

ANALYSIS OF LABOR ABSORPTION IN THE AGRICULTURE AND INDUSTRIAL SECTORS USING A DEMOMETRIC APPROACH IN CENTRAL JAVA PROVINCE, 2014–2023

Himah Anafida Pratama^{1*}, Muhammad Farid Alfariy², Agus Arifin³, Sidiq Juniarso⁴

¹⁻³ Faculty of Economics and Businnes, Jenderal Soedirman University, Indonesia

⁴ Directorate General of Treasury Regional Office Central Java, Indonesia

*Email corresponding author: himah.pratama@mhs.unsoed.ac.id

Abstract

In Central Java Province, the industrial sector contributes the largest share to the Regional Gross Domestic Product (RGDP), yet agriculture continues to serve as the primary source of employment. This study examines the absorption of labor in the agricultural and industrial sectors across 35 Regencys and cities in Central Java over the 2014–2023 period, employing a demometric framework. Data were sourced from publications by Indonesia's Central Statistics Agency (Badan Pusat Statistik) and the Central Java provincial Open Data portal. A quantitative analysis was conducted using multiple linear regression models with fixed effects. The findings reveal that, within the agricultural sector, labor absorption is negatively affected by both Agricultural RGDP and Foreign Direct Investment (FDI). In the industrial sector, FDI also has a negative effect, while the Regency/City Minimum Wage positively influences labor absorption. Moreover, demographic variables exhibit significant impacts across both sectors: the Dependency Ratio is positively associated with labor absorption, whereas the Average Years of Schooling correlates negatively. Based on these results, the study recommends implementing agricultural price protection measures, managing population dynamics, and accelerating industrial transformation.

Keywords: Labor absorption, Agricultural sector, Industrial sector, Central Java Province, Demometric approach

INTRODUCTION

Population issues are not immune to problems that can affect national development. According to Arifin & Faridatussalam (2023), population problems encompass both population dynamics and population structure. Therefore, population issues always remain an interesting topic for research. Indonesia has the fourth-largest population in the world, following China, India, and the United States (Hasanah & Armanda, 2021). According to the Directorate of Population and Employment Statistics (2021), Indonesia is currently experiencing a demographic bonus, with the productive-age population reaching 70.72%. This situation can pose both challenges and threats to the country. The distribution of Indonesia's population is concentrated in Java Island, which has the highest population among all Indonesian island.

Table 1. Population of Java Island

Province	-	Year	
		2021	2022
West Java		48.274	49.406
East Java		40.665	41.150
Central Java		36.516	37.032
Banten		11.904	12.252
Jakarta		10.562	10.680
Yogyakarta		3.668	3.762

Source: Badan Pusat Statistik, 2024

Table 1 presents the population figures over the past three years (2021–2023) for Java Island, comprising six provinces: West Java, East Java, Central Java, Banten, DKI Jakarta, and DI Yogyakarta. Throughout 2021–2023, all six provinces on Java Island experienced population growth. Central Java ranks as the province with the third-largest population, following West Java and East Java. The high number of working-age individuals, as noted by Wati et al. (2024), directly contributes to an increase in the labor force. According to Ratnasari (2021), aligning population growth with the rising demand for labor is crucial to prevent employment issues, such as unemployment.

Table 2. Open Unemployment Rate on Java Island

Province	Year		
	2021	2022	2023
West Java	9,82	8,31	7,44
Banten	8,98	8,09	7,52
Jakarta	8,50	7,18	6,21
Central Java	5,95	5,57	5,13
East Java	5,74	5,49	4,88
Yogyakarta	4,56	4,06	3,69

Source: Badan Pusat Statistik, 2024

Table 2 presents the open unemployment rate (TPT) data for the provinces on Java Island, including West Java, Central Java, East Java, Banten, DKI Jakarta, and DI Yogyakarta. Over the period from 2021 to 2023, all six provinces experienced a decline in their TPT. Central Java ranked fourth with the highest TPT on Java Island, following West Java, Banten, and DKI Jakarta. The decreasing TPT in Central Java has brought it below the national average. According to the Badan Pusat Statistik (2022), the inability of the labor force to be absorbed in the job market is directly reflected in the TPT. The high unemployment rate, as identified by Yuliana et al., (2019), is due to the imbalance between the higher population growth and the limited growth in job opportunities. In light of this phenomenon, Fitrahwaty et al. (2024) argue that investment plays a key role in driving job creation.

Table 3. State of Domestic Investment in Java Island

Province	Year		
	2021	2022	2023
Banten	25.989,5	31.283,9	37.971,7
Yogyakarta	2.761,3	2.275,0	5.015,5
Jakarta	54.708,2	89.223,6	95.202,1
West Java	59.948,5	80.808,3	88.012,9
Central Java	31.311,2	24.992,3	32.987,2
East Java	52.552,2	65.355,9	74.937,4

Source: Badan Pusat Statistik, 2024e

Table 3 presents the realized Domestic Investment (DI) data for the provinces on Java Island from 2021 to 2023. Generally, the PMDN values in West Java, DKI Jakarta, Banten, and East Java have shown an upward trend. However, Central Java and DI Yogyakarta experienced fluctuating DI values. Table 1.4 indicates that the DI value in Central Java remains relatively low compared to other provinces on Java Island, reflecting its volatile investment climate.

Table 4. State of Foreign Investment in Java Island

Province	Year		
	2021	2022	2023
West Java	5.217,7	6.534,5	8.283,7
Jakarta	3.330,6	3.744,1	4.830,0
Banten	2.190,0	3.410,7	4.451,6
East Java	1.849,2	3.134,0	4.741,0
Central Java	1.465,9	2.362,0	1.563,7
Yogyakarta	21,8	113,9	46,0

Source: Badan Pusat Statistik, 2024d

Table 4 presents the realized Foreign Direct Investment (FDI) data for the provinces on Java Island from 2021 to 2023. Generally, the FDI values in West Java, DKI Jakarta, Banten, and East Java have shown consistent increases. However, Central Java and DI Yogyakarta experienced fluctuating FDI values over the past three years. In 2023, West Java led the nation with an FDI realization of IDR 122.6 trillion, accounting for approximately 16.5% of the national total. This indicates a strong and consistent investment climate in West Java.

Table 5. Distribution of GRDP by Business Field in Central Java Province

Business Field	—	Year		
		2021	2022	2023
Manufacturing industry		33.73	32.96	32.75
Wholesale Trade		14.77	14.63	14.63
Agriculture		12.74	12.45	11.92

Source: Badan Pusat Statistik, 2024b

Table 5 is a distribution table of GRDP by business field in 2019-2023 to see the contribution of each sector to GRDP in Central Java. According to Ali et al. (2020), a high GRDP value indicates that the sector is an active contributor to the economy in a region. The GRDP that makes the largest contribution during 2021-2023 is the processing industry sector, wholesale trade is in second place and in third place is the agricultural sector.

Table 6. Number of Workers by Business Field in Central Java Province

Business Field	Year		
	2021	2022	2023
Agriculture	4.233.443	4.557.468	4.889.060
Manufacturing industry	3.954.314	4.025.810	4.184.724
Wholesale Trade	3.471.872	3.565.465	3.662.695

Source : Badan Pusat Statistik, 2024c

The state of labor absorption as reflected in the GDP contribution in Central Java is misaligned as evidenced by Tables 5 and 6 where the manufacturing industry is the sector with the highest contribution, but the agricultural sector still dominates the number of workers in Central Java. Therefore, an analysis of the industrial and agricultural sectors needs to be carried out to identify sectors that need attention and have the opportunity to increase employment.

Demographic factors play a crucial role in labor absorption, with dependency ratio,

population size, and average years of schooling being significant determinants. According to Ratnasari (2021), the population serves both as the object and subject of economic development, indicating that population growth can influence labor absorption levels. The dependency ratio, which compares the productive and non-productive age groups, is an essential instrument for analyzing the impact of the demographic bonus phenomenon on labor absorption (Parwodiwiyono & Witono, 2022). In Central Java, the demographic bonus phenomenon has made the dependency ratio a critical factor to assess how significantly this demographic shift affects labor absorption. Furthermore, Hepi & Zakiah (2018) argue that the average years of schooling reflect the education level in a region, making it a vital factor for labor absorption. This study aims to analyze the factors influencing labor absorption in the agricultural and industrial sectors by integrating economic elements such as Gross Regional Domestic Product (GRDP) of agriculture and industry, Foreign Direct Investment (FDI), Domestic Investment (DI), and Regional Minimum Wage (RMW), alongside demographic factors like population size, dependency ratio, and average years of schooling.

LITERATURE REVIEW AND HYPOTHESIS FORMULATION

Literature Review

1. Solow-Swan Theory

The Solow theory was developed by Robert M. Solow and is also known as the neoclassical growth theory. The market has the power to create equilibrium, which can reduce the need for government intervention in the market (Mankiw, 2006). Systematically, this relationship can be written as:

$$Y = F(K, L)$$

According to Mankiw (2006), the Solow-Swan theory explains how capital accumulation, labor force growth, and technological advancement interact within an economy. The capital stock is a key determinant of economic output because it changes over time. Capital consists of investment and depreciation, both of which play important roles in determining output. Investment refers to business expansion, which increases capital and consequently raises output. Depreciation refers to the use of capital that leads to a reduction in the capital stock.

2. Dual Sector Theory (W. Arthur Lewis)

Lewis's development theory is known as the Lewis Two-Sector Model. It is often referred to as a migration theory, as it essentially discusses the development process occurring in urban and rural areas, the process of urbanization, investment patterns, and wage-setting systems in the modern sector (Todaro & Michael, 2004). According to Lewis's theory of economic dualism, as cited in Jhingan (1975), the agricultural sector initially experiences a labor surplus due to the relative ease of working as a farmer. However, the agricultural sector is subject to the law of diminishing returns, caused by a continual reduction in available land each year. The industrial sector absorbs the surplus labor from the agricultural sector without reducing the agricultural output. This is because the industrial sector produces surplus output that generates new capital. As a result, the industrial sector expands and employs labor from the agricultural sector.

3. Demometric Approach

The demometric approach was introduced by Jacques (1978). His study aimed to analyze sectoral labor absorption in Tucson, Arizona, and the United States. According to Jacques (1978), households not only act as consumers of goods and services in the economy, but they also play a vital role in the labor supply (a demographic aspect). Each region has distinct demographic characteristics, which will in turn lead to the formulation of different policies.

Demometric model Jacques (1978) is a development of econometric models applied to the traditional economic-base model developed by Muth and Rosen, with the

addition of demographic variables. Thus, the demometric approach is an economic approach that studies the relationship between population dynamics and economic processes such as economic growth, income distribution, and development. This approach requires the construction of a regional macroeconomic model with key components such as birth rates, migration, employment, output, and population size.

Hypotesis

1. GRDP in the Agricultural and Industrial Sectors

The Gross Regional Domestic Product (GRDP) represents the value added generated by economic activities. A high GRDP indicates that a sector is active and productive (Ningrum & Nurhayati, 2021). According to research by Maryati et al., (2021), Cantika & Murwiati (2024), dan Fatridzi et al., (2024), GRDP has a positive effect on labor absorption. Therefore, the hypotheses formulated in this study are as follows:

H1: The GRDP of the agricultural sector has a positive effect on labor absorption in the agricultural sector.

H2: The GRDP of the industrial sector has a positive effect on labor absorption in the industrial sector.

2. Foreign Direct Investment (FDI)

Foreign Direct Investment (FDI) is suspected to increase the level of labor absorption. According to Solow's theory, investment is used for the purchase or creation of capital goods to enhance the production capacity of goods and services. This is supported by research conducted by Rohadin (2020), Tamala et al. (2023) and Hakim & Pakpahan (2021), who found that both FDI and domestic investment have a positive effect on labor absorption. Therefore, the hypotheses formulated in this study are as follows:

H3: FDI has a positive effect on labor absorption in the agricultural sector.

H4: FDI has a positive effect on labor absorption in the industrial sector.

3. Domestic Investment (DI)

Domestic Investment (DI) is also suspected to increase the level of labor absorption. This is supported by research conducted by Rohadin (2020), Tamala et al. (2023) dan Hakim & Pakpahan (2021), who found that both FDI and PMDN positively affect labor absorption. Therefore, the hypotheses formulated in this study are as follows:

H5: DI has a positive effect on labor absorption in the agricultural sector.

H6: DI has a positive effect on labor absorption in the industrial sector.

4. Regency/City Minimum Wage (RMW)

According to the theory of labor demand, higher wages will reduce the demand for labor. This is consistent with research conducted by Maryati et al. (2021), Izzah (2021) and Dewi et al. (2017). Therefore, the hypotheses formulated in this study are as follows:

H7: The Regency/City Minimum Wage (RMW) has a negative effect on labor absorption in the agricultural sector.

H8: The Regency/City Minimum Wage (RMW) has a negative effect on labor absorption in the industrial sector.

5. Population Size

A large population that is not matched by adequate job opportunities can increase unemployment, according to Prayogo & Indira Hasmarini (2022). Malthusian theory states that competition among individuals intensifies as population increases, and a rapid population increase may bring about economic problems. Therefore, the hypothesis formulated in this study is as follows:

H9: Population size has a negative effect on labor absorption in the industrial sector.

6. Dependency Ratio

The dependency ratio is suspected to reduce labor absorption due to increasing pressure on the productive age group. Research conducted by Cantika & Murwiati (2024) and Sinaga

et al. (2024) found that the dependency ratio negatively affects labor absorption. Therefore, the hypotheses formulated in this study are:

H10: The dependency ratio has a negative effect on labor absorption in the agricultural sector.

H11: The dependency ratio has a negative effect on labor absorption in the industrial sector.

7. Average Years of Schooling

Average years of schooling are suspected to increase the level of labor absorption. This indicator can be used to measure the quality of education in a population. Studies conducted by oleh Haydarsyah & Nilasari (2024), Izzah (2021) and Rohadin (2020) reveal that average years of schooling positively affect labor absorption. Higher human resource quality increases the opportunity for individuals to enter the labor market.

H12: Average years of schooling has a positive effect on labor absorption in the agricultural sector.

H13: Average years of schooling has a positive effect on labor absorption in the industrial sector.

RESEARCH METHODS

This study uses multiple linear regression with the help of the eviews 9 analysis tool. 35 Regency / cities of Central Java Province are the population in this study with a sample of 2014-2023. This study uses secondary data sourced from the Central Java Statistics Agency and Open data. In this research model consists of two models, namely agricultural and industrial models. The following is the model used:

1. Industry sector

$$\ln Y_{it} = \alpha + \beta_1 \ln X_{1it} + \beta_2 \ln X_{2it} + \beta_3 \ln X_{3it} + \beta_4 \ln X_{4it} + \beta_5 \ln X_{5it} + \beta_6 \ln X_{6it} + \beta_7 \ln X_{7it} + e \dots\dots\dots (1)$$

Description:

Y: Total employment in the industrial sector

X1: GRDP of industrial sector

X2: Foreign Investment

X3: Domestic Investment

X4: Regency / City Minimum Wage

X5: Total Population

X6: Dependency Ratio

X7: Average Years of Schooling

2. Agriculture sector

$$Y_{it} = \alpha + \beta_1 X_{1it} + \beta_2 X_{2it} + \beta_3 X_{3it} + \beta_4 X_{4it} + \beta_5 X_{6it} + \beta_6 X_{7it} + e \dots\dots\dots (2)$$

Description:

Y: Total Employment in the agricultural sector

X1: GRDP of agriculture sector

X2: Foreign Investment

X3: Domestic Investment

X4: Regency/City Minimum Wage

X6: Dependency Ratio

X7: Average Years of Schooling

The regression model in the agricultural sector does not include demographic variables, namely population. The diversity of population preferences in choosing to work in the agricultural sector which cannot be measured statistically and numerically, research conducted by Ayuni (2025) states that one of the reasons people choose to work in the agricultural sector is environmental factors, personality and motivation. In addition, the results of research by Pesik et al. (2016), Dewi et al. (2017) and Nuryaman et al. (2023) state that interest in working in the agricultural sector is influenced by views on the agricultural sector and uncertain wage levels. Thus, the diverse

preferences of the population in the agricultural sector and cannot be measured by numbers are the reasons why the population size variable is not used because it has the potential to be biased in producing conclusions.

RESULTS AND DISCUSSION

Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	231134.9	91910.25	2.514789	0.0124
GRDP_Agr	-0.015945	0.004329	-3.683051	0.0003
FDI	-0.003075	0.001210	-2.540760	0.0116
DI	0.001223	0.001223	1.000026	0.3181
RMW	-0.018571	0.009811	-1.892873	0.0593
DR	3515.972	1146.342	3.067123	0.0024
AYS	-24140.79	10131.25	-2.382804	0.0178
Effects Specification				
Cross-section fixed (dummy variables)				
R-squared	0.882132	Mean dependent var	118376.5	
Adjusted R-squared	0.866874	S.D. dependent var	82470.79	
S.E. of regression	30090.69	Akaike info criterion	23.57151	
Sum squared resid	2.80E+11	Schwarz criterion	24.02344	
Log likelihood	-4084.015	Hannan-Quinn criter.	23.75140	
F-statistic	57.81425	Durbin-Watson stat	1.175550	
Prob(F-statistic)	0.000000			

Figure 1. Regression analysis results of 35 regencies/cities in Central Java Agriculture Sector

In the regression analysis model results, it is known that the R-Squared determination value is 0.882132. This shows the ability of the independent variable to explain the influence of the dependent variable by 89.10 percent. While the remaining 10.9 percent is explained by other variables. The calculated F value in the model is 57.81490 with a probability value of 0.000000. Thus, there is a significant joint influence of the independent variable on the dependent variable. The t table value in the model shows 1.96, so the variables that have a significant effect are Agricultural

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.462193	9.153352	0.159744	0.8732
LN_GRDP_Ind	0.018355	0.086590	0.211979	0.8323
LN_FDI	-0.017766	0.007503	-2.367939	0.0185
LN_DI	0.001610	0.006960	0.231389	0.8172
LN_RMW	0.689362	0.190194	3.624522	0.0003
LN_PS	0.082347	0.721972	0.114059	0.9093
DR	0.064069	0.014379	4.455830	0.0000
AYS	-0.566972	0.117104	-4.841593	0.0000
Effects Specification				
Cross-section fixed (dummy variables)				
R-squared	0.827180	Mean dependent var	11.20890	
Adjusted R-squared	0.804174	S.D. dependent var	0.789076	
S.E. of regression	0.349184	Akaike info criterion	0.845729	
Sum squared resid	37.55419	Schwarz criterion	1.308681	
Log likelihood	-106.0025	Hannan-Quinn criter.	1.030000	
F-statistic	35.95601	Durbin-Watson stat	1.223710	
Prob(F-statistic)	0.000000			

Figure 2. Regression analysis results of 35 regencies/cities in Central Java Manufacturing industry Sector

In the regression analysis model results, it is known that the R-Squared determination value is 0.827180, which means that the independent variable explains that it affects the dependent variable by 82.71 percent. While the remaining 17.29 percent is explained by other variables. The calculated F value in the model is 35.95601 with a probability value of 0.000000. Thus, there is a significant joint influence of the independent variable on the dependent variable. The t table value in the model shows 1.96, so the variables that have a significant effect are FDI, RMW, DR, and AYS. Based on the results of the regression analysis test, the regression estimation model is obtained as follows

1. Agriculture sector

$$Y_{it} = 231134.9 - 0.015945 X_{1it} - 0.003075 X_{2it} + 0.001223 X_{3it} - 0.018571 X_{4it} + 3515.972 X_{5it} - 24140.79 X_{6it} + e \dots\dots\dots (3)$$

Based on the table, the interpretation of the regression estimation results of 35 Regencys / cities in the agricultural sector is as follows:

1. The coefficient value of 231134.9, indicates that if the agricultural GRDP variable (X1), FDI (X2), PMDN (X3), RMW (X4), Dependency Ratio (X6), Average years of schooling (X7) is zero then the variable number of workers in the agricultural sector will increase by 231134.9 thousand people.
2. The regression coefficient value of the agricultural GRDP variable is -0.01594. This shows that if each agricultural GRDP variable increases by 1 million, the variable number of agricultural sector workers will decrease by 0.01594 thousand people.
3. The regression coefficient value of the FDI variable is 0.003075. This shows that if each FDI variable increases by 1 billion, the variable number of agricultural sector workers will decrease by 0.003075 thousand people.
4. The regression coefficient value of the PMDN variable is 0.001223. This shows that if each PMDN variable increases by 1 million, the variable number of agricultural sector workers will increase by 0.001223 thousand people.
5. The regression coefficient value of the RMW variable is -0.018571. This shows that if each MSE variable increases by 1 million, the variable number of agricultural sector workers will decrease by 0.018571 thousand people.
6. The regression coefficient value of the dependency ratio variable is 3515.972. This shows that if each dependency ratio variable increases by 1 percent, the variable number of agricultural sector workers will increase by 3515.972 thousand people.
7. The regression coefficient value of the average years of schooling variable is -24140.79. This shows that if each average years of schooling variable increases by 1 year, the variable number of agricultural sector workers will decrease by 24140.79 thousand people.

2. Industry sector

$$\ln Y_{it} = 1.462193 - 0.018355 \ln X_{1it} - 0.017766 \ln X_{2it} + 0.001610 \ln X_{3it} + 0.689362 \ln X_{4it} + 0.082347 \ln X_{5it} + 0.064069 \ln X_{6it} - 0.566972 \ln X_{7it} + e \dots\dots\dots (4)$$

Based on the table, the interpretation of the regression estimation results of 35 regencies / cities in the industrial sector is as follows:

1. The constant value is 1.462193, indicating that if the agricultural GRDP variable (X1), FDI (X2), PMDN (X3), RMW (X4), Total Population (X5), Dependency Ratio (X6), Average years of schooling (X7) is zero then the variable number of industrial sector workers will increase by 1.462193 thousand people.
2. The regression coefficient value of the industrial GRDP variable is -0.018355. This shows that if each agricultural GRDP variable increases by 1 percent, the variable number of industrial sector workers will decrease by 0.00018355 percent.

3. The regression coefficient of the FDI variable is -0.017766. This shows that if each FDI variable increases by 1 percent, the variable number of industrial sector workers will decrease by 0.00017766 percent.
4. The regression coefficient value of the PMDN variable is 0.001610. This shows that if each PMDN variable increases by 1 percent, the variable number of industrial sector workers will increase by 0.00001610 percent.
5. The regression coefficient value of the RMW variable is 0.689362. This shows that if each PMA variable increases by 1 percent, the variable number of industrial sector workers will increase by 0.00689362 percent.
6. The regression coefficient value of the population variable is 0.082347. This shows that if each variable population increases by 1 percent, the variable number of industrial sector workers will increase by 0.00082347 percent.
7. The regression coefficient value of the dependency ratio variable is 0.064069. This shows that if each dependency ratio variable increases by 1 percent, the variable number of industrial sector workers will increase by 0.00064069 percent.
8. The regression coefficient value of the average years of schooling variable is -0.566972. This shows that if each average years of schooling variable increases by 1 year, the variable number of industrial sector workers will decrease by 0.00566972 percent.

Discussion

1. The Influence of Gross Regional Domestic Product on Labor Absorption

a. Agricultural Sector

The hypothesis testing based on the output of the panel data regression analysis shows that GRDP has a negative and significant effect on labor absorption. This result contradicts the previously formulated hypothesis and differs from the findings of earlier studies by Maryati et al. (2021), Yuniarti et al. (2020) and Cantika & Murwiati (2024), which found that the agricultural sector's GRDP had a positive effect on labor absorption. This discrepancy is presumed to be due to differences in the year and location of the studies.

However, this research aligns with the study conducted by Iftinan et al. (2024), which indicates a negative relationship between agricultural GRDP and labor absorption in the agricultural sector in Central Java. According to the Official Portal of Central Java (2018), in recent years, the province has been striving to modernize agriculture by adopting agricultural technology. This modernization is suspected to have increased the GRDP of the agricultural sector. The mechanization of agriculture has reduced the need for labor in the sector, as technology has increasingly become a production input. In addition, there appears to be a declining preference among the population of Central Java to work in the agricultural sector.

b. Industrial Sector

The hypothesis testing based on the output of the panel data regression analysis shows that the GRDP of the industrial sector has no effect on labor absorption in the agricultural sector in Central Java during the period 2014–2023. This result differs from the previously formulated hypothesis and also contrasts with the findings of earlier studies by Maryati et al. (2021), Cantika & Murwiati (2024), and Rochmani et al. (2017), which stated that the industrial sector's GRDP influenced labor absorption in the industrial sector. The difference in findings is presumed to be due to variations in research locations and time periods. The results of this study indicate that although the industrial sector is the largest contributor to GRDP, labor absorption in this sector does not necessarily correspond proportionally to its contribution to GRDP.

2. The Influence of Foreign Direct Investment (FDI) on Labor Absorption

a. Agricultural Sector

The hypothesis testing based on the panel data regression analysis output shows that FDI has a negative and significant effect on labor absorption in the agricultural sector in Central Java

from 2014 to 2023. This finding differs from previous studies by Yuniarti et al., (2020) and Rohadin (2020), which concluded that FDI had a positive effect on labor absorption in the agricultural sector. The difference is likely due to variations in research characteristics such as location and time frame. This study focuses on Central Java across 35 Regencys/cities during 2014–2023, while previous studies focused on all of Indonesia at the provincial level during 2018–2020.

The negative effect of FDI on labor absorption is suspected to be related to the investment focus areas outlined in the Amendment to the Central Java Governor Regulation No. 51 of 2012 concerning the General Investment Plan of Central Java Province for 2012–2025. This regulation emphasizes investment in food development, infrastructure, and renewable energy. Food development under this plan includes the use of food estate programs, which involve more modern technology. Additionally, Fatridzi & Akbar (2024) noted that investment can increase production capacity, but investors tend to prioritize technology. Consequently, FDI has a negative impact on labor absorption in the agricultural sector in Central Java.

b. Industrial Sector

The hypothesis testing indicates that FDI has a negative effect on labor absorption in the industrial sector during the 2014–2023 period. This result contrasts with the previously formulated hypothesis and the findings of Hakim & Pakpahan, (2021) and Rozen-Bakher (2017), who found a positive influence of FDI on labor absorption in the industrial sector.

The suspected reason for the negative effect is again the investment focus defined in the Amendment to Governor Regulation No. 51 of 2012, which emphasizes investments in food, infrastructure, and renewable energy. The inflow of foreign investment often leads to technology transfer aimed at increasing production efficiency. As a result, greater use of technology can increase output more quickly without increasing labor. While technology enhances efficiency, it can replace human labor in the production process.

3. The Influence of Domestic Investment (DI) on Labor Absorption

a. Agricultural Sector

Panel data regression analysis results show that DI has no effect on labor absorption in the agricultural sector during 2014–2023. This contradicts the initial hypothesis and previous findings by Sari et al. (2015), who found that DI had a positive and significant effect on labor absorption in Central Java. The discrepancy is likely due to different research periods—Sari et al. focused on the years 1985–2014. his study’s results are consistent with Yuniarti et al.(2020) and Kawasaki (2024) who also found no significant effect of DI on labor absorption. The likely explanation is that from 2014 to 2023, DI in Central Java was focused on food development, infrastructure, machinery, and equipment—as outlined in the amended Governor Regulation No. 51 of 2012. In contrast, from 1985 to 2014, DI was directed toward labor-intensive sectors. The lack of impact indicates that DI has not been effective in increasing labor absorption in agriculture, possibly because DI in Central Java is relatively low compared to other provinces on Java Island and has shown fluctuation.

b. Industrial Sector

The analysis also shows that DI has no effect on labor absorption in the industrial sector during 2014–2023. This contradicts both the initial hypothesis and the findings of Sari et al. (2015), who reported a positive and significant effect of DI on industrial labor absorption in Central Java, with a focus on the 1985–2014 period.

These findings are consistent with those of Yuniarti et al.(2020) and Kawasaki (2024), who also found no significant effect of DI on labor absorption. The presumed reason is that DI from 2014 to 2023 targeted sectors such as food, infrastructure, machinery, and equipment—as stated in the amended Governor Regulation No. 51 of 2012. Furthermore, the regulation reflects a policy direction aimed at promoting investment distribution based on regional sectoral strengths, rather than focusing solely on the industrial sector. This decentralization of investment

may explain the lack of influence on industrial labor absorption. The relatively small and fluctuating value of DI in Central Java compared to other Java provinces may also be a factor. According to Alalawneh & Nessa (2020), investment does not always directly affect labor absorption because some investments involve acquisitions, which result in fewer new jobs being created.

4. The Influence of Regency/City Minimum Wage (RMW) on Labor Absorption

a. Agricultural Sector

Regression analysis results show that RMW has no significant effect on labor absorption in the agricultural sector in Central Java from 2014 to 2023. This finding is inconsistent with the previously formulated hypothesis but aligns with the study by Yuniarti et al. (2020), which found that RMW does not affect labor absorption in the agricultural sector. This is likely because minimum wage regulations are not typically applied in the agricultural sector. RMW is determined by the governor based on business classification and job risk, but the agricultural sector is not categorized under those entitled to sectoral minimum wages. Therefore, RMW does not affect labor absorption in the agricultural sector of Central Java.

b. Industrial Sector

Regression analysis shows that RMW has a positive and significant effect on labor absorption in the industrial sector in Central Java from 2014 to 2023. This finding differs from the initial hypothesis but is consistent with prior studies by Rochmani et al. (2017) dan Ling et al. (2024), which reported a positive influence of RMW on industrial labor absorption. This positive relationship is likely due to the nature of industrial jobs, which often require higher skills and human capital than agricultural jobs. According to the efficiency wage theory, higher wages can motivate higher-skilled workers, increasing productivity and, in turn, production output. In addition, Rochmani et al. (2016) pointed out that labor market competition in Central Java is highly competitive. The presence of many labor-intensive industries could explain why higher minimum wages positively affect labor absorption. Therefore, RMW has a significantly positive effect on labor absorption in the industrial sector.

5. The Influence of Population Size on Labor Absorption

a. Industrial Sector

The hypothesis testing based on the panel data regression analysis shows that population size has no effect on labor absorption in the industrial sector in Central Java from 2014 to 2023. This result contradicts the previously formulated hypothesis and differs from previous studies by oleh Haydarsyah & Nilasari (2024) dan Hakim & Pakpahan, (2021), which stated that population size had a positive effect on labor absorption. These differences may be due to variations in research periods and locations.

However, this finding is in line with the studies by Ratnasari (2021) dan Cantika & Murwiati (2024), which concluded that population size does not influence labor absorption. Central Java is the third most populous province on Java Island. Several factors may explain the lack of effect, one being that rapid population growth is not matched by the creation of new jobs, causing labor absorption to stagnate.

6. The Influence of the Dependency Ratio on Labor Absorption

a. Agricultural Sector

The hypothesis testing shows that the dependency ratio has a positive effect on labor absorption in the agricultural sector in Central Java from 2014 to 2023. This result contradicts the previously formulated hypothesis. However, it is consistent with the study by Nurhuda et al., (2023), which found a significant positive effect of the dependency ratio on labor absorption.

The dependency ratio, as a variable representing the demographic bonus, implies that a lower ratio means a larger share of the productive-age population. A positive effect indicates that a higher proportion of non-productive-age individuals leads to greater labor absorption. When

the dependency ratio is high, the burden on the productive population increases, which may compel more people to enter the workforce, thereby increasing labor absorption.

b. Industrial Sector

Similarly, the results show that the dependency ratio positively affects labor absorption in the industrial sector in Central Java from 2014 to 2023. This also contradicts the initial hypothesis but aligns with the findings of Nurhuda et al., (2023), which showed a significant positive relationship. The logic is the same: a higher dependency ratio means a heavier burden on the productive population, which increases the urgency to work and earn a living, thereby positively influencing labor absorption.

7. The Influence of Average Years of Schooling on Labor Absorption

a. Agricultural Sector

The hypothesis testing results show that average years of schooling has a negative effect on labor absorption in the agricultural sector in Central Java during 2014–2023. This finding contradicts the initial hypothesis and the findings of Haydarsyah & Nilasari (2024) and Rohadin (2020), who found that education level positively affects labor absorption. The discrepancy may stem from differences in research location, period, and sectoral specification.

Agriculture is largely informal, and individuals of all educational backgrounds can enter this sector. The uncertainty of income from agriculture and its relatively unattractive image among the public lead many to choose jobs in other sectors that offer better income prospects. According to the Official Portal of Central Java Province (2017), the region has intensified agricultural modernization since 2017 to increase young people's interest in the sector. However, agriculture in Central Java is still in transition, as shown by limited access to agricultural technology in several regions such as Wonosobo, Wonogiri, Blora, Temanggung, Grobogan, and Magelang. These factors suggest that agriculture is not yet appealing to younger generations, particularly those with higher education.

b. Industrial Sector

The results also show that average years of schooling has a negative effect on labor absorption in the industrial sector in Central Java from 2014 to 2023. This finding contrasts with the initial hypothesis and with previous studies by Haydarsyah & Nilasari (2024) and (Rohadin, 2020), which concluded that education level positively affects labor absorption.

This research shows that higher educational attainment tends to reduce labor absorption in the industrial sector, implying that as the education level increases, fewer people work in this sector. According to Indonesia's Ministry of Manpower (2024), industries in Central Java are predominantly labor-intensive manufacturing sectors that mostly require low to medium-skilled workers. The region is well-known for its textile and garment industries, as well as footwear production. Furthermore, the Ministry of Manpower (2024a) suggests that this phenomenon may result from skill mismatch, where the skills possessed by job seekers do not align with the needs of employers. This mismatch contributes to the negative influence of average years of schooling on labor absorption in the industrial sector.

CONCLUSION

Conclusions

- a. The findings indicate that, in the agricultural sector across 35 regencies/cities in Central Java, the economic variables affecting labor absorption are Agricultural GRDP and FDI—both having a negative impact on employment in this sector. In the industrial sector across the same 35 regencies/cities, FDI negatively affects labor absorption, whereas the Regional Minimum Wage (RMW) has a positive impact.

- b. The findings also show that, for both the agricultural and industrial sectors in these 35 regencies/cities, the demographic variables influencing labor absorption are the dependency ratio—which has a positive effect—and the average years of schooling, which has a negative effect.

Implications

- a. Based on the researcher's findings, the agricultural GRDP in 35 regencies/cities in Central Java can reduce labor absorption in the agricultural sector. *Recommendation:* Increase interest in agricultural work by ensuring price protection for farm produce during both peak and off-seasons.
- b. According to the findings, Foreign Direct Investment (FDI) can reduce labor absorption in the agricultural sector across these 35 regencies/cities. *Recommendation:* Introduce FDI partnership models with local farmers, such as employing local labor as part of the investment.
- c. The research shows that the dependency ratio can increase labor absorption in the agricultural sector in the 35 regencies/cities. *Recommendation:* Implement labor-intensive agricultural expansion programs in areas with high dependency ratios to absorb informal workers. Complement this with population control efforts through an intensified family planning program.
- d. According to the findings, the average years of schooling can reduce labor absorption in the agricultural sector across 35 regencies/cities. *Recommendation:* Promote agricultural sector development through research-based and technological approaches, including both extensification and intensification techniques.
- e. The researcher's findings indicate that FDI can reduce labor absorption in the industrial sector across 35 regencies/cities in Central Java. *Recommendation:* The government should prioritize labor-intensive FDI projects and include them in regional investment plans.
- f. Research shows that the Regional Minimum Wage (RMW) in the 35 regencies/cities can increase labor absorption in the industrial sector. *Recommendation:* Ensure industries in Central Java adhere to RMW regulations for employees with less than one year of service. When increasing the RMW, the government should concurrently raise standards for business licensing and operational quality.
- g. Findings reveal that the dependency ratio can increase labor absorption in the industrial sector across 35 regencies/cities. *Recommendation:* Develop integrated industrial zones in areas with high dependency ratios, combined with population control through an intensified family planning program.
- h. The research indicates that average years of schooling in these 35 regencies/cities can reduce labor absorption in the industrial sector. *Recommendation:* Ensure education curricula align with industry needs and promote transformation toward higher-standard industries, such as technology and service sectors.

Limitations and suggestion

The data used in this study are secondary, sourced from Statistics Indonesia (BPS) and the Open Data Jateng platform. A limitation of this research is the unavailability of data on the number of industrial sector workers for the year 2016. To address this gap, the study applied an average-based estimation approach and proportional distribution across the regencies/cities. This study focuses on macroeconomic variables. For future research, it is recommended to incorporate fiscal variables such as Regional Own-Source Revenue (PAD), regional transfer funds, and other balancing funds. These variables can provide a clearer reflection of a region's financial autonomy.

BIBLIOGRAPHY

- Alalawneh, M. M., & Nessa, A. (2020). The Impact of Foreign Direct Investment on Unemployment: Panel Data Approach. *Emerging Science Journal*, 4(4), 228–242. <https://doi.org/10.28991/esj-2020-01226>
- Ayuni, F. (2025). *Analisis Faktor-Faktor Yang Mempengaruhi Minat Generasi Z Bekerja Pada Sektor Pertanian Dan Dampak Terhadap Pembangunan Ekonomi Daerah*. 1(1), 26–37. <https://ejournal.gemacendekia.org/index.php/joeder/article/view/58>
- Badan Pusat Statistik. (2022). *Yuk, Kenalan dengan Sakernas*. Badan Pusat Statistik Provinsi Jambi. <https://jambi.bps.go.id/id/news/2022/08/23/269/yuk--kenalan-dengan-sakernas.html>
- Badan Pusat Statistik. (2024a). *Produk Domestik Regional Bruto Provinsi Jawa Tengah Menurut Lapangan Usaha 2019-2023*. <https://jateng.bps.go.id/id/publication/2025/04/11/533709d6288e2ccfb2baf7cb/produk-domestik-regional-bruto-provinsi-jawa-tengah-menurut-lapangan-usaha-2020-2024.html>
- Badan Pusat Statistik. (2024b). *Provinsi Jawa Tengah Dalam Angka 2024*. <https://jateng.bps.go.id/id/publication/2024/02/28/980d120f5be18d6400c48b16/provinsi-jawa-tengah-dalam-angka-2024.html>
- Badan Pusat Statistik. (2024c). *Realisasi Investasi Penanaman Modal Dalam Negeri Menurut Lokasi - Jumlah Investasi (Milyar Rupiah), 2021-2023*. bps.go.id. <https://www.bps.go.id/id/statistics-table/2/NzkzIzI=/realisasi-investasi-penanaman-modal-dalam-negeri-menurut-provinsi--investasi-.html>
- Badan Pusat Statistik. (2024d). *Realisasi Investasi Penanaman Modal Luar Negeri Menurut Provinsi (Juta US\$), 2021-2023*. bps.go.id. <https://doi.org/https://www.bps.go.id/id/statistics-table/2/MTg0MCMY/foreign-direct-investment-realization-by-province.html>
- Cantika, & Murwati, A. (2024). Analisis Penyerapan Tenaga Kerja Berdasarkan Pendekatan Demometrik di Seluruh Provinsi Indonesia pada Periode 2018- 2022. *Economics and Digital Business Review*, 5(2), 386–405. <https://doi.org/https://doi.org/10.37531/ecotal.v5i2.1194>
- Dewi, R. F., Prihanto, P. H., & Edy, J. K. (2017). Analisis penyerapan tenaga kerja pada sektor pertanian di Kabupaten Tanjung Jabung Barat. *e-Jurnal Ekonomi Sumberdaya dan Lingkungan*, 5(1), 19–
25. <https://doi.org/10.22437/jels.v5i1.3925>
- Direktorat Statistik Kependudukan dan Ketenagakerjaan. (2021). *Statistik Mobilitas Penduduk dan Tenaga Kerja 2021*. https://ppid.bps.go.id/upload/doc/LAKIN_Direktorat_Statistik_Kependudukan_dan_Ketenagakerjaan_2021_1658392403.pdf
- Fatridzi, M. Al, & Akbar, U. U. (2024). Analisis Faktor-Faktor Yang Mempengaruhi Penyerapan Tenaga Kerja Sektor Industri Dan Pertanian di Indonesia. *Media Riset Ekonomi Pembangunan (MedREP)*, 1(2), 685–894. <https://medrep.ppj.unp.ac.id/index.php/MedREP/login>
- Fitrahwaty, Handayani, A., Rinaldi, & Septian, Y. (2024). Pengaruh Inflasi dan Investasi terhadap Pengangguran di Indonesia. *Jurnal Masharif al-Syariah: Jurnal Ekonomi dan Perbankan Syariah*, 9, 3566–3581. <https://doi.org/https://doi.org/10.30651/jms.v9i5.24673>
- Hakim, A. R., & Pakpahan, A. (2021). Apakah UMR Mempengaruhi Penyerapan Tenaga Kerja : Pendekatan Model Demometrik. *Anterior Jurnal*, 20(2), 1–10. <https://doi.org/10.33084/anterior.v20i2.1831>
- Hasanah, U., & Armanda, D. (2021). Analisis Dampak Bonus Demografi Terhadap Kesempatan Kerja di Propinsi Aceh. *Asia-Pacific Journal of Public Policy*, 02, 55–66. <https://doi.org/10.52137/apjpp.v7i2.68>
- Haydarsyah, M. Z., & Nilasari, A. (2024). Faktor Internal Penyerapan Tenaga Kerja di Pulau Jawa. *Jurnal Ilmiah Akuntansi dan Keuangan (JIaku)*, 3(3), 190–208. <https://doi.org/10.24034/jiaku.v3i3.6787>
- Hepi, & Zakiah, W. (2018). Pengaruh Angka Harapan Hidup dan Rata-Rata Lama Sekolah Terhadap

PDRB Perkapita Serta Pertumbuhan Ekonomi di Provinsi Kalimantan Tengah 2011-2015.

- Palangka Raya, 4(1), 56–68.
<https://journal.student.uny.ac.id/ekonomi/article/download/22350/19064>
- Izzah, C. I. (2021). Analisis Faktor Faktor Yang Mempengaruhi Penyerapan Tenaga Kerja Di Wilayah Solo Raya. *Equilibrium: Jurnal Penelitian Pendidikan dan Ekonomi*, 18(02), 90–101.
<https://doi.org/10.25134/equi.v18i2.4322>
- Jhingan, M. L. (1975). *Ekonomi Pembangunan dan Perencanaan*. Rajawali Pers.
http://elibrary.bpsdm.jabarprov.go.id/index.php?p=show_detail&id=624
- Kawasaki, P. (2024). Analisis penyerapan tenaga kerja di Provinsi Jawa Tengah. *Economics, Finance, and Business Review*, 1(1), 47–58. <https://doi.org/10.20885/efbr.vol1.iss1.art5>
- Ledent, J. (1978). Regional Multiplier Analysis: A Demometric Approach. *Environment and Planning A: Economy and Space*, 10(5), 537–560. <https://doi.org/10.1068/a100537>
- Ling, L., Khan, H., Qianqian, L., & Qiumei, L. (2024). Minimum wage standard adjustment and employment: Heterogeneity effects on the human capital investment. *Heliyon*, 10(3), e25097. <https://doi.org/10.1016/j.heliyon.2024.e25097>
- Mankiw, N. G. (2006). *Macroeconomics* (Keenam). Erlangga.
- Maryati, S., Handra, H., & Muslim, I. (2021). Penyerapan Tenaga Kerja dan Pertumbuhan Ekonomi Menuju Era Bonus Demografi di Sumatra Barat. *Jurnal Ekonomi dan Pembangunan Indonesia*, 21(1), 95–107. <https://doi.org/10.21002/jepi.2021.07>
- Ningrum, M., & Nurhayati, S. F. (2021). Analisis Faktor-Faktor yang Mempengaruhi Penyerapan Tenaga Kerja pada Industri Kecil di Provinsi Jawa Timur. *Prosiding Seminar Nasional, September*, 14–24.
<https://jurnal.untidar.ac.id/index.php/semnasfe2021/article/download/4471/2154>
- Nurhuda, N., Sari, I., Syukri, M., & Muddin, H. (2023). Effect of employee Dependency Ratio on Economic Growth in North Luwu Regency. *EKALAYA : Jurnal Ekonomi Akuntansi*, 1(1), 1–9.
<https://doi.org/10.59966/ekalaya.v1i1.16>
- Nuryaman, H., Suyudi, S., & Cahrial, E. (2023). Persepsi Dan Motivasi Generasi Muda Milenial Terhadap Pekerjaan Di Sektor Pertanian (Studi Kasus Peserta Program Penumbuhan Wirausaha Muda Pertanian (PWMP) Universitas Siliwangi). *Jurnal Ilmiah Mahasiswa Agroinfo Galuh*, 10(2), 1313. <https://doi.org/10.25157/jimag.v10i2.10041>
- Parwodiwiyono, S., & Witono. (2022). Analisis Kaitan Angka Beban Ketergantungan dengan Indeks Pembangunan Manusia dalam Pemanfaatan Bonus Demografi (Studi 6 Provinsi Indonesia). *Jurnal Kependudukan, Keluarga, dan Sumber Daya Manusia*, 3(1), 43–53.
<https://doi.org/10.37269/pancanaka.v3i1.121>
- Pesik, C. S., Kapantow, G. H. M., & Katiandagho, T. M. (2016). FAKTOR-FAKTOR PENYEBAB PERGESERAN TENAGA KERJA SEKTOR PERTANIANKE SEKTOR NON PERTANIAN DI KECAMATAN KALAWAT,KABUPATEN MINAHASA UTARA. *AGRI-SOSIOEKONOMI*, 12(3A), 67.
<https://doi.org/10.35791/agrsosek.12.3A.2016.14287>
- Prayogo, I., & Indira Hasmarini, M. (2022). SEIKO : Journal of Management & Business Analisis Pengaruh IPM, Upah Minimum, PDRB dan Jumlah Penduduk Terhadap Penyerapan Tenaga Kerja Di Yogyakarta Tahun 2018-2021. *SEIKO : Journal of Management & Business*, 5(2), 77–85. <https://doi.org/10.37531/sejaman.vxix.3455>
- Ratnasari, D. (2021a). Pengaruh UMK, Pendidikan, Jumlah Penduduk Terhadap Penyerapan Tenaga Kerja di Kota/Kabupaten Jawa Tengah. *Journal Of Economics*, 1, 16–32.
<https://ejournal.unesa.ac.id/index.php/independent/article/download/38981/36734>
- Ratnasari, D. (2021b). Pengaruh UMK, Pendidikan, Jumlah Penduduk Terhadap Penyerapan Tenaga Kerja di Kota/Kabupaten Jawa Tengah. *Journal of Economics*, 2798–5008, 16–32.
<https://doi.org/10.26740/independent.v1n2.p16-32>
- Rochmani, T. S., Purwaningsih, Y., & Suryantoro, A. (2016). Analisis Penyerapan Tenaga Kerja Sektor Industri di Jawa Tengah. *JIEP*, 16(2), 2548–1851.
<https://www.bing.com/ck/a?!&p=883bfc098c02b8b3ec11bf471183ed3101913e12a04fcb9c199d59c6f8b8e311JmltdHM9MTc0OTM0MDgwMA&pptn=3&ver=2&hsh=4&fclid=2032afb0-75b0-6bad-022d->

- bab574356a7d&psq=kenapa+pma+berpengaruh+negatif+terhadap+penyerapan+tenaga+kerja+sektor+i
- Rochmani, T. S., Purwaningsih, Y., & Suryantoro, A. (2017). Analisis Penyerapan Tenaga Kerja Sektor Industri Di Provinsi Jawa Tengah. *Jurnal Ilmu Ekonomi dan Pembangunan*, 16(2). <https://doi.org/10.20961/jiep.v16i2.2322>
- Rohadin. (2020). Pengaruh Investasi dan Rata-Rata Lama Sekolah Terhadap Penyerapan Tenaga Kerja di Kabupaten Cirebon Tahun 2013-2018. *Seminar Nasional Konsorsium Untag Indonesia*, 2(1). <https://jurnal.untag-sby.ac.id/index.php/semnasuntag/issue/view/422>
- Rozen-Bakher, Z. (2017). Impact of inward and outward FDI on employment: the role of strategic asset-seeking FDI. *Transnational Corporations Review*, 9(1), 16–30 . <https://doi.org/10.1080/19186444.2017.1290919>
- Sari, A. D. R., Setyadi, D., & Farouk, U. (2015). Analisis Pengaruh Perkembangan Penanaman Modal Dalam Negeri dan Penanaman Modal Asing Terhadap Penyerapan Tenaga Kerja di Provinsi Jawa Tengah Periode 1985-2014. *Admisi Bisnis*, 1(2), 1411 – 4321. <https://jurnal.polines.ac.id/index.php/admisi/article/view/898/722>
- Sinaga, D. P., Lubis, C. K. S., Hidayat, N., Sari, C. M., & Syahfitri, T. I. (2024). Analisis Pengaruh Rasio Ketergantungan, Indeks Pembangunan Manusia, dan Tingkat Partisipasi Angkatan Kerja Terhadap Pertumbuhan Ekonomi di Provinsi Jawa Barat. *IJEDR: Indonesian Journal of Education and Development Research*, 2(2), 1485–1496. <https://doi.org/10.57235/ijedr.v2i2.2639>
- Tamala, L. A., Napitupulu, D., & Saputra, A. (2023). Faktor-Faktor yang Memengaruhi Penyerapan Tenaga Kerja Sektor Pertanian di Kabupaten Muaro Jambi. *Agricultural Socio-Economic Empowerment and Agribusiness Journal*, 2(1), 19. <https://doi.org/10.20961/agrisema.v2i1.72035>
- Todaro, P., & Michael. (2004). *Pembangunan Ekonomi Dunia Ketiga Jilid I*. Erlangga.
- Wati, M. I., Utami, F. A., & Nisa, L. F. (2024). Pengaruh Angkatan Kerja Dan Jumlah Penduduk Terhadap Pengangguran Di Provinsi Jawa Timur. *Jurnal Ilmiah Wahana Pendidikan*, 10, 299–513. <https://doi.org/https://doi.org/10.5281/zenodo.13908957>
- Yuliana, T., Laut, L. T., & Jalunggono, G. (2019). Analyze Of Open Unemployment Determination Central Java 2005-2019. *T.P*, 123. <https://ejournal.jatengprov.go.id/index.php/jurnaljateng/article/view/1217/800>
- Yuniarti, P., Wianti, W., & Nurgaheni, N. E. (2020). Analisis Faktor-faktor yang Mempengaruhi Tingkat Pertumbuhan Ekonomi di Indonesia. *SERAMBI: Jurnal Ekonomi Manajemen dan Bisnis Islam*, 2(3), 169–176. <https://doi.org/10.36407/serambi.v2i3.207>