

DETERMINANTS OF LABOR ABSORPTION IN THE MANUFACTURING INDUSTRY IN CENTRAL JAVA PROVINCE

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Abstract

Structural transformation through industrialization offers numerous benefits to the economy of the Central Java Province, including contributing to the reduction of the Open Unemployment Rate (OUR). However, this structural transformation process remains suboptimal, as reflected in the contribution to regional Gross Regional Domestic Product (GRDP) and absorption capacity of the manufacturing sector. This study aims to analyze the influence of Domestic Investment (DI), the number of business units, Regional Original Revenue (ROR), Provincial Minimum Wage (PMW), and education level on labor absorption in the manufacturing industry in Central Java Province. The research employs multiple linear regression analysis using time series data derived from secondary sources covering the period from 1990 to 2022. The findings indicate that DI, number of business units, ROR, PMW, and education level simultaneously have a significant impact on labor absorption in the manufacturing sector in Central Java. Partially, DI has a significantly negative effect, while number of business units have a significantly positive effect. In contrast, ROR, PMW, and education level do not have a statistically significant effect. The implication of this study is that the government needs to reassess its industrialization strategies to be more employment-oriented by promoting labor-intensive investments and simplifying the licensing process for establishing new business units.

Keywords: Structural Transformation, Manufacturing Industry, Labor Absorption

INTRODUCTION

Economic development is characterized by economic growth, followed by changes in the structure of the economy and the pattern of its activities. According to Todaro and Anggraini et al. (2020), structural transformation is reflected in the decline of the agricultural sector and the increase of industry and services in GDP, accompanied by institutional changes. In addition, according to Arthur Lewis's two-sector model, the transition of labor and the growth of employment opportunities from the traditional sector (agriculture) to the modern sector (industry) is possible due to the expansion of the modern sector's output (Romli et al., 2016). The process of labor transition, according to Chenery's theory, runs slower (lag) than the process of structural change itself (Imaniah, 2020).

This change in economic structure is necessary because high unemployment remains a persistent problem in Indonesia. High unemployment has a significant impact on several economic and social issues, including the emergence of beggars and vagrants, as well as a decline in state revenue. Indonesia's unemployment rate for 2015-2024 remains in the range of 5 percent to 6 percent (BPS, 2025). Unemployment conditions in Indonesia are the highest in Southeast Asia compared to six other countries on the list (IMF, 2024). To achieve these goals, a structured and strategic plan is needed. One potential path in this case is through the industrial sector, which can absorb unemployment while increasing people's per capita income (Primandhari, 2016).

As many as 80 percent of the 31,776 medium and large companies in Indonesia are located in Java, indicating Java's dominance as the center of the manufacturing industry, with Central Java Province ranking third (BPS, 2025). The transformation of the economic structure in Central Java through industrialization is still not optimal, as employment in the manufacturing sector is smaller

(22%) compared to the agricultural sector (32%). This optimal structural transformation is crucial in helping to reduce unemployment in Central Java, which is currently high.

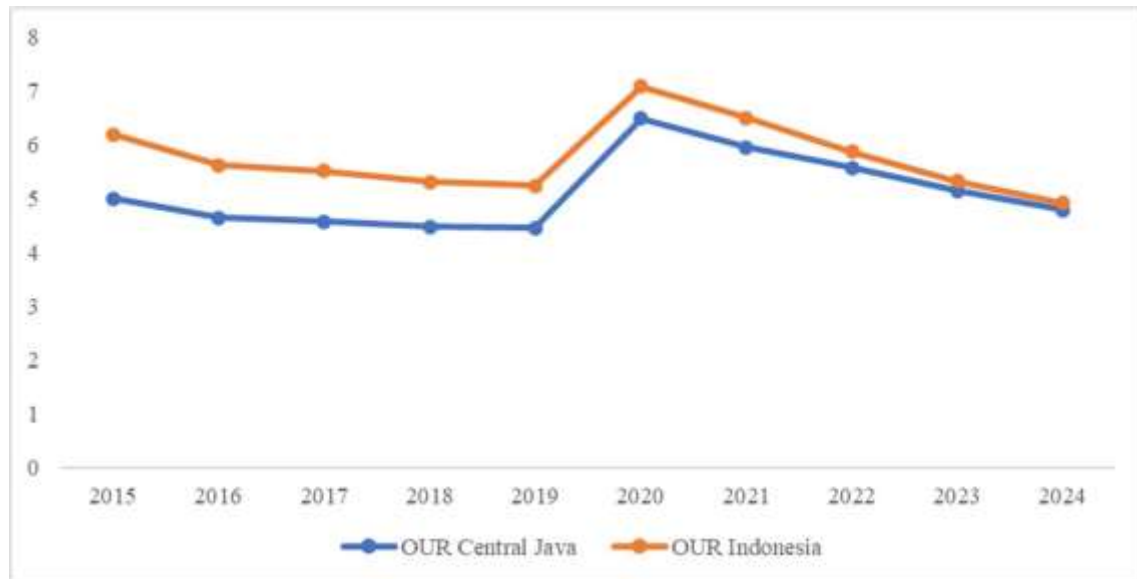


Figure 1. Comparison of Open Unemployment Rate in Central Java and Indonesia

Based on Figure 1, Central Java's Open Unemployment Rate (OUR) during the period from August 2015 to 2024 shows a trend that continues to approach Indonesia's OUR, although it remains below it. There is a possibility that Central Java's OUR will be above Indonesia's OUR if this trend continues. Reducing the unemployment rate is crucial because Central Java Province has a population of 38 million, with a labor force of 22 million people as of 2024 (BPS, 2025). Therefore, it is essential to optimize the role of the manufacturing industry as the primary driver of economic growth and community welfare in Central Java, given the sector's advantages, including greater added value, innovation, and higher levels of mechanization.

Based on the background and formulation of the problem, this study aims to analyze whether Domestic Investment (DI), the number of business units, Regional Original Revenue (ROR), Provincial Minimum Wage (PMW), and education level influence the level of employment in the manufacturing industry in Central Java. Theoretically, this research can complement the findings of empirical studies on factors that influence labor absorption in the manufacturing industry sector of Central Java. The reason for using these variables is that according to several previous studies, Domestic Investment dan Provincial Minimum Wage (Putri & Soelistyo, 2018), number of business units (Dewi & Gunawan, 2018), Regional Original Revenue (Sabyan & Wiarta, 2024), and education level (Buchari, 2016) influence employment.

The novelty of the research lies in its time frame and variables. The research period spans from 1990 to 2022, utilizing ROR variables that are rarely employed in the analysis of employment in the manufacturing industry. The findings indicate that DI, number of business units, ROR, PMW, and education level simultaneously have a significant impact on labor absorption in the manufacturing sector in Central Java. Partially, DI has a significantly negative effect, while the number of business units has a significantly positive effect. In contrast, ROR, PMW, and education level do not have a statistically significant effect. This study suggests that the government should reassess its

industrialization strategies to be more employment-oriented by promoting labor-intensive investments and streamlining the licensing process for establishing new business units.

LITERATURE REVIEW AND HYPOTHESIS FORMULATION

In this research, the two main theories of structural change used are Arthur Lewis' theory and Chenery's theory. In Arthur Lewis' theory, Arthur Lewis assumes that a country's economy is divided into two sectors (two-sector model), namely the traditional (agricultural) economy in rural areas and the modern (industrial) economy in urban areas (Romli et al., 2016). The traditional sector refers to the subsistence rural sector that is overpopulated and characterized by marginal productivity of labor equal to zero. Arthur Lewis defined this condition as surplus labor, i.e., when some labor from the traditional sector is withdrawn, the sector will not lose output. Meanwhile, the modern urban industrial sector has a high level of productivity and serves as a place to absorb labor that is gradually transferred from the subsistence sector. Arthur Lewis's two-sector model focuses on the process of labor transition, output growth, and increased labor absorption in the modern (industrial) sector (Romli et al., 2016). This transition process can occur due to the expansion of output in the modern sector. The speed of labor absorption in the industrial sector depends on investment factors in the industry and capital accumulation in the modern sector as a whole.

Chenery's theory, known as the Pattern of Development, focuses on structural changes in the stages of the economic change process of developing countries, which transform traditional agriculture (subsistence) to the industrial sector as the main engine of economic growth (Imaniah, 2020). The most important aspect of the Chenery model lies in its analysis, which highlights the quantitative relationship between per capita income and the percentage contribution of the economic sector and the manufacturing industry to national income. There are two indicators of the changing economic structure (Imaniah, 2020). In terms of domestic demand, the demand for food consumption is expected to decrease. During this process of structural change, the export share of industrial products is expected to increase, while the import share of the industrial sector is expected to decrease. In terms of labor, there will be a shift of labor from the agricultural sector in rural areas to the industrial sector in urban areas, although this process runs slower or lags behind the process of structural change itself.

In the context of structural transformation proposed by Lewis and Chenery, the manufacturing industry became a key sector that reflected the shift to a modern economy. The manufacturing industry processes goods with low value into products with higher value, closer to the needs of end consumers. It also includes industrial services and assembly work. According to Sulastri (2021), the industry plays a crucial role in a country's economic development. This is because industrial development can absorb more labor and increase overall community income. The manufacturing industry is considered a leading sector that drives other industries. The manufacturing sector is one of the media that utilizes Indonesia's abundant natural resources. An area is considered industrialized when it makes the manufacturing industry a leading sector (Pramushinta, 2022).

In supporting industrial development, labor is one of the key components. According to Law No. 13 of 2003 on Labor, labor is defined as every individual who is capable of performing work to produce goods and/or services, both to meet their own needs and to benefit the community. Individuals included in the labor force are individuals aged between 15 years and 64 years. Apart from this age, it is considered non-labor. Labor plays a crucial role in the implementation of development. Labor is related to labor absorption. Labor absorption refers to the number of jobs that have been filled, which is reflected in the number of working individuals (Hasyim et al., 2023).

Investment in the manufacturing sector plays an important role in driving the development of the sector. Investment is an investment activity in a company to add capital goods and production equipment so that the amount of production increases (Ain', 2021). According to Law Number 25 of 2007 concerning Investment, DI is an investment activity that involves conducting business in Indonesia's territory, carried out by Indonesian residents using domestic capital. Local investment

tends to be more stable compared to foreign investment, as it is less affected by fluctuations in the global economy (Tarumingkeng, 2024). Investment formation is the factor responsible for a country's economic growth and development. Investment provides benefits not only for investors but also for the host country's economy and the investor's home country (Kurniawan, 2016). Harrod-Domar's Savings and Investment theory also explains the important role of investment in the economy. The Harrod-Domar theory explains that investment activities are considered one of the important factors for the economy and have two roles at once (Ain', 2021). The first role is that investment has a positive relationship with state income, and the second role is that investment expands the economy's production capacity through an increase in capital stock.

Hypothesis 1: Domestic Investment has a positive effect on manufacturing industry employment

In addition to the investment, the number of business units is another variable used in this study. According to BPS (2025), a business unit or industrial company is an entity that carries out economic activities with the aim of producing goods or services. This business unit operates in a specific location or building and maintains organized administrative records regarding production and cost structure. Business units play a crucial role in the economy because they are key actors in creating added value through the production of goods and services. The existence of business units in various economic sectors, both formal and informal, will encourage the growth of national output. Business units are one of the instruments in creating employment. Through their operations, business units draw labor from diverse backgrounds and locations. An increase in the number of business units means an expansion of business fields, thereby creating new employment opportunities (Meisi et al., 2021).

Hypothesis 2: Number of business units has a positive effect on manufacturing industry employment.

In addition to the variable number of business units, Regional Original Revenue is also used in this study. Regional Original Revenue (ROR) is revenue generated from the region's wealth, collected by the local government, and used to finance local government activities (Anggraeni in Mafaza Mafaza et al., 2016). This ROR policy is based on prioritizing the principles of democracy, community participation, equity, justice, and accountability (Nurjanah, 2022). According to Law Number 33 of 2004 concerning Financial Balance between the Central Government and Regional Governments, the sources of Regional Original Revenue include local taxes, local retribution, the results of managing separate regional assets, and other legitimate sources of Regional Original Revenue.

ROR is related to the regional autonomy policy, specifically as the primary source of financing for the regions to exercise their authority. ROR plays a role in funding infrastructure projects and public services, such as in manufacturing industries that require adequate transportation infrastructure. High own-source revenues enable local governments to finance the development of quality infrastructure, thereby creating an ecosystem that fosters the growth of various economic sectors.

Hypothesis 3: ROR has a positive effect on manufacturing industry employment.

In addition to Regional Original Revenue, the Provincial Minimum Wage variable is also used in this study. Wages are compensation given by employers to employees as a reward for work performed (Prabaningtyas, 2015), so wages play a role in the company's operational cost structure. Minimum wage policies, such as the District Minimum Wage and Provincial Minimum Wage, regulate the provision of workers' wages in Indonesia. The Provincial Minimum Wage (PMW) is the lowest monthly wage limit, comprising basic wages and benefits, at the provincial level. The minimum wage policy is considered a step towards achieving social justice through improving workers' welfare (Susanti, 2017).

One of the theories regarding wages is the marginal productivity theory. The marginal productivity theory was introduced by Phillips Henry Wicksteed and John Bates Clark. This wage theory explains that the wage level of workers is determined by the productivity produced by workers. This means that the wages paid to workers are directly proportional to the additional value or marginal product that workers contribute to the production process (Husada & Yuhan, 2022).

Hypothesis 4: PMW has a negative effect on manufacturing industry employment.

In addition to the Provincial Minimum Wage, the education level variable is also used in this study. According to Law Number 20 of 2003 on the National Education System, education is a conscious and planned effort to create a learning environment and learning process so that students can actively develop their potential to have religious, spiritual strength, intelligence, personality, self-control, noble character and skills needed by themselves, society, nation, and state. At the macro level, education can be viewed as a key factor in strengthening the economy through the availability of a skilled and productive workforce (Silalahi et al., 2023).

Education is one of the components of human capital that reflects the quality of human resources. Education can be measured by the level of education attained, such as high school or equivalent and college. The education level refers to the level of education that individuals have attained to enhance their skills or knowledge, making them more useful in life (Minggayoni et al., 2023).

Hypothesis 5: the education level has a positive effect on the absorption of manufacturing industry labor.

RESEARCH METHODS

This research uses a quantitative descriptive approach. The period of this research spans from 1990 to 2022, with the research location in Central Java Province. Data collection took data sources issued by government agencies such as the Central Statistics Agency (BPS). In addition, scientific journals and academic publications were also used as the basis for the arguments used.

The analysis technique used is multiple linear regression analysis. Before the analysis is carried out, a stationarity test must be conducted using the Augmented Dickey-Fuller (ADF) Test. One of the requirements for using multiple linear regression equations is to meet classical assumptions. The classical assumption test is used to verify that the resulting regression model satisfies the requirements of classical assumptions, thereby obtaining an unbiased and efficient estimator (BLUE/Best Linear Unbiased Estimator) through the least squares method (Indartini & Mutmainah, 2024). The classic assumption tests used in this study consist of a normality test, a multicollinearity test, a heteroscedasticity test, and an autocorrelation test. This study uses the following regression equation model:

$$LA_t = \alpha + \beta_1 DI_t + \beta_2 BU_t + \beta_3 ROR_t + \beta_4 PMW_t + \beta_5 EL_t + e \dots\dots\dots (1)$$

Description:

<i>LA</i>	= Labor Absorption (Person)
α	= Constant
β	= Independent Variable Coefficient
<i>DI</i>	= Domestic Investment (Rp)
<i>BU</i>	= Number of Business Unit (Unit)
<i>ROR</i>	= Regional Original Revenue (Rp)
<i>PMW</i>	= Provincial Minimum Wage (Rp)
<i>EL</i>	= Education Level (Person)
<i>t</i>	= Time Series Unit
<i>e</i>	= Error Term

RESULTS AND DISCUSSION

The province of Central Java has the capital city of Semarang and a population of 37.89 million as of 2024, with the majority of its residents being male and of productive age. The majority of the productive-age population working in 2024 has not yet graduated from elementary school, while there are fewer college graduates. The length of roads reaches 31,694.87 km (kilometer), with 1,584.62 km of roads in good condition. The total installed power amounted to 18,234 million VA (Volt-Ampere), with distribution for industry accounting for 4,152 million VA. Central Java Province

has several industrial estates, ports, and airports to improve the economy, one of which is the Batang Integrated Industrial Estate. Judging from the economy of Central Java, the Gross Regional Domestic Product (GRDP) has increased from 2020 to 2024.

Based on testing, some variables initially did not meet the stationarity test and classical assumptions, but after adjustments were made, all variables were deemed suitable for further analysis. The following are the final results, as shown in Table 1.1.

Table 1. Model Estimation Results

<i>Variable</i>	<i>Coefficient</i>	<i>t-Statistic</i>	<i>Prob.</i>
C	31716.82	2.618908	0.0148
D(DI,2)	-0.002262	-2.404521	0.0239
D(BU)	37.65360	2.320425	0.0288
D(LOG(ROR),2)	36555.58	1.020543	0.3172
D(LOG(PMW))	-28266.28	-0.36816	0.6660
D(LOG(EL))	-62867.89	-0.269636	0.7897
R-squared	0.352442		
F-statistic	2.721319		
Prob(F-statistic)	0.042691		

Source: Eviews, Data processed

Based on the table, the following are the results of the coefficient of determination, F-test, and t-test. As seen in Table 1, the R-squared value is 0.3524. This means that 35.24% of the variation in Labor Absorption can be explained by Domestic Investment, number of business units, Local Government Revenue, Provincial Minimum Wage, and education level. The probability value of the F-statistic is significant, so H_0 is rejected, meaning that Domestic Investment, number of business units, local government revenue, provincial minimum wage, and education level collectively have a significant influence on labor absorption. Based on the Partial Test (t-test), the significant variables are Domestic Investment and the number of business units, while the insignificant variables are ROR, PMW, and education level. The following is a discussion of each variable.

This study shows that domestic investment has a negative and significant effect on employment. Therefore, the hypothesis is rejected. The reason for this is because the type of Domestic Investment entering the manufacturing industry in Central Java Province tends to be capital intensive, thus providing additional capital for the use of technology. This is done to produce greater output but at an efficient cost. The more advanced the technology in the production process, the fewer workers are needed to operate it.

Some subcategories of the manufacturing industry that are capital-intensive include the chemical industry, pharmaceuticals and traditional medicine, non-metallic mineral products, and machinery and equipment. Therefore, DI does not encourage labor absorption, resulting in lower labor demand. The negative impact of DI is supported by research from Adityaputri (2022), which states that the type of investment that enters tends to be capital-intensive, providing additional capital for the use of technology to achieve greater output at a more efficient cost.

In addition to Domestic Investment, this study shows that the number of business units has a positive and significant influence on employment. Therefore, the hypothesis is accepted. The reason for this is because newly established industrial business units require labor to carry out production processes such as processing, storage, and packaging. Additionally, other processes, such as marketing and customer service, require human labor. Therefore, an increase in the number of industries is closely related to employment.

Based on the subcategories of the manufacturing industry, although the majority are capital-intensive subcategories, some subcategories are labor-intensive industries. Some labor-intensive manufacturing industry subcategories, according to the Indonesian Minister of Industry Regulation No. 51/M-IND/PER/10/2013 of 2013 on the Definition and Limitation and Classification of Certain

Labor Intensive Industries, include the food, beverage, and tobacco; textile and apparel industries; leather and leather goods industries; footwear industries; children's toy industries; and furniture industries. Furthermore, the regulation explains the characteristics of capital-intensive industries, which include having a minimum of 200 workers and a minimum of 15 percent of labor costs in production costs. Therefore, an increase in the number of business units in this subcategory has a positive impact on labor absorption. The results of this study are consistent with research by Dewi & Gunawan (2018) and Ardiansyah et al. (2018). According to Ardiansyah et al. (2018), this is because industries are closely related to labor absorption, as an industrial business unit requires labor to carry out its production processes.

In addition to the number of business units, this study shows that Regional Original Revenue (ROR) has a positive but insignificant effect on employment. Therefore, the hypothesis is rejected. The reason for this is because local governments are still considered not optimal in managing funds in their regions. This is evident from the distribution of Central Java Government spending, where the majority is allocated to operational expenses, while capital expenditures receive only a small portion. This results in reduced public sector development. As a result, infrastructure development, such as roads, water, and electricity, which could drive the manufacturing industry, has been hindered.

The realization of Central Java Provincial government expenditure from 2019 to 2022 averaged Rp25 trillion, with most of it used for operational expenditure, accounting for 60 percent. Meanwhile, capital expenditures received a tiny portion, averaging 6 percent from 2019 to 2022. The quality of road infrastructure in Central Java declined from 2017 to 2021, with roads in good condition dropping from 70.14 percent to 40.15 percent. Several regencies have experienced a significant decline in the number of roads in good condition, including Tegal Regency, Jepara Regency, and Temanggung Regency.

The results of this study align with research by Nurjanah (2022) and Walalangi et al. (2017), who also found that ROR does not influence labor absorption. According to Nurjanah (2022), this is due to local governments being deemed insufficiently optimal in managing their budgets. There is a possibility that some areas still have low budget allocations, leading to reduced public sector development.

In addition to Regional Original Revenue, this study shows that the Provincial Minimum Wage (PMW) has a negative but insignificant effect on labor absorption. Therefore, the hypothesis is rejected. The reason for this is because minimum wages are rigid. A rigid minimum wage means it will not decrease even under domestic or foreign economic pressure. During periods of economic crisis, global financial crisis, and the COVID-19 pandemic, the minimum wage did not decrease but instead increased. This contrasts with Domestic Investment (DI), Regional Original Revenue (ROR), and the number of business units, which experienced declines during these periods. Labor absorption also decreased during the global financial crisis of 2008 and the COVID-19 pandemic.

The findings of this study align with those of Handoyo & Rudatin (2023), who also found that the minimum wage does not affect labor absorption. According to Handoyo & Rudatin (2023), this is because the industry in question is capital-intensive. Therefore, production costs are more focused on capital and technology rather than employee wages.

In addition to the Provincial Minimum Wage, this study shows that education level has a negative but insignificant effect on labor absorption. Therefore, the hypothesis is rejected. This is due to a mismatch between the skills possessed by high school students and above and the needs of industry, as well as a shift in the composition of the workforce based on sector. The shift in the composition of the labor force by sector began in 1998, with sectors such as services, mining and quarrying, electricity, gas, and clean water, as well as construction experiencing a decline, while sectors such as trade and industry saw an increase.

The mismatch is evident from data on the number of employed individuals based on their primary occupation and highest level of education from 2020 to 2022. The number of people working in sector group 2 (Mining and Quarrying, Processing Industry, and others) was 5,223,913 in 2020, comprising individuals with the highest education level of elementary school, junior high school, high

school, and college. Of this number, 67.05 percent were contributed by workers with elementary and junior high school education, while workers with senior high school education contributed 29.50 percent and university education only 3.45 percent. The contribution of workers with senior high school and university education was smaller than that of workers with lower education levels to the total workforce in sector 2. In 2022, employment in sector 2 for elementary and junior high school graduates experienced a relatively high increase (1.62% and 5.17%), while high school education and above experienced a drastic decline, especially for university education (-3.15% and -10.24%).

The results of this study are in line with the research by Ratnasari & Nugraha (2021), which also found that the education level has no significant influence. According to Ratnasari & Nugraha (2021), this occurs due to a mismatch between the skills possessed by high school students and above and the needs of the industry. Many workers entering the labor market have lower education levels and work as laborers.

CONCLUSION

This research concludes that Domestic Investment, number of business units, Regional Original Revenue, Provincial Minimum Wage, and education level together have a significant influence on Labor Absorption. The decline in DI from 1990 to 2022 has had a significant negative effect on the employment of the manufacturing industry in Central Java. Number of business unit from 1990 - 2022 has a significant positive effect on the absorption of manufacturing industry labor in Central Java. ROR, PMW, and education level from 1990 to 2022 have no significant effect on employment in the manufacturing industry of Central Java.

This research implies that policies related to DI, such as changes in investment regulations, can be considered shifts from capital-intensive to labor-intensive. This is done by simplifying and adjusting regulations governing investment activities in specific subsectors or sectors, one of which is through the investment priority list. Through the investment priority list for labor-intensive industries, it can encourage investors to invest more in the sector. Investors who invest in labor-intensive industries are eligible for various incentives, including income tax reductions and import duty exemptions. Increasing the number of business units in the manufacturing industry can be done by providing ease of licensing and regulation, as well as the development of new industrial estates. Difficult licensing and regulatory processes will be a significant obstacle for investors seeking to establish businesses in the manufacturing industry, so speeding up, simplifying, and integrating these processes is essential. Industrial estates can also foster collaboration between companies within a single ecosystem, thereby reducing logistics costs and enhancing production efficiency.

The limitation of this study is that Domestic Investment (DI) in Central Java is complex and influenced by national and regional political stability, which is not covered in this study. Therefore, future research is recommended to incorporate political factors into the analysis.

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