that meets the labour market's requirements.

The novelty of this study is the use of FDI, DI, Skilled Labour and unskilled Labour variables at the same time in the analysis of economic growth. Previous studies generally discussed FDI, DI and labour in general or studied educated and unskilled labour without integration with investment variables. This study separates labour into skilled and unskilled labour. This study is expected to contribute to a better understanding of the role of the quality of human resources in strengthening the relationship between investment and economic growth.

The results of the study are expected to support the idea that the economic growth depends on the level of investment and the labour force quality. When the workforce is trained FDI and DI can be supportive for investment to be more successful in raising production and

productivity of the region. But if investment is mainly in unskilled labour without developing skills, the gains from investment for economic growth may be less.

LITERATURE REVIEW AND HYPOTHESIS FORMULATION

Economic growth is the growth in the capacity of an economy to produce goods and services in a region over a period of time. Economic growth of a region is usually measured using the Gross Regional Domestic Product (GRDP). GRDP is the added value of goods and services produced in a certain region in a certain year. The more GRDP, the more economic growth of a region. The year-on-year change in GRDP development at current prices is caused by changes in the volume of goods and services produced and changes in price levels. The change in production volume or real production growth can be measured by removing the price effect by calculating GRDP at constant prices (Bambang et al., 2021).

Foreign Direct Investment (FDI) refers to an investment activity undertaken by foreign investors. The goal of FDI is to earn a return on the investment and to help spur economic growth and development in the host country. FDI can increase investment in infrastructure, production facilities and technology. This could increase output of goods and services which can stimulate economic growth. Foreign direct investment can bridge the gap of domestic savings and bring foreign exchange to the host country (Fiorentina et al., 2013). It can boost foreign exchange reserves of the country, boost revenue of the government through taxes, royalties and other channels, motivate local workers to pursue training and managerial skill development to enhance their productivity and competitiveness in the global market and finally create more employment opportunities.

The allocation of Domestic Investment (DI) to various economic sectors can boost production capacity and efficiency, and generate new employment opportunities that help raise the purchasing power of the people. This statement stands for the connection between the capital accumulation and the economic growth where one of the contributions is from DI. Moreover, DI is also helpful in building national economic self-reliance by minimizing foreign capital dependence, thus providing more sustainable economic stability. Domestic investment can be done by domestic companies, foreign citizens, or the Indonesian government investing in the country (Sherafima Trisniani and Sugianto, 2025).

Riza Safitri and Deky Aji Suseno (2025) revealed that DI has an important role in promoting economic development because it is more in line with domestic market needs and closely related to the local economic structure. The effect of DI on GRDP was proved in the Fixed Effect model while FDI had no significant effect.

Labour is all persons able to work, to produce goods and services, for their own needs or for the needs of society. Labour is also defined as human effort in the production process that deserves compensation. This means that labour can be any person who is able to work and produce goods or services, irrespective of age. Skilled labour is divided into two categories: skilled labour by education. Unskilled labour is a worker with low education, often only elementary or junior high school, according to Sukirno (2006). Sukirno added that unskilled labour has low competitiveness in the labour market, thus the group received lower wages than skilled workers. This makes them one of the most economically vulnerable groups, especially when faced with economic pressures such as inflation, layoffs or global crises (Indah et al., 2025).

Based on the discussion and previous research references presented above, the research hypotheses are formulated as follows:

H1: Foreign Direct Investment has a positive effect on economic growth.
H2: Domestic Investment has a positive effect on economic growth.
H3: Skilled labour has a positive effect on economic growth.
H4: Unskilled labour has a positive effect on economic growth.

RESEARCH METHODS

This study uses secondary data obtained from the Central Statistics Agency (BPS). The data include Gross Regional Domestic Product (GRDP), FDI investment value, DI investment value, Skilled Labour, namely the population of regencies/municipalities in Central Java aged 15 years and above who are included in the labour force and have senior high school/vocational high school, diploma/academy, or university education, and Unskilled Labour, namely the population of regencies/municipalities in Central Java aged 15 years and above who are included in the labour force and have elementary or junior high school education, for the period 2017-2025 across 29 regencies and municipalities in Central Java. The analytical technique used in this study is panel data regression with the assistance of EViews 13 software. The model equation is as follows:

$$PDRB_{it} = \beta_0 + \beta_1 PMA_{it} + \beta_2 PMDN_{it} + \beta_3 SL_{it} + \beta_4 UL_{it} + e_{it}$$

Description:

$PDRB_{it}$	: Gross Regional Domestic Product of region i in year t
β_0	: Constant
$\beta_1 FDI_{it}$	: Foreign Direct Investment of region i in year t
$\beta_2 DI_{it}$	: Domestic Investment of region i in year t
$\beta_3 SL_{it}$	: Skilled Labour of region i in year t
$\beta_4 UL_{it}$	: Unskilled Labour of region i in year t
$\beta_1 - \beta_4$	: Regression coefficient of each independent variable
e_{it}	: Error term
i	: cross-section or research region
t	: research time period, namely 2017 to 2025

RESULTS

This study uses panel data regression analysis. Panel data regression consists of three models, namely the Common Effect Model (CEM), Fixed Effect Model (FEM), and Random Effect Model (REM). The following tests were conducted to select the most appropriate model.

Chow Test

The Chow test is used to determine the most appropriate model in panel data analysis between the Common Effect Model and the Fixed Effect Model. The decision rule for model selection through the Chow test is based on the probability value (Prob.) of the Cross-section F. If the probability value is greater than 0.05, the CEM is selected; if the probability value is less than 0.05, the FEM is selected.

Table 2. Chow Test

Effects Test	Statistic	d.f.	Prob.
Cross-section F	603.531660	(28,228)	0.0000
Cross-section Chi-square	1127.274448	28	0.0000

Source: Processed by the author

Based on the results above, the probability value of the Cross-section F is 0.0000, meaning that the probability value is less than 0.05; therefore, the Fixed Effect Model is selected.

Hausman Test

The Hausman test is used to determine the most appropriate model in panel data analysis between the Fixed Effect Model and the Random Effect Model. If the probability value is greater

than 0.05, the REM is selected; if the probability value is less than 0.05, the Fixed Effect Model is selected.

Table 3. Hausman Test

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	25.705537	4	0.0000

Source: Processed by the author

Based on the results above, the probability value of Cross-section random is 0.0000, meaning that the probability value is less than 0.05; therefore, the Fixed Effect Model is selected.

Classical Assumption Tests

This study applies classical assumption tests consisting of the multicollinearity test and the heteroscedasticity test. These tests are conducted as follows. This subsection presents the analysis of research data obtained through the data collection method. The results may be presented in tables and followed by an explanation of the statistical values shown. In this study, the classical assumption tests consist of the multicollinearity test and the heteroscedasticity test.

Multicollinearity Test

The multicollinearity test is conducted to determine the correlation among the independent variables (X). If the correlation matrix among independent variables shows a value greater than 0.8, multicollinearity is indicated; otherwise, multicollinearity is not indicated.

Table 4. Multicollinearity Test

	PMA	PMDN	TKT	TKTT
FDI	1.000000	0.136515	0.085642	0.083455
DI	0.136515	1.000000	0.198018	0.101732
SL	0.085642	0.198018	1.000000	0.614267
UL	0.083455	0.101732	0.614267	1.000000

Source: Processed by the author

Based on the correlation table above, the correlation values among the independent variables are less than 0.8. Therefore, the data can be stated to be free from multicollinearity symptoms or to have passed the multicollinearity test.

Heteroscedasticity Test

The heteroscedasticity test is conducted to determine whether the regression model contains unequal residual variance from one observation to another. A good regression model is one that does not experience heteroscedasticity. The results of the heteroscedasticity test are presented in the following table.

Table 5. Heteroscedasticity Test

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1190785.	232165.4	5.129037	0.0000
FDI	0.078137	0.050865	1.536163	0.1259
DI	0.105298	0.074012	1.422719	0.1562
SL	0.247892	1.509394	0.164233	0.8697
UL	-0.104606	1.180238	-0.088631	0.9295

Source: Processed by the author

Based on the results above, the probability values for the variables in the heteroscedasticity test are greater than 0.05, indicating that the data are free from heteroscedasticity symptoms or have passed the heteroscedasticity test.

Panel Data Regression Results

Table 6. Hypothesis Test Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	21673407	437470.8	49.54252	0.0000
FDI	0.634420	0.095845	6.619235	0.0000
DI	0.171284	0.139461	1.228183	0.2206
SL	6.830230	2.844162	2.401491	0.0171
UL	13.65534	2.223930	6.140183	0.0000
R-squared	0.989964			
Adjusted R-squared	0.988555			
F-statistic	702.7879			
Durbin-Watson stat	1.366323			
Prob(F-statistic)	0.000000			

Source: Processed by the author

Based on the regression results above, the regression equation is as follows:

GRDP = 21673407 + 0.634420 FDI + 0.171284 DI + 6.830230 SL + 13.65534 UL

T-Test

The results of the hypothesis tests carried out on the results of the panel data regression analysis using the FEM model are presented in Table 5:

1. The constant (a) is 21673407, which means that the value of the dependent variable is 21673407 when all the independent variables are equal to zero.
2. The coefficient of FDI is 0.634420 implying that given that other variables are held constant, a unit increase in FDI will cause an increase of 0.634420 in GRDP. Probability value of 0.0000 < 0.05, indicating that the probability is less than the significance level. Thus, it can be concluded that Foreign Direct Investment (FDI) has a positive and significant effect on economic growth in the Central Java Province.
3. The coefficient of DI is 0.171284, which means that when other variables are assumed to be constant, the increase of GRDP by 0.171284 is obtained by adding one unit of DI. The probability value of 0.2206 is greater than 0.05 which means the value of probability is above the level of significance. It can be concluded that Domestic Investment (DI) has a positive but insignificant effect on economic growth in Central Java Province.
4. The coefficient of SL is 6.830230, which means that, ceteris paribus, GRDP will increase by 6.830230 with one unit increase of SL. This probability value, 0.0171, is less than 0.05 indicating that the probability is less than the significance level. Therefore, it can be concluded that Skilled Labour (SL) has a positive and significant effect on economic growth in Central Java Province.
5. The coefficient of UL is 13.65534 which means if the other variables are constant, one unit increase in UL will increase GRDP by 13.65534. The probability value of 0.0000 is less than 0.05, indicating that the probability is below the significance level. Therefore, it can be concluded that Unskilled Labour (UL) has a positive and significant effect on economic growth in Central Java Province.

F-Test

The F-test is used to test the magnitude of the effect of the model simultaneously or jointly. Table 5 shows the panel regression results. The probability of F-statistic is 0.0000 which is less than 0.05. Therefore, the four independent variables; FDI, DI, SL and UL have a positive and significant effect simultaneously on economic growth in Central Java.

R-squared Test

The R-squared value in the panel data regression results shows the ability of the independent variables to explain the dependent variable simultaneously . Based on the results of the regression, the R-squared value is .989964 or 98.99 percent. The other variables outside the model or the error term accounts for the remaining 1.01 percent. The high value of the coefficient obtained from the data processing shows that FDI, DI, SL and UL explain the dependent variable accurately.

DISCUSSION

Based on previous studies and the theories described in the preceding section, this part explains the research findings regarding the effects of FDI, DI, SL, and UL on economic growth in Central Java.

The Effect of Foreign Direct Investment (FDI) on Economic Growth

The regression results show that the FDI variable has a coefficient of 0.634420, a t-statistic value of 6.619235, and a probability value of 0.0000, which is less than 0.05. Based on these results, FDI has a positive and significant effect on economic growth in Central Java. The positive coefficient of 0.634420 indicates that the inflow of foreign investment contributes to increasing regional economic activity. FDI can promote economic growth through several channels, including the addition of production capital, development of the industrial sector, use of more modern technology, increased production capacity, and creation of new employment opportunities. Through FDI, regions obtain additional development financing from foreign investors, thereby reducing domestic capital constraints.

This finding is consistent with the concept of investment as one of the main factors in economic growth. Investment not only increases physical capital such as machinery, buildings, and production infrastructure but also provides benefits in the form of technology transfer, improved production management, and access to new markets. A study conducted by Umayatu Suiroh Suharto and Wahyu Tri Nugroho (2016) on provincial economic growth on Java Island also found that FDI has a positive and significant effect on economic growth; thus, the results of this study are consistent with that research. The results of this study are in line with the research by Wiwit Aji Prihatin, et al (2019), which states that investment has a positive and significant impact on increasing economic growth in Indonesia.

In the context of regional research, the significant effect of FDI indicates that foreign investment entering the research area has been connected to local economic activities. This may occur when FDI enters productive sectors such as manufacturing, trade, services, or other sectors with strong linkages to the regional economy. FDI absorbed into productive sectors will increase output, expand employment opportunities, and increase community income. Therefore, the hypothesis stating that FDI has a positive effect on economic growth is accepted. Local governments need to maintain a conducive investment climate through simplified licensing, legal certainty, infrastructure provision, and improvements in labour quality so that FDI can continue to have a positive impact on economic growth.

The Effect of Domestic Investment (DI) on Economic Growth

The regression results show that the DI variable has a coefficient of 0.171284, t-statistic value of 1.228183 and a probability value of 0.2206 which is greater than 0.05. This implies that DI has a positive but insignificant effect on economic growth. In theory, DI should promote economic growth because domestic investment can enhance production capacity, develop business activities, generate employment and strengthen the local economic structure. DI is usually more

closely tied to the needs of the domestic market and the local economic sectors. Several previous studies also revealed that DI has a positive and significant effect on economic growth, especially in Central Java. The results of this study, however, indicate that the effect of DI is not yet significant. There are several reasons for this state of affairs. First, the realization of DI may not be evenly distributed among regions and may be concentrated in some areas only. Second, DI may reach sectors with low multiplier effects on the local economy. Third, the DI values recorded may not have been completely realized in actual production activities. Fourth, the effect of DI on economic growth may take time to manifest and may not be immediately observable in the study period.

The results of this study are in line with the research by Esti Winarni, et al (2020), which states that PMDN has a positive but not significant impact on economic growth in Central Java Province. This finding also supports some studies by Sherafima Trisniani and Sugianto (2025) that DI does not significantly affect economic growth. Therefore the hypothesis that states DI has a positive and significant effect on economic growth is rejected, because DI has positive direction but not significant . Local governments have to encourage domestic investment to grow not only in nominal terms but also to be directed towards productive, labour-intensive sectors with strong linkages to the local economy.

The Effect of Skilled Labour (SL) on Economic Growth

The regression results show that the coefficient of the variable Skilled Labour (SL) is 6.830230, the t-statistic value is 2.01491 and the probability value is 0.0171 which is less than 0.05. Therefore, EL has a positive and significant effect on economic growth. Skilled labour contributes to growth economically by increasing the efficiency of production. The educated workers are not only the implementers of production, they also may be involved in non-production activities such as management, marketing, finance, administration, supervision and business development. The literature on skilled labour also says that Skilled Labour can be used not only in production processes but also in organizational and production management activities while Unskilled Labour is usually more limited to direct production work.

In the present study, the importance of SL shows the significant effect of human resource quality on regional economic development. Regions with more educated workers have a greater ability to raise productivity, attract investment, develop modern sectors and strengthen local economic competitiveness. Thus, the hypothesis that Skilled Labour has a positive effect on economic growth is accepted. Local governments should upgrade the quality of education, job training, vocational programmes and skills certification so that the available labour force is compatible with the needs of the labour market and industrial sectors.

The Effect of Unskilled Labour (UL) on Economic Growth

The regression results indicate that the coefficient of the Unskilled Labour (UL) variable is 13.65534, the t-statistic value is 6.140183 and the probability value is 0.0000 which is less than 0.05. This means that UL has a positive and significant impact on the economic growth. This may be the case because unskilled Labour is still very important in labour-intensive sectors such as agriculture, small trade, construction, simple manufacturing, informal services and other local economic activities. In areas where the economic structure still depends heavily on labour-intensive sectors, unskilled labour continues to be an important factor of production.

This finding can be explained by production theory which states that output is affected by the use of inputs in production, including labour. The more labour that is taken up with economic activity, the greater the capacity to produce goods and services. The literature on economic growth also shows that labour is an important factor in production processes and regional development. Labour is one of the main production factors used in the production process of goods and services as well as capital in economic development, labour according to Indah et al. (2025) in their study of labour in Central Java.

The coefficient of UL is higher than SL, suggesting that the economic structure of the research area is still substantially dependent on sectors that absorb a large amount of unskilled

labour. In other words, regional economic growth is still likely driven heavily by labour-intensive sectors, rather than only by high-technology sectors and highly skilled labour.

But this positive result does not mean that the quality of education does not matter. Unskilled Labour does have a positive effect but in the long run we still need to improve the quality of labour to increase productivity. Too much unskilled Labour without skill enhancement will result in quantitative rather than productive growth. So, unskilled Labour should be helped by technical training, non-formal education, job courses and skill upgrading to make its contribution more qualified to economic growth. Therefore, it is accepted that unskilled Labour has a positive effect on economic growth.

CONCLUSION

Based on the panel data regression results, it can be concluded that FDI, SL, and UL have positive and significant effects on economic growth, while DI has a positive but insignificant effect. Simultaneously, all independent variables have a significant effect on economic growth in Central Java.

The results of this study indicate that regional economic growth is determined not only by investment but also by labour conditions. FDI is proven to promote economic growth through additional capital, technology, and production capacity. DI has a positive direction but is not yet significant; therefore, it needs to be directed toward productive sectors with large multiplier effects. SL plays an important role through improvements in productivity and the quality of human resources. Meanwhile, UL also makes a substantial contribution because many regional economic sectors remain labour-intensive and require direct production labour.

Therefore, regional economic development strategies should be directed toward two main aspects: increasing productive investment and improving labour quality. Incoming investment must be directed toward sectors that are able to create added value, absorb labour, and strengthen the local economic structure. Meanwhile, both educated and unskilled Labour need to be continuously improved in quality so that economic growth increases not only in numerical terms but also in terms of creating public welfare.

The limitation of this study is that the variables used only include FDI, DI, Skilled Labour, and Unskilled Labour; therefore, other factors that may also affect economic growth have not been included. Based on these limitations, future research is recommended to add other variables that influence economic growth so that the research model can explain economic growth more comprehensively.

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