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THE IMPACT OF MACROECONOMIC VARIABLES ON LABOR ABSORPTION IN SUMATRA ISLAND

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Abstract: *The role of macroeconomic variables in labor absorption in Sumatra is a crucial aspect in supporting regional economic development. This study aims to analyze the influence of economic growth, open unemployment rate, investment, and provincial minimum wage on labor absorption in 10 provinces in Sumatra during the period 2014–2023. This quantitative research method uses secondary data from the Central Statistics Agency and the Investment Promotion Agency, with a sample of 100 observations. Data analysis was conducted using multiple linear regression of panel data with the Fixed Effect Model (FEM) approach, as well as classical assumption tests and hypothesis testing. The results indicate that economic growth and open unemployment rates have no significant effect. Investment has a negative and significant effect, due to the dominance of capital-intensive investments with low labor absorption. Conversely, provincial minimum wages have a positive and significant effect. Policy implications include the need to strengthen labor-intensive investments, improve labor quality, and adjust minimum wages based on productivity to promote sustainable labor absorption in Sumatra.*

JEL classification: J21, E24, O15, R23.
Key words: Labor Absorption, Economic Growth, Open Unemployment Rate, Investment, Minimum Wage, Panel Data, Sumatra Island.

1. INTRODUCTION

Economic development is a continuous process involving population growth, increased productivity of natural resources, and strengthening of the economic system to boost national income (Syarief, 2021). Balance between the quality and quantity of human resources (HR) is key to increasing the production of goods and services without burdening production costs.

However, an increase in the labour force that is not matched by job creation can trigger unemployment, poverty, and socio-economic inequality (Rusniati, 2018). In Indonesia, the population has continued to increase from 252.2 million in 2014 to 278.8 million in 2023, with the labour force growing from 121.87 million (2014) to 147.71 million (2023) (BPS, 2023). Despite a decline in the unemployment rate from a peak of 9.76 million people (2020) to 7.85 million people (2023), labour market challenges remain complex due to labour market mechanisation, skill gaps, and the dominance of the informal sector (Kemnaker RI, 2023).

Labour absorption in Indonesia is still concentrated in Java (56%) and Sumatra (21-22%), with Sumatra's contribution to the national Gross Domestic Product (GDP) reaching 22%, mainly from the plantation, agriculture, and mining sectors (BPS, 2023). As an island with the most provinces (10 provinces), it plays a significant role in contributing to national economic growth. However, the economic development of a region is not solely reflected in economic growth figures but is also closely linked to labour market dynamics. Labour issues are a focus of equal importance, given their impact on public welfare and the sustainability of economic development.

Although in different proportions, labour market conditions in Sumatra are almost identical to those in Indonesia. The following data shows the employment situation in Sumatra:

Tab.1- Employment Conditions Data in Sumatra Island 2014-2023

Year	Working-age population	Labor force	Employed population	Open unemployment (%)
2014	37.973.504	25.152.495	23.661.690	5,84
2015	38.705.894	25.587.918	23.913.680	6,43
2016	39.426.578	26.709.794	25.258.225	5,25
2017	40.153.905	27.036.461	25.629.604	5,12
2018	40.856.783	28.097.064	26.664.054	5,11
2019	41.589.068	28.302.454	26.873.133	5,01
2020	43.272.088	29.476.032	27.665.526	6,17
2021	43.992.908	29.856.545	28.152.049	5,69
2022	44.715.370	30.448.398	29.203.615	5,33
2023	45.059.062	31.152.975	29.582.508	4,97

Source: *Central Statistics Agency, 2023 (processed)*

Based on Table 1, the employment conditions in Sumatra show an annual increase in the working age, labour force, and employed population from 2014 to 2023. However, the number of employed people is smaller than the labour force, which could lead to unemployment. The open unemployment rate decreased from 2014 to 2019 but increased by

6.17% in 2020 due to the impact of the COVID-19 pandemic. Subsequently, from 2021 to 2023, the open unemployment rate decreased again to 4.97%. This decline cannot yet be considered an improvement in the employment situation in Sumatra because people continue to work to meet their needs. Unemployment appears low, but many work less than 40 hours per week with low wages and productivity. In addition, they are also considered underemployed if their jobs do not match their fields or skills.

The issue of relatively low labour absorption remains a key focus of this study. Labour absorption in Sumatra faces various challenges influenced by macroeconomic factors. This study aims to examine the influence of macroeconomic variables believed to play a significant role in labour absorption rates, namely economic growth, open unemployment rate (OUR), investment, and minimum wage.

Economic growth is believed to play a positive role in increasing employment. Firmansah (2019) states that an increase in aggregate demand due to economic growth requires additional labour as a factor of production, especially in labour-intensive economic structures. Conversely, in capital-intensive economic structures, economic growth increases the demand for capital more than the demand for labour. This is reinforced by Atiyatna's (2023) research, which found a positive relationship between economic growth and labour absorption, especially in the micro and small industrial sectors. Economic growth and industrial sector development have proven to increase labour demand, thereby opening up more job opportunities for the community.

The open unemployment rate is also an important variable that influences labour absorption. A high open unemployment rate indicates an imbalance between labour supply and demand, which can hinder economic growth (Belmondo, 2020). This condition reflects the suboptimal utilisation of human resources, thereby impacting the productivity and economic competitiveness of a region. Yanda (2022) emphasises that the limited availability of jobs, which is not commensurate with the growth of the labour force, has led to an increase in unemployment.

In addition, investment plays a crucial role in driving economic growth and labour absorption. Anggraini (2020) states that investment not only creates jobs directly through the establishment of new businesses or company expansion, but also indirectly increases productivity and efficiency. Mankiw (2006) adds that investment is an important component in

the formation of national income, which ultimately drives economic growth. Investment made by the government, the private sector, or through partnerships is one of the strategic instruments for improving the standard of living of the community in the long term.

On the other hand, minimum wages also influence labour absorption. Bhagaskara's (2020) research shows that an increase in minimum wages can reduce labour demand because it increases companies' operating costs. This has the potential to cause a decline in labour absorption. However, an increase in minimum wages also has a positive side by reducing disparities in the labour market, especially between skilled and unskilled workers. The establishment of sectoral minimum wages also encourages labour migration from the agricultural sector to the industrial sector.

Based on the above, this study aims to analyse the development and influence of economic growth, open unemployment rates, investment, and minimum wages on labour absorption in Sumatra Island.

2. LITERATURE REVIEW

2.1 Labour Absorption and Labour Market

The workforce, as defined in Article 1 Paragraph 2 of Law Number 13 of 2003, refers to every individual who is capable of performing work to produce goods or services to meet personal and community needs (Rozaini, 2023). The population of a region is generally divided into two groups: the workforce and the non-workforce. The labour force includes individuals aged 15–64 who have the ability and willingness to work, while the non-labour force includes individuals outside this age range, such as children, the elderly, or retirees, as well as those who are physically or mentally unable to work despite being of productive age.

Labour absorption, as an indicator of the number of workers absorbed into economic activities, is influenced by internal and external factors. According to Paramita (2017), external factors include economic growth, inflation, unemployment rates, and interest rates, while internal factors include wages, productivity, capital, and non-wage expenditures. Firmansah (2019) defines labour demand as the ability of companies to recruit workers in certain numbers with certain wages and for certain periods of time, which is highly dependent on the dynamics of the labour market.

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Labour market theory explains the interaction between labour supply (workers) and demand (companies). Ehrenberg (2012) states that the labour market acts as a mechanism for allocating human resources, providing information about job opportunities, wages, and working conditions, as well as a space for negotiation that brings together the interests of workers and employers. This market also functions to reduce unemployment by improving the efficiency of matching job seekers with available vacancies. Ideally, a perfectly competitive labour market is characterised by symmetrical information, free mobility of workers and companies, and wages determined by the balance of supply and demand (Nurlina, 2018). However, in practice, the labour market is often imperfect due to factors such as corporate monopolies, the existence of trade unions, discrimination, and geographical mobility barriers. These imbalances lead to an imbalance in bargaining power, low wages, and limited access for workers to better opportunities.

Labour absorption is at the core of labour market theory, as it reflects the process of placing workers in suitable jobs. This process is influenced by the dynamics of labour demand from companies and labour supply from workers, as well as wage policies and labour regulations. This concept is also closely related to the unemployment rate, where the market's inability to optimally absorb labour can create economic and social inequalities.

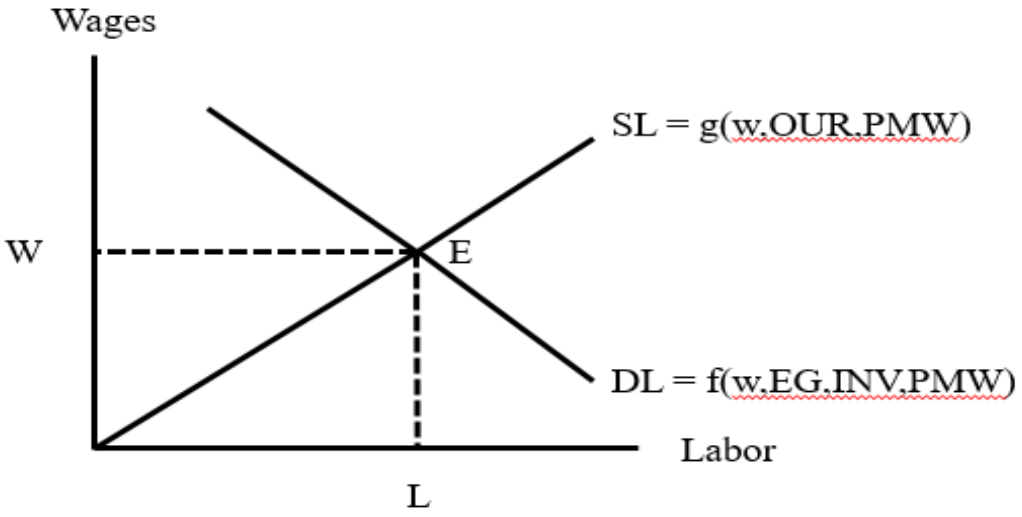

Fig. 1 – Balance of Labour Supply and Demand

The labour demand and supply curves play an important role in determining equilibrium in the labour market. The labour demand curve shows the relationship between wage rates and

the number of workers required by companies. Labour demand is influenced by various factors, such as economic growth (EG), investment (INV), and provincial minimum wage (PMW), which can be formulated linearly as **DL = a – bw + cEG + dINV – ePMW**, where a, b, c, d, and e are constants, and w represents the wage rate. The higher the wage rate, the lower the labour demand tends to be, while increases in investment and economic growth can stimulate labour demand.

Meanwhile, the labour supply curve shows the relationship between wage rates and the number of workers willing to work. Labour supply is influenced by factors such as the open unemployment rate (OUR) and the provincial minimum wage (PMW), which can be expressed in linear form as **SL = f + gw − hOUR + iPMW**, where f, g, h, and i are constants. In this case, the higher the wage rate, the more individuals are encouraged to enter the labour market, while high unemployment rates can reduce the labour supply.

The equilibrium point in the labour market, where labour demand equals labour supply, can still be found by equating the two formulas above:

$$DL = SL$$

Combining the two modified formulas, the following results are obtained:

$$a - bw + cEG + dINV - ePMW = f + gw - hOUR + iPMW$$

From this equation, we can find the equilibrium wage rate (We) and the equilibrium labour supply (Le). The solution can become more complex depending on the interaction of independent variables, but in general it can be described as follows:

$$We = \frac{a-f+cEG+dINV-ePMW+iPMW-hOUR}{b+g}$$

$$Le = \frac{ga+bf+gcEG+gdINV-gePMW+giPMW-ghOUR}{b+g}$$

With this formula, we can analyse independent variables such as economic growth, open unemployment rate, investment, and minimum wage that affect the labour market. Labour absorption is greatly influenced by the balance between labour supply and demand, which depends on various economic factors. When economic growth increases, business activity expands, causing labour demand to increase and driving an increase in labour absorption. Similarly, investment plays a role in creating new jobs through the establishment of businesses and company expansion, thereby increasing the demand for labour. However, high

unemployment rates can increase the number of available workers without guaranteeing an increase in labour absorption, especially if labour demand does not also increase.

In addition, minimum wage policies also have complex effects. An increase in the minimum wage can increase the number of individuals who want to work, but if companies consider the labour costs to be too high, they may reduce the number of workers they hire. This can have varying effects on employment. Therefore, a balance between economic policies and labour market conditions must be managed well to create optimal employment growth.

3. RESEARCH METHODS

This study is quantitative research, so the data used in this study is quantitative data which reveals the relationship between independent and dependent variables expressed in numbers. The data sources are secondary data obtained from the Central Statistics Agency and the Investment and Integrated Services Agency. The secondary data used is in the form of panel data. Panel data is defined as combined data, specifically time series data combined with cross-sectional data from 2014 to 2023 across 10 provinces in Sumatra.

The analysis technique used in this study employs a panel data regression model. Data analysis in this study was conducted using the Eviews 10 programme. The panel data regression model used in this study is as follows:

$$LA_{it} = \beta_0 + \beta_1 EG_{it} + \beta_2 OUR_{it} + \beta_3 INV_{it} + \beta_4 PMW_{it} + \varepsilon_{it} \ldots\ldots\ldots$$

It can be seen that **LA** represents labour absorption, while **EG** (economic growth), **OUR** (open unemployment rate), **INV** (investment), and **PMW** (provincial minimum wage) are independent variables that influence the level of labour absorption. In this model, **β1, β2, β3, and β4** are regression coefficients indicating the magnitude of each independent variable's influence on labour absorption, while **ε** represents the standard error or other factors not included in the model. The index **i** refers to cross-sectional data, namely 10 provinces in Sumatra, while **t** represents the years of the study from 2014 to 2023.

The panel data model equation above was then estimated using the common effect, fixed effect, and random effect models, while the Chow test, Hausman test, and Lagrange multiplier test were used to determine which method was more suitable for this study. The next step was to test the classical assumptions. The classical assumption test on the regression model used was conducted to determine whether the regression model was a good regression model or not.

In this study, the classical assumption tests used were the multicollinearity test and the heteroscedasticity test. After the classical assumption test, a hypothesis test was conducted to measure the accuracy of the regression function in estimating the actual value. This analysis can be measured from the F test and the t test.

4. RESULTS AND DISCUSSION

4.1 Description of the Development of Research Variables

The economic growth of Riau Province recorded the highest acceleration of 35.61%, while Bengkulu Province experienced the most drastic decline of -1,836.63%. Overall, Sumatra Island had an average economic growth of 3.84%, but its economic development dropped significantly by -51.59% compared to the previous period.

The highest development of open unemployment rate occurred in Bangka Belitung Islands at 4.01%, while the lowest development was recorded by Aceh at -3.89%. Overall, Sumatra Island has an average open unemployment rate of 5.49% with a declining development of -1.18%.

The highest investment development in Sumatera Island was achieved by North Sumatera with 77.61% growth, followed by Aceh (53.72%) and Riau Islands (53.68%), while the lowest growth occurred in Jambi (12.83%) and South Sumatera (13.25%). Overall, Sumatra Island recorded an average investment of IDR10,177,232.38 with an investment growth of 25.16%.

The highest provincial minimum wage growth in Sumatra Island occurred in Bangka Belitung Islands with an increase of 9.03%, followed by Riau Islands (7.93%) and Aceh and Jambi (7.83%), while the lowest growth was experienced by North Sumatra (6.81%) and Bengkulu (6.75%). Overall, Sumatra Island has an average provincial minimum wage of IDR 2,376,163 with an annual growth of 7.53%.

The highest growth in employment in Sumatra Island occurred in West Sumatra (3.04%), followed by North Sumatra (2.85%) and Lampung (2.82%), while the lowest growth was experienced by South Sumatra (2%), Riau (2.03%), and Jambi (2.15%). Overall, Sumatra Island has an average employment of 2,666,041 people with an annual growth of 2.52%.

4.2 Descriptive Statistics

In descriptive statistics, research variables, both independent variables and dependent variables, are discussed descriptively. The results of descriptive statistics on 4 independent variables and 1 dependent variable in the study obtained the following results, Total observations are 100 with a *time series* of 10 years from 2014 to 2023 and a *cross section of* 10 provinces namely Aceh, North Sumatra, West Sumatra, Riau, Jambi, South Sumatra, Bengkulu, Lampung, Bangka Belitung Islands and Riau Islands.

Tab.2- Descriptive Statistics of Research Variables

Variables	N	Minimum	Maximum	Mean	Std. Deviation
Economic Growth	100	-3,8	7,36	3,84	2,1
Open Unemployment Rate	100	2,6	10,34	5,49	1,52
Investment	100	548230,1	98765432	10177232	14453692
Provincial Minimum Wage	100	1350000	3498479	2376163	544676.7
Labour Absorption	100	604223	7550374	2666041	1780801

Source : Data processed by *Eviews 10*, (2025)

Table 2 shows that the minimum value of Economic Growth is -3.8%, while the maximum value is 7.36%, with an average of 3.84% and a standard deviation of 2.1. This indicates a slight deviation in the data, so that the values are relatively evenly distributed. For the Open Unemployment Rate, the lowest value is 2.6%, while the highest value reaches 10.34%, with an average of 5.49% and a standard deviation of 1.52. This indicates that the variation in unemployment rates in the analysed areas is not too significant.

For the Investment variable, the lowest value is 548,230.1, and the highest value reaches 98,765,432, with an average of 10,177,232 and a standard deviation of 14,453,692. The data deviation is quite large, indicating an imbalance in the distribution of investment across various regions. Next, for the Provincial Minimum Wage, the lowest value is Rp. 1,350,000, while the highest value is Rp. 3,498,479, with an average of Rp. 2,376,163 and a standard deviation of 544,676.7. This indicates that the minimum wage values are fairly spread out with relatively small deviations. Finally, Labour Absorption has a minimum value of 604,223 and a maximum of 7,550,374, with an average of 2,666,041 and a standard deviation of 1,780,801. The relatively

high standard deviation indicates that the distribution of the number of workers absorbed varies significantly across regions.

4.3 Panel Data Regression Results

After conducting the Chow test (probability F = 0.0000 and chi-square = 0.0000) and the Hausman test (probability = 0.0161), the analysis results indicate that the *Fixed Effect Model (FEM)* is the appropriate model. Therefore, further testing with the *Lagrange Multiplier Test* is not necessary. The following are the results of the panel data regression model estimation:

Tab.3- Model Fixed Effect

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.803.596	23.0358,9	7.829.506	0,0000
EG	4.620, 337	10.940,66	0,422309	0,6739
OUR	-7.344,162	25.480,79	-0,288223	0,7739
INV	-0,006718	0,001611	-4.169.669	0,0001
PMW	0,401236	0,041607	9.643.470	0,0000

Source : Data processed by *Eviews 10*, (2024)

From the results of the *Fixed Effect Model*, the following equation was obtained :

LAit = 1.803.596 + 4.620,337EGit – 7.344,162OURit – 0,006718INVit + 0,401236PMWit + εit

The constant value is 1,803,596, meaning that if the variables EG, OUR, INV, and PMW remain unchanged (constant), labour absorption will remain at 1,803,596 people. The regression coefficient for EG is 4.620,337, meaning that every 1% increase in EG will increase labour absorption by 4,620 people. The regression coefficient for OUR is -7,344.162, meaning that a 1% increase in OUR will decrease labour absorption by 7,344 people. The regression coefficient for INV is -0.006718, meaning that a Rp1,000,000 increase in INV will reduce labour absorption by 6.718 people. Meanwhile, the PMW regression coefficient is 0.401236, indicating that an increase of Rp100,000 in PMW will increase employment by 40,123 people.

4.4 Classical Assumption Testing

Multicollinearity test is conducted to check whether there is a high correlation between independent variables. If it is above 0.8, it can be a sign that multicollinearity occurs. The correlation coefficient of EG and OUR is (-0.37 < 0.80), EG and INV is (-0.03 < 0.80), EG and

PMW is (-0.27 < 0.80), OUR and INV is (0.08 < 0.80), OUR and PMW is (0.05 < 0.80), then INV and PMW is (0.02 < 0.80). So it can be concluded that the research that has been done does not have a correlation between each independent variable because the value is smaller than 0.8. Therefore, the data is said to have no symptoms of multicollinearity.

Heteroscedasticity test using the Glejser method is carried out to ensure that there is no inconsistency in the residual variance. The test results show the probability value of all independent variables (economic growth: 0.1294; unemployment rate: 0.6928; investment: 0.0698; minimum wage: 0.3816) are greater than 0.05 so there is no heteroscedasticity problem.

4.5 Hypothesis Testing

The F-test is used to test whether all variables (economic growth, open unemployment rate, investment, and minimum wage) simultaneously have a significant effect. The test results show an F-statistic value of 827.55 with a probability of 0.000000, which is smaller than 0.05. This proves that the four variables together have a significant effect on labour absorption.

The t test was conducted to test the effect of each variable partially. The results show :

- Economic growth and open unemployment rate have an insignificant effect (probability > 0.05), meaning that these two variables do not directly affect labour absorption.
- Investment has a negative and significant effect (probability 0.0001), indicating that every Rp1 million increase in investment reduces employment by 6,718 people. This result contradicts the initial hypothesis that investment should increase employment.
- Provincial Minimum Wage (PMW) has a positive and significant effect (probability 0.0000), where a Rp100,000 increase in PMW increases employment by 40,123 people. This finding contradicts the classical theory that high wages reduce employment.

4.6 Discussion

Based on the results of panel data regression analysis with the Fixed Effect model, the coefficient value of Investment (INV) is -0.006718. This means that if investment increases by IDR1,000,000, while the variables of economic growth, unemployment rate, and minimum wage are considered constant, employment will decrease by 6,718 people. The t-test result shows a significance value of 0.0001 <0.05, which proves that investment partially has a negative and significant effect on labour absorption.

This finding is in line with the research of Sabihi (2021) and Manyamsari & Nasir (2023), which state that investment tends to focus on capital-intensive sectors (such as mining or technology-based industries) that have minimal labour absorption. These results are also supported by Wahyudi (2023), who explains that the allocation of investment to machines or technology actually reduces dependence on human labour, so that employment decreases.

The coefficient value of Provincial Minimum Wage (PMW) is 0.401236. This means that if PMW increases by IDR100,000, while other variables are considered constant, labour absorption will increase by 40,123 people. The t-test result shows a significance value of 0.0000 <0.05, proving that PMW has a positive and significant effect on labour absorption.

This finding contradicts the classical theory (Mankiw) which states that high wages can reduce employment. However, this result is consistent with research by Wiasih (2021) and Rozaini (2023) in North Sumatra, which explains that an increase in PMW increases people's purchasing power, so the demand for goods/services rises and encourages the expansion of employment in labour-intensive sectors (such as agriculture, MSMEs, and services). Purnomo & Hasanah (2021) also confirmed that a living wage increases worker productivity, so firms tend to retain or add labour.

Meanwhile, Economic Growth (EG) and Open Unemployment Rate (OUR) have coefficient values of 4,620.337 and -7,344.162 respectively, but the t-test result shows a significance value > 0.05. This proves that both variables have an insignificant effect on labour absorption.

The insignificance of EG can be explained by the fact that economic growth in Sumatra during the study period was dominated by capital-intensive sectors such as oil and gas mining, technology-based processing industry, and energy. These sectors rely on machinery and large capital, so their contribution to labour absorption is minimal. This finding is in line with the research of Septiadi (2019) and Anggraini (2020) which states that economic growth in Sumatra is jobless growth because it is not matched by the development of labour-intensive sectors.

Meanwhile, the insignificance of OUR is caused by the skill mismatch between local labour and industry needs. As explained by Hasanah (2021), many unemployed people in Sumatra come from high school graduates who do not have the competencies required by the modern labour market, such as information technology or logistics management. As a result,

even though the unemployment rate is high, companies have difficulty recruiting suitable workers, so there is no increase in employment.

4.7 Intercept Analysis Result

The intercept (constant) in the regression model shows the baseline value of labour absorption in each province when all independent variables (economic growth, unemployment rate, investment, and minimum wage) are assumed to be zero. Based on the analysis, North Sumatra Province recorded the highest intercept of 6,028,215, reflecting the region's intrinsic capacity to absorb labour, supported by leading sectors such as agriculture, plantations, and labour-intensive MSMEs. Meanwhile, Bangka Belitung Province has the lowest intercept (-379,171 people), indicating that without the support of macro variables, the province struggles to create jobs due to its dependence on the capital-intensive mining sector and lack of labour-based industries.

Provinces such as Lampung and South Sumatra also recorded high intercepts (3,312,041 people and 3,066,340 people respectively), indicating that the agriculture, fisheries and tourism sectors form the backbone of natural labour absorption in the region. In contrast, Riau Islands (-5,851 people) and Bengkulu (251,670 people) have low intercepts due to the lack of labour-intensive industries and supporting infrastructure.

5. CONCLUSIONS AND SUGGESTIONS

5.1 Conclusions

Based on the results of the processed data and discussion, it is concluded that the average development of variables of Economic Growth (-51.59%), Open Unemployment Rate (-1.18%), Investment (25.16%), Provincial Minimum Wage (7.53%) and Labour Absorption (2.52%) in Sumatera Island in 2014-2023. The most dominant variable in influencing labour absorption in Sumatra Island provinces in 2014-2023 is the Provincial Minimum Wage which has a positive and significant influence. Meanwhile, Economic Growth and Open Unemployment Rate have an insignificant effect. The highest amount of labour absorption is in North Sumatra Province and the lowest in Bangka Belitung Province.

5.2 Suggestions

The government needs to encourage investment in labour-intensive sectors such as manufacturing and agribusiness to create more jobs. Strengthening skills training for local labour is also important to address the mismatch between labour competencies and industry needs. In addition, the adaptive provincial minimum wage policy needs to be maintained along with incentives for small and medium enterprises to continue absorbing labour. Infrastructure development and inter-regional connectivity improvement also need to be done to expand labour access to available job opportunities.

Future researchers are advised to analyse other variables that can affect labour absorption. Through more in-depth research and more complete data and methods and ultimately able to perfect the results of existing research.

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