

The Effect of Investment, GDP Oil and Gas, and GDP Non-oil and Gas On Employment Absorption

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Abstract

Labor absorption is often used as an indicator to assess the success of regional economic development because it reflects the ability of economic growth to create job opportunities. This study aims to analyze the influence of investment, oil and gas GRDP, and non-oil and gas GRDP on labor absorption in Bojonegoro Regency. The study employs a quantitative approach using time-series data 2010-2024 sourced from the Central Statistics Agency (BPS) and the Regional Investment and One-Stop Service Agency (DPMPTSP), with analysis conducted using multiple linear regression. The results indicate that investment and non-oil and gas GRDP have a positive effect on labor absorption, whereas oil and gas GRDP has a negative effect due to its capital-intensive nature. This study underscores the importance of strengthening the non-oil and gas sector and improving the quality of investment to foster more inclusive economic growth.

Keywords: *economic growth, investment, oil and gas GDP, non-oil and gas GDP, and labor absorption*

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INTRODUCTION

Regional economic development is the process of enhancing a region's economic capacity with the aim of improving community well-being through economic growth and the equitable distribution of employment opportunities. One key indicator of successful economic development is a region's ability to optimally absorb the labor force, thereby reducing unemployment and increasing community income (Asrahmaulyana, 2022). Labor absorption is a critical issue, particularly in regions with high economic growth that have not yet fully succeeded in creating widespread employment opportunities (Sabihi et al., 2021).

Bojonegoro Regency is one of the regions in East Java Province that contributes significantly to the Regional Gross Domestic Product (GRDP), particularly through the oil and gas sector. While the oil and gas sector makes a major contribution to regional economic growth, its capital-intensive nature results in relatively low labor absorption compared to non-oil and gas sectors. This situation leads to a phenomenon where high economic growth does not necessarily result in optimal labor absorption. Increased use of technology and production efficiency in the industrial and natural resource sectors have led to a reduced need for labor. This indicates that an increase in economic output does not always lead to an increase in labor absorption, particularly in capital-intensive sectors (Nababan & Purba, 2023). In addition to RDP, investment is also a key factor in boosting labor absorption. According to Keynesian theory, investment can increase aggregate demand, which in turn drives increased production and employment opportunities. Increased investment expands a company's production capacity, thereby increasing the demand for labor (Mustika & Khairani, 2022).

According to data from the Bojonegoro Regency Central Statistics Agency, labor absorption fluctuated during the 2020–2024 period. In 2021, the number of people employed reached approximately 725,000, but declined in 2022 to approximately 715,000. On the other hand, the non-oil and gas GRDP has continued to increase year by year, while the oil and gas GRDP has actually shown a downward trend. This phenomenon indicates a difference in the impact of the oil and gas and non-oil and gas sectors on labor absorption. Non-oil and gas sectors such as agriculture, trade, manufacturing, and services tend to be more labor-intensive and thus have a greater capacity to create jobs compared to the oil and gas sector.

Previous research conducted by Firda (2025) indicates that GRDP has a significant impact on labor absorption. Research by Jaya and Kholilah (2020) also indicates that GRDP and investment have a positive effect on labor absorption in Indonesia. Furthermore, research by Widyapangesti and Soelistyo (2023) explains that investment, GRDP, and the minimum wage influence labor absorption on the island of Java. Previous studies have only analyzed labor absorption at the aggregate level without specifically distinguishing between the oil and gas sector and the non-oil and gas sector, particularly in regions that are highly dependent on natural resources. Research is generally conducted at the national or provincial level, so it has not been able to describe the specific conditions of regions with high dependence on the oil and gas sector, such as Bojonegoro Regency. Therefore, there is a research gap in conducting a more in-depth study of how investment, oil and gas GRDP, and non-oil and gas GRDP affect labor absorption in Bojonegoro Regency.

THEORITICAL REVIEW AND HYPOTHESIS DEVELOPMENT

Economic Growth Theory

Economic growth is the process of increasing a region's production capacity, as reflected in rising regional output or income over the long term. According to Keynesian theory, economic growth is influenced by aggregate demand, which consists of consumption, investment, government spending, exports, and imports. Increased economic growth is expected to stimulate production activities, thereby boosting regional income and creating more job opportunities for the public (Sukirno, 2011). In the context of regional development, economic growth is also closely linked to the ability of productive sectors to improve people's well-being through job creation. Recent research shows that regions with high GRDP growth tend to have higher rates of job creation due to increased production and economic activity (Kesumawati & Fisabilillah, 2024).

Investment Theory

Investment is an expenditure on capital goods aimed at increasing future production capacity. According to Mankiw's investment theory, investment has a multiplier effect that can drive growth in output, income, and employment. Increased investment enables firms to expand their business activities, boost production capacity, and create greater demand for labor, which in turn generates a multiplier effect (Mankiw, 2024). However, the impact of investment on labor absorption is also influenced by the characteristics of the investment sector. Investment in labor-intensive sectors tends to have a greater impact on labor absorption compared to capital-intensive sectors. Recent empirical research in Indonesia indicates that investment has a positive effect on regional economic growth and labor absorption, particularly when supported by adequate infrastructure and human capital quality (Utari & Haq, 2026).

Labor Theory

The labor force consists of the working-age population capable of performing work to produce goods and services. Labor absorption reflects an economic sector's ability to absorb the available labor force (Sumarsono, 2003). Labor absorption reflects the ability of economic sectors to absorb the available labor force and is often used as an indicator of the success of regional economic development. The rate of labor absorption is influenced by various factors, such as economic growth, investment, wage levels, technological developments, and the regional economic structure. In developing regions, labor-intensive sectors have a greater capacity to absorb labor because their production processes rely more on human labor than on modern technology (Satoto, 2023).

Relationship Between Investment and Labor Absorption

Increased investment will drive the expansion of production activities and business capacity, thereby increasing the demand for labor. Keynesian theory explains that investment creates a multiplier effect that can stimulate economic growth and expand employment opportunities. In the regional economy, productive investment not only increases capital accumulation but also creates jobs and boosts community income. Several recent studies in Indonesia have found that investment has a positive impact on labor absorption, particularly in sectors with high labor intensity and broad economic linkages (Mustika & Khairani, 2022).

H1: Investment has an impact on employment in Bojonegoro Regency.

Relationship Between Oil and Gas GRDP and Labor Absorption

The oil and gas sector is a capital-intensive industry because its production activities rely more on modern technology, machinery, and large amounts of capital than on human labor. Therefore, an increase in the oil and gas sector's regional gross domestic product (GRDP) is not always accompanied by a significant increase in employment. Although the oil and gas sector makes a major contribution to regional revenue, its capacity to absorb labor is relatively limited compared to labor-intensive sectors. Previous research has also shown that extractive industries tend to generate high economic output but this is not accompanied by an increase in employment opportunities due to the use of automation and technological efficiency (Pelzl & Poelhekke, 2021).

H2: The oil and gas GRDP influences employment in Bojonegoro Regency.

Relationship Between Non-Oil and Gas GRDP and Labor Absorption

The oil and gas sector is a capital-intensive industry because its production activities rely more on modern technology, machinery, and large amounts of capital than on human labor. Therefore, an increase in the oil and gas sector's regional gross domestic product (GRDP) is not always accompanied by a significant increase in employment. Although the oil and gas sector makes a major contribution to regional revenue, its capacity to absorb labor is relatively limited compared to labor-intensive sectors. Previous research has also shown that extractive industries tend to generate high economic output but this is not accompanied by an increase in employment opportunities due to the use of automation and technological efficiency (Huseynli, 2022).

H3: Non-oil and gas GRDP influences labor absorption in Bojonegoro Regency.

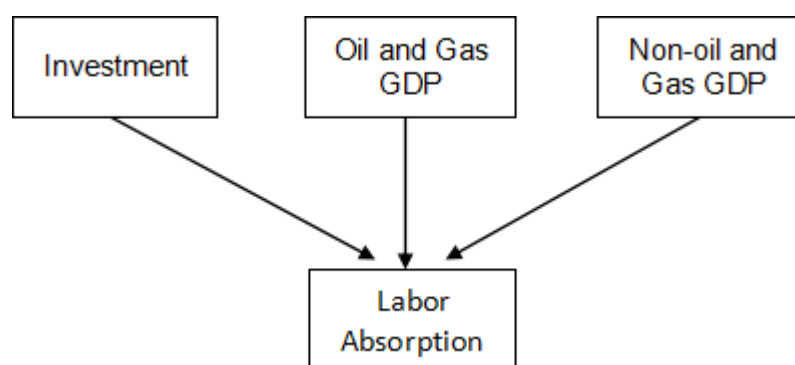


Figure 1
Conceptual Framework

RESEARCH METHODS

This study employs a descriptive quantitative approach to analyze the effect of investment, oil and gas GRDP, and non-oil and gas GRDP on labor absorption in Bojonegoro Regency. The data used consists of time-series data from 2010 to 2024 obtained from the Central Statistics Agency (BPS) and the Bojonegoro Regency Investment and One-Stop Service Agency (DPMPTSP). The dependent variable in this study is labor absorption (Y), which is measured by the number of employed people in Bojonegoro Regency during the observation period. The independent variables consist of investment (X_1), oil and gas GRDP (X_2), and non-oil and gas GRDP (X_3). Investment is measured by the total realized domestic and foreign investment value in Bojonegoro Regency expressed in rupiah. Oil and gas GRDP refers to the regional gross domestic product originating from the mining and oil and gas sector at constant prices, while non-oil and gas GRDP represents the GRDP generated from sectors outside oil and gas, such as agriculture, trade, manufacturing, and services, also measured at constant prices.

The data analysis technique used in this study is multiple linear regression analysis with the Ordinary Least Squares (OLS) method using IBM SPSS Statistics. The regression analysis aims to determine the partial and simultaneous effects of the independent variables on labor absorption. This study employs the following regression model:

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + e$$

Notes:

Y = Employment

X_1 = Investment

X_2 = Oil and Gas GRDP

X_3 = Non-Oil and Gas GRDP

e = Error term

To ensure that the regression model produces unbiased and valid estimators according to the BLUE (Best Linear Unbiased Estimator) assumptions, several classical assumption tests were conducted, including the normality test, multicollinearity test, heteroscedasticity test, and autocorrelation test (Ghozali, 2021). Furthermore, hypothesis testing was carried out using the t-test to examine the partial effect of each independent variable, the F-test to examine the simultaneous effect of all independent variables, and the coefficient of determination (R^2) test to measure the model's ability to explain variations in labor absorption.

RESULTS AND DISCUSSION

Research Results

Classical Assumption Test

Variabel	Tolerance	Ketentuan	VIF	Ketentuan	Keterangan
X1	0,274	$\geq 0,1$	3,653	≤ 10	Tidak Terjadi <u>Multikorelasi</u>
X2	0,47	$\geq 0,1$	2,129	≤ 10	Tidak Terjadi <u>Multikorelasi</u>
X3	0,234	$\geq 0,1$	4,279	≤ 10	Tidak Terjadi <u>Multikorelasi</u>
Variabel (Y)	Sig (X1)	Sig (x2)	Sig (X3)	Ketentuan	Keterangan
<u>Penyerapan Tenaga Kerja</u>	0,232	0,47	0,133	$\geq 0,05$	Tidak Terjadi <u>Heterokedastitas</u>
<u>Asym. Sig (2-tailed)</u>	1,000	$\geq 0,05$	Tidak Terjadi <u>Autokorelasi</u>		
<u>Asym. Sig (2-tailed)</u>	0,200	$\geq 0,05$	Data Normal		

Figure 2 Classical Assumption Test

The results of the normality test indicate that the residual data are normally distributed, so the regression model is suitable for use in this study. In addition, the results of the multicollinearity test show that all independent variables have tolerance values greater than 0.10 and Variance Inflation Factor (VIF) values less than 10, indicating that there is no multicollinearity among the independent variables. The results of the heteroscedasticity test indicate that there are no signs of heteroscedasticity in the regression model because the significance values for each variable are greater than 0.05. Additionally, the results of the autocorrelation test using the Durbin-Watson statistic indicate that the regression model does not exhibit autocorrelation, so the research model can be used for further analysis.

Regression Model

$$Y = 594.093,245 + 4,681 X1 - 0,882 X2 + 3,695 X3$$

The regression equation indicates that the investment and non-oil and gas GRDP variables have a positive effect on employment in Bojonegoro Regency. The investment regression coefficient of 4.681 indicates that every 1 billion rupiah increase in investment will increase employment by 4,681 people, assuming all other variables remain constant. Meanwhile, the non-oil and gas GRDP regression coefficient of 3.695 indicates that a 1 billion rupiah increase in non-oil and gas GRDP can increase labor absorption by 3,695 people. Conversely, the oil and gas GRDP variable has a negative regression coefficient of -0.882, indicating that an increase in oil and gas GRDP tends to reduce labor absorption. This is because the oil and gas sector is capital-intensive and relies more on technology, thus not requiring a large workforce.

Hypothesis Test

F- Test

	Model	Df	Mean Square	F	F _{tabel}
1	Regression	3	564265	67,49	3,59
	Residual	11	836078		
	Total	14			

Figure 3 F-Test

Based on the results of the simultaneous test (F-test), the calculated F-value was 67.49, while the critical F-value was 3.59. This indicates that the calculated F-value is greater than the critical F-value ($67.49 > 3.59$), so it can be concluded that the variables of investment, oil and gas GRDP, and non-oil and gas GRDP independently have a significant effect on labor absorption in Bojonegoro Regency. These results indicate that changes in labor absorption in Bojonegoro Regency are influenced by the simultaneous development of investment, oil and gas GRDP, and non-oil and gas GRDP. Thus, the regression model used in this study is deemed valid and capable of explaining the relationship between the independent variables and the dependent variable.

T-Test

Variabel	T _{hitung}	Sig		T _{tabel}
Investasi	4,678	0,001	>	2,201
PDRB Migas	-2,264	0,045	>	2,201
PDRB NonMigas	3,937	0,002	>	2,201

Figure 4 T-Test

Based on the results of the partial test (t-test), the non-oil and gas GRDP variable yielded a t-value of 3.937 with a significance level of 0.002. This value is smaller than the significance level of 0.05, and the t-value is greater than the critical t-value of 2.201 ($3.937 > 2.201$). Therefore, it can be concluded that the non-oil and gas GRDP variable has a positive and significant effect on labor absorption in Bojonegoro Regency. These results indicate that increased economic activity in the non-oil and gas sector can boost labor absorption because

non-oil and gas sectors such as agriculture, trade, manufacturing, construction, and services are more labor-intensive and thus require a larger workforce compared to the oil and gas sector.

Discussion

Analysis of Investment on Labor Absorption

The results of the study indicate that investment has a positive and significant effect on labor absorption in Bojonegoro Regency. Increased investment expands production capacity, encourages business development, and stimulates economic activity, leading firms to require additional workers. According to Keynesian theory as explained by Mankiw, investment generates a multiplier effect in the economy because increased investment raises demand for goods and services, which subsequently encourages higher production and employment. These findings are consistent with the study of Mustika and Khairani, which states that investment significantly affects labor absorption through the expansion of business opportunities and job creation.

The findings of this study imply that investment plays an important role not only in increasing regional output but also in improving employment opportunities and community welfare. Productive investment can encourage the growth of local industries, increase household income, and strengthen regional purchasing power. In the context of Bojonegoro Regency, the results suggest that investment policies should prioritize labor-intensive sectors and local business development to ensure that economic growth is more inclusive. Therefore, the quality and sectoral allocation of investment become important factors in maximizing the employment effect of regional economic growth.

Analysis of Oil and Gas GRDP on Labor Absorption

In this study, oil and gas GRDP has a significant negative effect on labor absorption in Bojonegoro Regency. This indicates that an increase in oil and gas sector output is accompanied by a decline in labor absorption. The oil and gas sector is characterized as capital intensive and highly dependent on technology, meaning that production growth relies more on machinery, capital, and technological efficiency rather than human labor. In addition, the sector generally requires specialized skills, limiting the ability of local workers to participate directly in production activities.

The findings also indicate that Lewis's theory regarding labor transfer from traditional sectors to modern sectors does not fully apply in the case of the oil and gas industry in Bojonegoro Regency. Although the oil and gas sector contributes significantly to regional income, its economic benefits are not evenly distributed in terms of employment creation. This condition reflects the phenomenon of Dutch Disease, where the dominance of the extractive sector weakens the development of other labor-intensive sectors. Economically, this situation may increase regional dependence on natural resources while reducing the competitiveness of sectors such as agriculture, manufacturing, and trade. As a consequence, regional economic growth becomes less inclusive because high GRDP growth is not followed by proportional employment growth. Therefore, the findings imply that local governments should reduce excessive dependence on the oil and gas sector by strengthening economic diversification and developing sectors that have broader labor absorption capacity.

Analysis of Non-Oil and Gas GRDP on Labor Absorption

The results of this study show that non-oil and gas GRDP has a positive and significant effect on labor absorption in Bojonegoro Regency. This indicates that increased economic

activity in sectors such as agriculture, trade, manufacturing, construction, and services creates wider employment opportunities because these sectors tend to be labor intensive. As non-oil and gas sectors expand, labor demand also increases, which contributes to reducing unemployment and improving community income. These findings are in line with Lewis's theory, which states that growth in modern labor-intensive sectors can absorb surplus labor from traditional sectors and increase employment opportunities. The findings are also consistent with the study by Nigar Huseynli, which explains that non-oil and gas sectors contribute more significantly to labor absorption because their production activities involve more direct labor than capital-intensive sectors.

These results indicate that the development of non-oil and gas sectors is essential for creating sustainable and inclusive regional growth. Unlike the extractive sector, non-oil and gas sectors generate broader economic linkages because they involve micro, small, and medium enterprises as well as local labor participation. The growth of these sectors can strengthen regional economic resilience by reducing dependence on natural resources and creating more stable employment opportunities. Therefore, the findings suggest that development policies in Bojonegoro Regency should focus on strengthening labor-intensive sectors, improving workforce quality, and supporting local industries to achieve long-term economic sustainability and equitable welfare distribution.

CONCLUSION

This study concludes that investment and non-oil and gas GRDP have a positive and significant effect on labor absorption in Bojonegoro Regency. Increased investment encourages the expansion of business activities and production capacity, which ultimately creates wider employment opportunities. In addition, the growth of non-oil and gas sectors such as agriculture, trade, industry, and services contributes more effectively to labor absorption because these sectors are relatively labor intensive. On the other hand, oil and gas GRDP has a limited influence on labor absorption due to the capital-intensive characteristics and the high use of technology in the sector. These findings indicate that labor absorption in Bojonegoro Regency is influenced more by the development of productive investment and non-oil and gas economic sectors than by the oil and gas sector. The study also highlights the importance of government policies that support labor-intensive sectors in order to create inclusive and sustainable economic growth. Furthermore, this research contributes to the literature on regional economic development by emphasizing the strategic role of investment and non-oil and gas sector development in improving employment opportunities and regional welfare.

REFERENCES

- Asrahmaulyana. (2022). *Analisis Penyerapan Tenaga Kerja Dan Pertumbuhan Ekonomi Indonesia*. 2, 111–124.
- Dyah Indri, W., & Aris, S. (2023). Analisis Pengaruh PDRB, Investasi, Upah Minimum Provinsi Terhadap Oenyerapan Tenaga Kerja Di Pulau Jawa. *Jurnal Ilmu Ekonomi (Jie)*, 5(2), 247–261.
- Firda, R., Istiyani, N., Yulianti, L., & Luthfi, A. (2025). Analisis Penyerapan Tenaga Kerja Di Provinsi Jawa Timur Tahun 2015-2023. *Jurnal Ekuilibrium*, 9(2), 55–68. <https://doi.org/10.19184/jek.v9i2.53689>
- Ghozali, I. (2021). *Aplikasi Analisis Multivariate Dengan Pogram IBM SPSS 26 (Sepuluh)*. (10 ed.). Badan Penerbit Universitas Diponegoro.

- Huseynli, N. (2022). *Impact of Revenues from Oil and Non-oil Sectors on the Economic Growth of Azerbaijan*. 12(5), 31–35.
- Jaya, T. J. (2020). *EFFECT OF GROSS DOMESTIC REGIONAL BRUTO , PROVINCIAL MINIMUM WAGE , AND INVESTMENT ON LABOR ABSORPTION*. 9(3), 236–249.
- Kesumawati, F. O., & Fisabilillah, L. W. P. (2024). Analisis Produk Domestik Regional Bruto Terhadap Penyerapan Tenaga Kerja Provinsi Jawa Timur. *Independent: Journal of Economics*, 4(2), 44–51. <https://doi.org/10.26740/independent.v4i2.62970>
- Mankiw, N. G. (2024). *Principles of Economics* (10 ed.). New York: Worth Publishers.
- Mustika, N., & Khairani, A. (2022). Pengaruh Investasi Terhadap Penyerapan Tenaga Kerja. *Jurnal Budget: Isu dan Masalah Keuangan Negara*, 2(1), 32–50. <https://doi.org/10.22212/jbudget.v2i1.36>
- Nababan, T. S., & Purba, E. F. (2023). *Labour Absorption In Manufacturing Industry In Indonesia : Anomalous And Regressive Phenomena*. 1–14.
- Pelzl, P., & Poelhekke, S. (2021). Good mine , bad mine : Natural resource heterogeneity and Dutch disease in Indonesia ☆. *Journal of International Economics*, 131, 103457. <https://doi.org/10.1016/j.jinteco.2021.103457>
- Sabihi, D. M., Kumenaung, A. G., Niode, A. O., Kunci, K., & Sabihi, D. M. (2021). *Jurnal Berkala Ilmiah Efisiensi Volume 21 No . 01 Juli 2021 PENGARUH UPAH MINIMUM PROVINSI , INVESTASI DAN PERTUMBUHAN EKONOMI TERHADAP PENYERAPAN TENAGA KERJA DI KOTA MANADO Jurusan Ekonomi Pembangunan , Fakultas Ekonomi dan Bisnis Universitas Sam Ratulangi , Manado 95115 , Indonesia Email : dewisabihi@gmail.com Jurnal Berkala Ilmiah Efisiensi Dewi M . Sabihi. 21(01), 25–36*.
- Satoto, E. B. (2023). *The Effect of Local Taxes , Human Development Index , And Investment on Labor Absorption on Economic Growth*. 13(2), 168–189.
- Sukirno, S. (2011). *Makroekonomi: Teori Pengantar*.
- Sumarsono, S. (2003). *Ekonomi manajemen sumberdaya manusia dan ketenagakerjaan*. Yogyakarta : Graha Pena.
- Utari, E. G., & Haq, M. A. (2026). *Investment , Absorptive Capacity , and Regional Economic Growth : Explaining Heterogeneous Outcomes across Indonesian Provinces*.