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UNLOCKING LABOR MARKET: THE ROLE OF FDI, EDUCATION, INTERNET USAGE, AND GDP GROWTH IN 5-ASEAN

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ABSTRACT

Introduction: *Labour absorption is a crucial indicator of economic development. The large number of job gaps indicates that the labor market still has problems. Issues in the labour market arise because there is a mismatch between the demand and supply of labour, so that the available labour is not optimally absorbed. This study examined 5 ASEAN countries, namely Indonesia, Malaysia, Singapore, the Philippines, and Thailand. The aim is to analyse how the roles of FDI, GDP Growth, Education, and internet use influence labour absorption in 5 ASEAN countries.*
Methods: *This study employs a quantitative approach, utilising the Data Panel Regression analysis method. Based on the results of the model selection, the model used in this study is FEM (Fixed Effect Model)*
Results: *The study found that FDI and GDP Growth did not have a significant effect on labor absorption. Meanwhile, Internet Usage harms labor absorption. For Education, the mean of school years are used as an indicator of positive and significant results.*

INTRODUCTION

The inequality between the number of job seekers and the availability of jobs is still a global issue. In 2022, the ILO recorded a global labor jobs gap that touched 473 million people, or around 12.3 percent of the working-age population. This figure indicates that the need for labor has not been fully met, both globally and at the regional level. This indicates that the issue of employment, especially related to labor absorption, is still a primary concern in various countries. (ILO, 2023).

Labor absorption is the ratio of the proportion of the population aged 15-64 years who are economically active and includes all individuals who provide labor to produce both goods and services within a specific period of time. Labor absorption is often represented in the Labor Force participation rate indicator. This indicator plays a significant role in the study of the factors that determine the size and composition of a country's human resources, as well as in making projections of future labor supply. These indicators can be used to formulate employment policies, determine the training needs of the workforce, and calculate the estimated working life of the workforce. Labor absorption is a measure of the effectiveness of labor policies and economic growth of a country. In ASEAN, where the majority of countries are still developing countries, the challenges to labor absorption are increasingly complex.(World Bank, 2025)

The Association of Southeast Asia Nations (ASEAN), as one of the most successful regional organizations in developing countries, has contributed to maintaining regional peace and economic stability in Southeast Asia for more than 2 decades (Kavin, 2001). Until now, 10 countries are members of ASEAN, namely, Indonesia, Malaysia, the Philippines, Singapore, and Thailand, as pioneers in the formation of ASEAN, which was then followed by 5 other countries, namely, Vietnam, Laos, Myanmar, Cambodia, and Brunei Darussalam (Nesadurai, 2008). In the Southeast Asian region, especially in ASEAN countries, employment challenges are becoming increasingly complex. Most countries in the region are developing countries with fairly rapid growth characteristics, but although the last two decades have shown fairly rapid economic growth, it has not entirely had a positive impact on the dynamics of the labor market. This phenomenon suggests that economic fluctuations in some countries are not always followed by positive changes in the labor market. This condition reflects the mismatch between the demand and supply of labor which is a major obstacle in creating an inclusive and productive labor market(Ummah, 2021a).

Theoretically economic development is seen as one of the essential factors that can affect the labor market. One of the most well-known approaches is Okun's Law, which states that there is a negative relationship between the unemployment rate and real output growth (Okun, 1962). The Okun Law suggests that periods of higher-than-average economic growth are associated with a decrease in the unemployment rate, which indirectly implies an increase in labor absorption. On the other hand, when a country's economy slows down, it can increase unemployment. This observation forms the main pillar of Keynesian thought and subsequent macroeconomic theory, which provides practical guidance for policymakers to achieve two goals at once, namely, economic expansion and the achievement of maximum employment opportunities (Boďa & Považanová, 2025). At first Okun analyzed the United States economy measuring the relationship between unemployment and GDP.As a result, every point of a decrease in the unemployment rate, real GDP increases by about 3 percent. The decline in the unemployment rate indirectly increases the labor force participation rate. This is in line with a study conducted by the results of his research in Africa showing that an increase in economic growth can encourage an increase in the workforce Muyenka Wiza (2014)**.**

However, empirical data from several ASEAN countries show that the relationship does not always run in a linear fashion. There are conditions where economic growth is not always followed by an increase in labor participation or conversely, the labor force participation rate increases when economic growth contracts. This shows the complexity in the relationship between economic growth and the labor market, which is influenced by structural, demographic, and sectoral factors. Based on GDP Growth and LFPR data from 2010–2023, several anomalies were found that showed a mismatch between economic growth and increased labor participation. For example, in 2018, Indonesia experienced an increase in economic growth from 5.07% (2017) to 5.17% (2018), but the LFPR rate actually decreased from 69.05% to 68.74%. A similar thing happened in Malaysia in 2022, where economic growth jumped from 3.32% to 8.86%, but LFPR decreased from 69.64% to 69.57%. This phenomenon shows that positive economic growth is not always followed by increased labor participation. It is therefore important to review the relationship between economic growth and employment, particularly in the context of countries in the Southeast Asian region.

In addition to economic growth, Foreign Investment (FDI) can be a strong driver in creating jobs. However, on the other hand, FDI also has the potential to replace the domestic industry and displace the local workforce. FDI is expected to increase productivity, transfer technology, and create new demand for local labor. However, the effectiveness of FDI in creating jobs is still a debate, especially in the ASEAN region which has a diverse economic structure and workforce readiness levels.

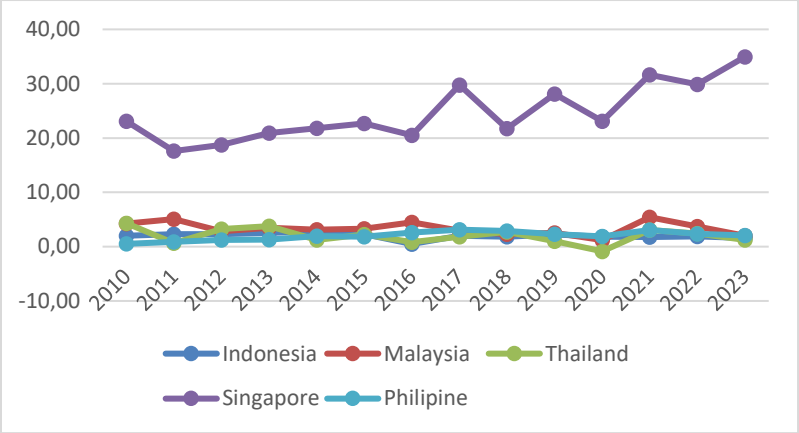

Figure 1. FDI inflows (% of GDP) in 2010-2023
Source: World Bank (2025), Data processed

Figure 1 shows the trend of Foreign Direct Investment to Gross Domestic Product (GDP) in ASEAN countries in the period 2010 to 2023. It can be seen that Singapore has consistently recorded the highest FDI ratio to GDP, starting from 23.07% in 2010, to reach 34.95% in 2023. On the other hand, Indonesia recorded a stagnant and low figure with FDI of 1.57% in 2023. As for Malaysia and Thailand, fluctuations, Thailand itself was in a negative lift (-0.86% in 2020), which is most likely due to the COVID-19 pandemic in 2020. Meanwhile, the Philippines has remained below 3% since 2010.

On the other hand, the trend in labor force participation rate (LFPR) over the same period shows a different pattern. Singapore and Thailand recorded high and stable LFPRs, 76.1% and 75.3%, respectively, in 2023. Indonesia and Malaysia are in the middle range, namely 69.07 and 69.75 percent in 2023. While the Philippines shows a more volatile trend, in 2020 labor force participation experienced a fairly sharp decline from 61% to 56% compared to other countries that experienced a decline of only 0-1%. However, in 2023 the Philippines managed to increase again at 63.48%. This fact shows that the magnitude of FDI does not always produce the same effect on job creation.

International capital flows from multinational corporations *(MNC*) to the recipient country is expected to encourage economic activity and absorb excess labor. Hijzen et al. (2013), found results in Indonesia with the estimate that takeovers by foreign companies increase the number of workers by 25% and tend to absorb more skilled jobs, accompanied by a significant decrease in low-skilled jobs. Ragoussis (2020), indicates that investment in *Brownfield* increases labor absorption twice as much as local companies. Based on research results from six developing countries (China, Côte d'Ivoire, Indonesia, Moldova, Serbia, and Vietnam) over two years after acquisition, the number of workers increased by 4%, outpacing domestic companies, which saw a 1.5% increase. These findings indicate that foreign investment has the potential to be one of the driving factors for labor absorption in developing countries. In addition, in Vietnam, efforts to attract FDI are one of the key components of the national strategy to boost economic growth and labor productivity, where the shift of labor to the FDI sector contributes significantly to overall productivity growth. Studies in Maluku, Indonesia also show that FDI has a positive and significant influence on labor absorption. The study also notes that the investment realized directly expands production capacity which will later require additional labor (Ramly et al., 2023).

In addition to Foreign Investment, education also affects the absorption of labor. Good education will produce quality human resources. This is important for the labor market in increasing the competitiveness of individuals. Based on Beureu Labor of Statistic (2024), Individuals born in the early 80's spend their time from the age of 18-36 years with 76% working, 5% unemployed, 19% not included in the labor force. The higher the education of the person, the more time they spend working and the less time they spend unemployed or not entering the workforce. Komalasari

(2024) in his research entitled "Analysis of the influence of education level on the proportion of labor absorption in the Manufacturing Industry" stated that the higher a person's level of education, the greater the proportion to labor absorption. It was also found that the higher the level of education of the community, the better the quality of human resources produced, so that they are more competitive in the job market. In addition, Silalahi et al. (2023) proved the positive and significant influence of education level on labor absorption in various cities in North Sulawesi Province. Rahayu (2020) research also supports similar findings, concluding that education levels contribute positively to increasing labor absorption (Rahmah & Juliannisa, 2022).

In addition to education, technology also plays an essential role in increasing productivity. The right technology is needed to improve product competitiveness; besides that, technology also allows the emergence of product innovation. Technological advances have made it possible for economic activities that initially used animals and humans to become machine-powered. Based on research conducted by the technology index in East Java Province from 2015 to 2019, there has also been an increase followed by the labor absorption rate. The results of this study are supported by the results of research conducted by Hasna (2020), which shows that technology has a positive and significant effect on labor absorption.

The study focuses on 5 key ASEAN countries, commonly known as ASEAN-5 (Indonesia, Malaysia, Singapore, Thailand, and the Philippines), due to their significant economic contributions to the ASEAN region. Based on ASEAN Secretariat (2023), These countries collectively accounted for about 83% of ASEAN's total GDP in 2022. In addition, the selection of five ASEAN countries in this study is based on the dynamics and contrast of labor market performance and foreign investment flows. These five countries are the largest recipients of FDI in ASEAN, but the labor force participation rate is still fluctuating. Therefore, the selection of these five countries allows for a comparative study to understand how FDI, GDP Growth, Education, and Internet Usage play a role in labor absorption.

LITERATURE REVIEW

Foreign Direct Investment

Investment is one of the important keys to the economic development of a country. In the construction of facilities. Facilities and infrastructure of the community often use investment in the form of goods or capital. Foreign investment in the region will be allocated for the development of public infrastructure, which will not directly provide jobs for the local community. According to Sukirno (2006), investment is defined as the company's expenditure to buy equipment and capital goods to increase the production capacity of goods and services available in the economy. In line with Harrod-Domar's theory, the addition of production equipment can increase production capacity, so that it will have an impact on the addition of labor (Ummah, 2021).

H1= FDI has a significant effect on labor absorption

Human Capital Theory

Education is one of the basics in improving the quality of human resources. A workforce with good educational potential is one of the important assets in encouraging development, this is because the quality of human resources determines the direction and success of a country's economic growth.) In the theory of Human Capital put forward by Becker and Mulligan (1997) in Amin et al. (2024) stating that the decision made by an individual to enter or remain in the labor force category is influenced by the investment they make in education, training, and skill acquisition. This is supported by the study's results ofMulyani et al. (2023), which shows that the workforce with education at the junior high school level has a positive effect on labor absorption. This is in line with the research of (Rahmah & Juliannisa, 2022)) in their research that the type of education a person gets has an influence on choosing a particular type of job. Expertise is an important capital for the workforce in achieving productivity.

H2 = Variable Mean Years of School is suspected to have a positive influence on labor absorption

The Use of the Internet

Nowadays, the use of the internet is increasingly rapid among the public. Almost everyone today uses the internet either through cellphones, smartphones, computers, TVs and other devices. Based on research on the effects of digitalization and the absorption of women's labor in Indonesia, the use of ICT has a positive and significant effect on the absorption of women's labor in Indonesia (Davani & Sulistyaningrum , 2022). This is in line with the research conducted by Hafiludin et al. (2024), his research entitled "Analysis Absorption of Labor in the ASEAN region ” the results of his research stated that internet users have a positive and significant impact on the absorption of labor in ASEAN.

H3 = Variable Individual Internet usage is suspected to have a positive effect on labor absorption.

Okun Law's Theory

Sustainable economic growth is fundamental to the sustainability of economic development and the improvement of people's welfare. Economic growth that is not accompanied by labor absorption will result in income inequality, which will further have an impact on increasing poverty. The relationship between economic growth and labor absorption is theoretically demonstrated through Okun's law (Purba & Damanik, 2024). According to Okun's Law Theory, economic growth has the potential to lower the unemployment rate. So that in this case, economic growth plays a role in increasing labor productivity, thereby encouraging the utilization of the labor force (Mankiw, 2007). The results of research entitled The Influence of Economic Growth on Labor Absorption in Samosir Regency show that economic growth has a significant effect on labor absorption (Purba & Damanik, 2024)

H4 = Variable Economic growth is suspected to have a positive influence on labor absorption

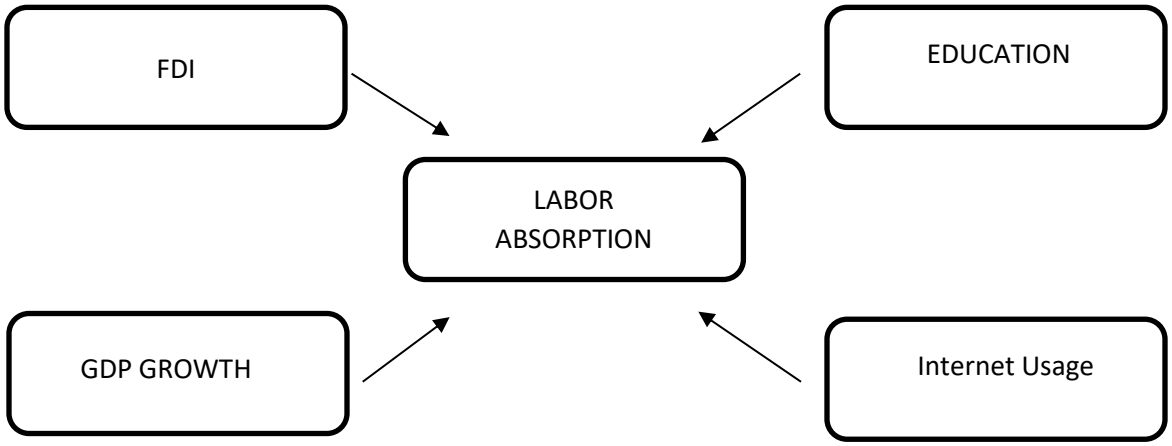

Figure 2. Research Framework

Source: Data processed (2025)

RESEARCH METHODS

In this study, the type of research used by the author is a quantitative approach. According to (Lim, 2024) The quantitative approach is an objective and systematic research approach that aims to understand social phenomena through the measurement of quantifiable variables. In terms of scope, this study focuses on phenomena that can be described in measurable units so that they can be analyzed statistically. This approach emphasizes objectivity and generalizable results. The main goal is to test hypotheses, make predictions and find cause-and-effect relationships between variables. The data used is numerical and collected through standardized instruments. The analysis is then performed using statistical software and mathematical models to ensure accurate results.

This study uses secondary data. The data used are taken from various reliable sources such as the World Bank, ILO, ASEANstats and other scientific literature to analyze the relationship between labor absorption. The data collected includes information such as Labor Force Participation Rate (LFPR), FDI (Foreign Direct Investment), Education projected through the average length of schooling, Internet Usage projected through *Individual Using the Internet* and GDP growth. The main sources used by the author come from the World bank, ITU, UNDP HDR and the statistical agencies of each country. This research was conducted in 5 ASEAN countries, namely, Indonesia, Malaysia, Singapore, Thailand and Vietnam from 2010 to 2023. Meanwhile, the analysis method used is Panel Data Regression using the help of E-views 12 software.

Regression Panel data is based on panel data. Panel data is data derived from observations of sectional cross units, or the same individuals over several periods of time. The regression method is one of the analysis tools that is widely used in various fields including economics and business, inseparable from the need for analysis tools that can

accommodate various forms of data between units (cross section), between time (time series), and a combination of their properties or what is called panel data (Gujarati, 2003).

The regression model equation using cross section data can be written in the equation:

$$yi = \alpha + Xi\beta + \varepsilon i \quad \ldots\ldots\ldots\ldots\ldots\ldots(1)$$

Description:

i = 1, 2, ..., n,

where n is the number of data cross sections.

The regression model equation using the time series section data can be written in the equation:

$$yt = \alpha + Xt\beta + \varepsilon \quad \ldots\ldots\ldots\ldots\ldots\ldots(2)$$

Description:

t = 1, 2, ..., t,

where t is the number of data time series.

In general, the data panel regression equation can be written in the equation:

$$yt = \alpha + \mathbf{X}'t\beta + \varepsilon t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(3)$$

With this equation, the equation in this study can be written as follows:

$$LFPRit = \alpha + FDI'\,it\beta + MYS\,it\beta + IUI'\,it\beta + GDP'\,it\beta\,\varepsilon_{it} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(4)$$

Description:

t = number of data series

i = number of cross sections

LFPR = Labor Force participation rate %

FDI = Foreign Direct Investment %

MYS = Mean years of School

IUI = Individual using Internet

GDP = GDP growth

RESULT AND ANALYSIS

Estimation of Panel Data Regression Model

To choose the best regression model used in this study, it is necessary to conduct a model selection test with 3 test methods, namely Pooled Least Square, Fixed Effect Model and Random Effect Model. Some of the tests that can be done to choose the most appropriate model are the Chow Test, the Hausman Test, and the Langragre Test. The results of the test are as follows:(Seventy .Et Al. , 2021)

Chow Test

The chow test is used to select which model is better in the panel data test, this method is used to choose which is the most appropriate between the FEM (Fixed Effect Model) or Pooled Least Square models. In this test H0 is the Pooled Least Square and H1 is the Fixed Effect Model. The following are the results of the chow test of this research:

Table 2. Chow Test Results

Redundant Fixed Effects Tests
Equation: Untitled
Test cross-section fixed effects

Effects Test	Statistics	D.F.	Prob.
Cross-section F	147.916610	(4,61)	0.0000
Cross-section Chi-square	165.913463	4	0.0000

Sources : Author,Data Processed (2025)

Based on the results of the chow test above, a Chi-square probability of 0.000 < alpha 5% (0.05) is obtained, which in this case the right model based on this test is FEM.

Hausman Test

After the Chow test was carried out, it was followed by a thirst test. This test is used to choose which model is better between FEM (Fixed Random Effect) and REM (Random Effect Model). The following are the results of the thirst test for this study:

Table 3. Hausman Test Results

Correlated Random Effects - Hausman Test
Equation: Untitled
Test cross-section random effects

Test Summary	Chi-Sq. Statistics	Chi-Sq. D.F.	Prob.
Cross-section random	591.666442	4	0.0000

Sources : Author,Data Processed (2025)

Based on the results of the test, the Chi-square probability is 0.000 < alpha 5% (0.05), if the probability is above 0.05 or alpha, then the best model is REM. Similarly, if the probability is below alpha 0.05 then the best model to choose is FEM. In this case, it can be seen that the probability of testing is 0.000 < 0.05, so the most appropriate model used for this study is FEM.

Classic Asusmsi Test

The Regerssiom method of panel data will give a BLUE (Best Linear Unbiased Estimation) if all Gauss Markow assumptions are met. The regression data panel provides an alternative model, Common Effect, Fixed Effect and Random Effect. The Common Effect and Fixed Effect models use the Ordinary Least Square approach, while the random effect model uses GLS (Generalized Least Square) as the estimation technique. According to Napi, in the regression of the data panel, not all classical assumption tests in OLS are used, only multicollinearity and heteroskedasticity are needed (Widarjono, 2017) in Napitupulu et al., 2021)

Multicollinearity Test

Panel data regression is not the same as linear regression model, therefore panel data models need to qualify to be free from classical assumption problems. The existence of a strong correlation (multicollinearity) between free variables in the formation of a model (equation) is not recommended because it will have an impact on the estimation of parameters, in this case the regression coefficient in estimating the actual value. There are several ways to identify the existence of multicollinearity, one of which is to find coefficient values between independent variables. The following are the results of the multicollinearity test of this study:

Table 4. Multicollinearity Test

Variable	FDI	MYS	IUI	GDP
FDI	1	0.7529974014474592	0.5151187714843998	0.03362938236898114
MYS	0.7529974014474592	1	0.8482780900571312	-0.03654852590152821
IUI	0.5151187714843998	0.8482780900571312	1	-0.2147358309947029
GDP	0.03362938236898114	-0.03654852590152821	-0.2147358309947029	1

Sources : Author,Data Processed (2025)

Based on the multicollinearity test, variables FDI, MYS (Mean years of School), IUI (Individual using Internet), and GDP growth have a coefficient of less than 0.85. If the value of the correlation coefficient is more than 0.85 for each independent variable, it can be concluded that the data is multicollinear. Based on the results of the multicollinearity test, it can be seen that all independent variables are below 0.85, so this model can be said to be free from multicollinearity.

Heteroskedaksity Test

Table 5. Heterosedaksity Test

Variable	Coefficient	Std. Error	t-Statistic	Prob.
FDI	0.006619	0.013010	0.508814	0.6127
MYS	-0.215556	0.153101	-1.407933	0.1642
IUI	0.002453	0.003879	0.632394	0.5295
GDP	0.001409	0.009625	0.146427	0.8841
C	2.108927	1.240204	1.700468	0.0941

Sources : Author,Data Processed (2025)

The heteroscedasticity test was conducted to verify that, since all variables exceeded 0.05, they were free from heteroscedasticity issues.

Data Panel Regression Results

Table 6. Data Panel Regression Results (FEM)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
FDI	0.098751	0.065388	1.510222	0.1361
MYS	4.239702	0.769507	5.509634	0.0000
IUI	-0.092077	0.019496	-4.722851	0.0000
GDP	0.075218	0.048377	1.554847	0.1252
C	34.11974	6.233428	5.473672	0.0000

Sources : Author,Data Processed (2025)

Based on the model of the estimated result of the panel regression above, the resulting regression equation is:

$$LFPRit = 34.1197407301 + 4.2397 (MYS) - 0.0921(IIU) + 0.0752182023596(GDP) + 0.0988(FDI)$$

The estimated results in the table above can be interpreted as follows:

1. The coefficient of the Foreign Direct Investment (FDI) variable is 0.0988, so if FDI increases by 1 percent, the labor force participation rate (LFPR) will increase by 0.0988 percent assuming *ceteris paribus.*
2. The coefficient in the variable of average length of school (MYS) is 4.2397, so if the average length of school (MYS) increases by 1 year, the participation rate of the labor force will decrease by 4.2397 percent assuming *ceteris paribus*.
3. The coefficient in individuals using the Internet (IUI) is -0.0921, so that if (IUI) increases by 1 percent of the population, the labor force participation rate will decrease by -0.0921 percent assuming *ceteris paribus*.

4. The coefficient of GDP Growth (GDP) is 0.075218, so if the GDP growth rate increases by 1 percent, the labor force participation rate will decrease by 0.075218 percent assuming *ceteris paribus*.

T-statistical test

The t-statistical test is used to determine the influence of free variables on bound variables. This test is carried out by looking at the probability value of each independent variable. If the probability value is less than alpha 0.05, it can be concluded that the free variable has a significant effect on the bound variable. The t-test can also be performed by comparing the t-calculated value with the t-table. If the value of t-calculated is greater than the t-table, then the free variable influences the bound variable.

Table 7. T-statistical test results

Variable	t-count	T-Table	Probability	Information
FDI	1.510222	1.995468931	0.1361	**insignificant**
MYS	5.509634	1.995468931	0.0000	**Significant**
IUI	-4.722851	1.995468931	0.0000	**Significant**
GDP	1.554847	1.995468931	0.1252	**Insignificant**

Sources : Author,Data Processed (2025)

Based on the table above, it can be interpreted as follows:

1. Based on the results of the Data Panel Revision with the first independent variable FEM (Fixed Effect Model), namely FDI (foreign direct investment), it can be seen that the t-statistical value of the t-table < is 1.510222 < 1.995468931, with a probability value of 0.1361 > alpha 005, then it can be concluded that statistically the *Foreign Direct Investment* does not have a significant effect on the labor absorption variable.
2. Based on the results of the Data Panel Management with the second independent variable FEM (Fixed Effect Model), namely MYS (Mean years of School), it can be seen that the statistical t-value of the > t table is 5.509634 > 1.995468931, with a probability value of 0.000 < alpha 0.05, then it can be concluded that statistically the variable MYS has a significant effect on the labor absorption variable.
3. Based on the results of the Data Panel Management with the third independent variable FEM (Fixed Effect Model), namely IUI (Individual Using The Internet), it can be seen that the t-statistical value of the t-table > is 4.722851 > 1.995468931, with a probability value of 0.000 < alpha 0.05, then it can be concluded that statistically the variable MYS has a significant effect on the labor absorption variable.
4. Based on the results of the Data Panel Management with the first independent variable FEM (Fixed Effect Model), namely GDP growth, it can be seen that the statistical t-value of the < t table is 1.554847 < 1.995468931, with a probability value of 0.1252 > alpha 0.05, then it can be concluded that statistically the GDP variable does not have a significant effect on the labor absorption variable.

The Influence of Foreign Direct Investment on Labor Absorption.

Based on the results of the Data Panel Management with the first independent variable FEM (Fixed Effect Model), namely FDI (foreign direct investment), it can be seen that the t-statistical value of the t-table < is 1.510222 < 1.995468931, with a probability value of 0.1361 > alpha 005, then it can be concluded that statistically Foreign Direct Investment does not have a significant effect on the labor absorption variable. This finding is inversely proportional to several studies in the ASEAN region such as research by (Kurniawan, 2016) His research shows that FDI has a positive effect on the absorption of labor in the Industrial Sector in Indonesia. This insignificance can be caused by several things. First, FDI is not directly directed to the labor-intensive sector, so it does not directly create a large number of jobs.

The results showed that the Foreign Direct Investment (FDI) variable did not have a significant influence on labor absorption in the five ASEAN countries observed (probability > 0.05). This phenomenon can be explained through the distribution of the FDI sector which tends to enter capital-intensive and high-tech sectors, rather than labor-intensive sectors that absorb much labor. According to the BKPM (2023), Indonesia's largest recipients of FDI in 2023 were the basic metal industry and metal goods sectors (22.1%), excluding machinery and equipment. These sectors are generally categorized as capital-intensive industries. According to a World Bank report, (2015), the fabricated metals subsector, such as copper fabrication, is known as a capital-intensive industry with limited impact on job creation. In Indonesia, FDI is more dominant in the category of capital incentives. This can be seen from the 5 sectors that receive the largest FDI, namely the basic metals industry, metal goods, not machinery and equipment

(22.1%), followed by the transportation, warehouse and telecommunications sectors (12.8%), the Chemical and Pharmaceutical Industry (9.5%), Mining (8.8%), Electricity, Gas and Water (5.8%). These sectors are capital-intensive and do not require a large amount of labor. In addition, the number of Indonesian workers dominated by high school graduates indicates that there is a mismatch of skills between the jobs needed and the competencies of the available workforce. So that the impact on labor absorption is not as large as labor-intensive sectors.

According to the Department of Statistics Malaysia (2023), in Malaysia in 2023, the three sectors with the highest contribution to labor absorption are actually open in the main sector receiving FDI. The three sectors are the wholesale and retail trade sector which has around 2.57 million workers (16.5% of the total workforce), followed by the manufacturing sector with 2.53 million workers (16.2%), and the construction sector with 1.57 million workers (10.1%). In contrast, the information and communication sector, which is one of the leading sectors receiving FDI, only absorbed 239.2 thousand workers (1.5%), while the financial and insurance sectors only recorded 419.2 thousand workers (2.7%). This inequality shows that foreign investment flows tend not to enter labor-intensive sectors, which can have a direct impact on the increase in large numbers of jobs. Based on DOSM 2024, Malaysia highlights the existence of skills *mismatch* in its labor market structure. Most of the jobs created through FDI are in sectors that require high skills and tertiary education backgrounds. At the same time, the majority of the national workforce still comes from the middle-educated group. This hinders the inclusiveness of FDI benefits for vulnerable groups of workers and strengthens the argument that foreign investment has not fully succeeded in driving equitable job creation. Therefore, in the absence of policy interventions that encourage FDI to enter labor-intensive sectors and increase the capacity of local labor through upskilling and reskilling programs, the role of FDI in structurally absorbing labor is likely to remain limited. Meanwhile, in Singapore, more than 80% of FDI goes to the financial services and information technology sectors. The country is indeed known as a regional financial and logistics hub, so FDI is not directed to expand the production capacity of labor, but to efficiency and technological development (Singapore Department of Statistics, 2025). Meanwhile, in Thailand, most of the FDI goes into the automotive and electronics sectors. said that during the 2023 period, the BOI accepted the electrical and electronic equipment (E&E) industry as the largest FDI recipient sector with 171 projects, which raised this lift by 84Board Of Investment (2023),**%** from 2022 with an investment value of 208.2 billion baht. Followed by agroindustry and food processing in second place with an investment worth 55.7 billion baht (up about 32%), and in third place was the automotive industry and parts sector, which increased by 89% with a value of 42.2 billion baht. Although this sector is manufacturing, it is highly automated so it does not absorb as much labor as the labor-intensive sector. This is supported by Jongwanich et al. (2022) studies, which also note that an increase in FDI does not necessarily increase employment opportunities due to the transformation of the industry towards digitalization and robotization. In his research, it mentions that in Thailand, these developments encourage investment into capital- and high-tech sectors, which tend to require a limited number of skilled workers, so they do not contribute significantly to the overall decline in unemployment. Similarly, in the Philippines, a report from the U.S. Department of State (2023), shows that FDI in recent years has flowed heavily into the real estate, information technology, and business service center (BPO) sectors. Although the BPO sector contributes to job creation, most of the workforce absorbed is skilled workers, such as data analysts, IT specialists, and global service support personnel. This is strengthened by the findings from Paolo et al. (2023), In the Philippines indicate that labor deployment, remittances, and FDI Inflows have not been inclusive, as they have instead worsened the condition of agricultural sector. While labor deployment and FDI inflows have increased employment opportunities in the manufacturing sector, production growth has not been achieved due to limited input capital. Capital-intensive sectors tend to benefit more from FDI inflows rather than labor-intensive sectors. Consequently, FDI stimulates job growth in the manufacturing sector but simultaneously reduces employment and production in the agricultural sectors, which is the main labor-intensive sector in the Philippines. Besides, this result is in line with studies by(Muara Setyanti & Wahyudi, 2021), there is no two-way causal relationship between FDI and the absorption of young workers in ASEAN-5 as a whole, although there is a one-way relationship in some countries. This indicates that FDI's contribution to the workforce is highly dependent on the destination sector, the quality of the workforce, and the readiness of local technology. Therefore, although FDI contributes significantly to GDP, its effect is not linear on labor absorption

The Influence of Education on Labor Absorption

Based on the results of the regression of the panel data that has been carried out, the coefficient in the variable of average length of school (MYS) is 4.2397, showing a positive relationship with labor absorption so that if the average length of school (MYS) increases by 1 year, the participation rate of the labor force will increase by 4.2397 percent assuming *ceteris paribus.* Moreover, vice versa, if the average length of school decreases by 1 year, the labor participation rate will decrease by 4.34%. This is in line with research conducted by Komalasari (2024), which indicates that the level of education has a significant effect on labor absorption in the manufacturing industry.

According to data from UNDP (2025), the relationship between education and labor absorption appears to be the strongest in Malaysia and Singapore. In Malaysia, the MYS increased from 9.7 years in 2010 to 11.1 years in 2023, while the LFPR also rose from 64.45 to 69.75. A similar trend was observed in Singapore, where the MYS, which had been high since the beginning (10.9 years in 2010), increased to 12.0 years in 2023, accompanied by an increase in the LFPR from 72.02 to 76.10. These findings are consistent with human capital theory which states that education increases individuals' skills and productivity, thereby increasing their chances of being absorbed into the formal job market. Indonesia also shows a similar trend. The average length of schooling increased from 7.4 years to 8.7 years in the same period, and LFPR was relatively stable in the range of 68–70%. Although not significantly improved, the stability of LFPR in the context of improving education indicates that improved access and educational attainment helps to maintain high levels of work participation.

Meanwhile, the Philippines showed an increase in MYS from 8.9 to 10.0 years, with the LFPR fluctuating but generally increasing from 62.76 to 64.83. This indicates the influence of education on the increase in the capacity of the workforce, although it is accompanied by external dynamics that may influence labor participation trends, such as the economic crisis and the pandemic. In contrast, Thailand is the only country with a slightly different pattern. Although the MYS increased from 7.6 to 9.0 years, the LFPR actually decreased slightly from 76.99 to 75.31. This decline is likely influenced by other factors such as population aging, changes in industrial sectors, or work preferences shifting to informal or non-traditional sectors. This suggests that although education is improving, other structural factors still play a role in determining labor absorption. However, overall education has been proven to have a positive relationship with labor absorption.

This is in line with research from (Mulyani et al., 2023b), which shows junior high school education, average school age, and labor force participation rate have a positive impact on employment. These findings are reinforced by the results of research outside the ASEAN region by (Ukaj et al., 2023), who analyzed data from Kosovo. The research shows that a person's chances of entering the workforce increase along with the level of education achieved. Quantitatively, individuals with basic education are 26.9% more likely to work than those without formal education, and this figure increases to 55% for secondary education and 76.6% for higher education. These findings underscore that education investment provides a significant return on employment opportunities and supports the findings in this study that mean years of schooling (MYS) have a positive influence on LFPR in ASEAN-5.

The Effect of Internet Use on Labor Absorption.

Research related to the influence of internet use on labor absorption has produced mixed findings. Some studies have found that internet use can increase labor intake, particularly for married women and those with higher levels of education (Dettling, 2013; Zhan & Yang, 2024). Internet accessibility is also associated with improved labor market performance, including higher wage rates and a greater proportion of workers in the formal sector (Mahalli & Pratomo, 2024). However, other research shows that internet access for women has a negative and significant impact on increasing the participation of the female labor force in Indonesia (Rahayu et al., 2024). This is in line with the author's finding that, based on the results of the study, the use of the internet has a negative effect on labor absorption. The coefficient in individuals using the Internet (IUI) is -0.0921, so that if IUI increases by 1 percent of the population, the labor force participation rate will decrease by -0.0921 percent, assuming ceteris paribus.

This can be influenced by several things, such as the level of public education, the level of digital literacy, and the number of social media users. The reason is that not all internet users use the internet to find jobs. Most of them use the internet as entertainment. Even though the internet can indeed increase efficiency, overuse can have a negative impact on labor output. Based on data from*(Department of Statistics Malaysia, 2024)*, shows that the most popular internet use activity in 2023 is participating in social media with a percentage of 99.4% as a ranking, followed by downloading images, movies, videos or music, playing or downloading games (93.9%), searching for information about goods or services (92.8%), downloading software or applications (89.6%). Judging from this statistical data,

most individuals use the internet as a means of entertainment, whether surfing on social media, playing games, downloading movies or music, so that the use of the internet as a place to find a job or work has not dominated. The same thing also happened in Singapore, data from (Singapore Department of Statistics, 2024), shows that from 2017 to 2023, the highest internet usage activities were used for communication (97.97%), followed by entertainment activities to fill leisure time (91.32%), and get information (70.47%). According to the PSA (2025), in Philippines the most online activity carried out by individuals aged 10 years and above who use the internet is calling, which is 94.2 percent. The highest average internet usage activity was participation in social networks (social media), creating user profiles, and uploading messages or other contributions, which was 87.3 percent, followed by streaming or downloading images, movies, videos, or music, which was 63.6 percent. Meanwhile, looking for a job or submitting a job application online only (6.6%) is ranked the lowest. This reinforces the argument that increased internet use does not necessarily increase labor absorption. No data on internet usage activity was found in Thailand, however this pattern is also relevant in Thailand, where the study from Lopez-Sintas et al. (2020) identified "traditional users" (older, less educated, living outside of cities) who are less diverse in their internet use for productive activities than younger and educated "mobile users". The phenomenon of "mobile underclass" is also observed, where individuals who rely heavily on mobile internet access in Thailand may be "less likely to get many economic benefits" than computer users. The persistent digital divide based on age, education, and location, exacerbates this problem; The internet tends to reinforce the inequalities that exist in the labor market instead of being an *equalizer*, as those with lower digital resources and skills are unable to take full advantage of digital job opportunities. Therefore, if individual internet use continues to be dominated by entertainment and communication purposes without increased equitable access to digital skills and more functional devices, and accompanied by existing socio-economic disparities, the internet could negatively impact the inclusivity of labor absorption and limit its full potential to universally improve LFPR. This is supported by a study from Hsieh & Goel (2019), find that the use of the internet in the workplace assumes that the internet is not used for work-related matters so that it can reduce productivity growth in the workplace of OECD countries. Based on research from Yan Liu & Henry Stemmier (2023), although the digital sector as a whole shows rapid growth in job creation, and economic contribution, there are indications that increased internet use and digital transformation can indirectly negatively impact the Labor Force participation rate for certain groups in society. Research by Lopez-Sintas et al., (2020) further indicates that although the digital sector shows rapid growth in job creation and overall economic contribution, there are indications that increased internet use and digital transformation may indirectly negatively impact the Labor Force Participation Rate (LFPR) for certain groups in society. The digital skills gap is a decisive factor, as the IT *services* sector, which creates high-paying jobs and increases social mobility, tends to prefer those with advanced digital skills. This can create a polarization of the job market, where highly educated jobs in the IT sector are thriving, while opportunities for low-educated workers may be limited or shift to less stable jobs. In addition, many low-income countries face challenges such as weak digital infrastructure, a shortage of ICT talent, and a disadvantaged business environment, which hinders their full participation in the digital economy. Therefore, if individual internet use is more dominated by non-productive goals and the skills gap continues to widen, the negative impact on LFPR, particularly for certain segments of the population, can be an inevitable consequence of uneven digital adoption.

The Effect of GDP Growth on Labor Absorption.

Based on Okun's legal theory, the basis for understanding the relationship between a country's economic output and the labor market is Okun's Law, which was first identified by Arthur Okun (1962). Boďa & Považanová , (2025) , Basically, this theory states that there is a stable and inversely proportional relationship between the level of unemployment and the growth rate of real output. Based on previous findings, in this study economic growth does not affect labor absorption. This is due to several factors, one of which is the results of a study conducted by (Burgi et al., 2024), On the other hand, some unusual facts emerge when examining GDP growth in relation to changes in employment and labor productivity in the agricultural sector. Several high-income, upper-middle, and lower-middle-to-lower countries in the sample showed a decline in employment that accompanied growth in the agricultural sector. This result is in contrast to the manufacturing and services sectors. This is also supported by a report from the ILO (2022), which states that structural transformation in Southeast Asia tends to shift the workforce from the agricultural and informal sectors to the modern service sector that is more technological and selective. This indicates that economic transformation is shifting towards capital-intensive and high-tech sectors, which do not require large-scale labor absorption.

Based on research from Gil Sander & Shen Yoongi (2020), structural changes that occurred in Indonesia from 2000 to 2018, it tends not to have signitendficant impact on the overall increase in labor productivity. One of the reasons why structural change contributes relatively little to the overall growth of labor productivity in Indonesia is due to ineffective labor shifts. Most workers are moving from the agricultural sector to the low-value service sector, which is not much more productive. From 2000 to 2018, labor movements from agriculture were mainly to the trade, hotel and restaurant sectors, as well as "other services" where productivity levels are not much higher than those of agriculture. A worker in these sectors only produces 1.4 to 2 times more output than the average worker in the agricultural sector. This indicates that economic growth does not always lead to labor absorption, as the sector contributing the most to economic growth is not necessarily the one that employs a large workforce. Sectors such as financial services, mining, and information technology that contribute large to GDP tend to be capital-intensive and require only a limited amount of skilled labor. This remains essentially unchanged from 2019 to 2023; GDP growth is primarily driven by capital-intensive sectors, including processing, information-communication, and financial services (BPS, 2024). This shows that the increase in the labor force participation rate is not necessarily influenced by GDP growth, but depends on the sectors that contribute to economic growth. This is also experienced by the Philippines, according to (World Bank, 2025b). The economy in the Philippines is growing rapidly, but the increase in productivity is limited**.** Since 2010, more than 90% of growth has come from capital accumulation. Since 2010, the total productivity factor accounts for less than 10%, and the contribution of human capital is very small In contrast to Indonesia which is experiencing a shift in the workforce, Malaysia is actually facing a serious miss match skills. Malaysia faces significant labor market imbalances including labor shortages in a number of specific occupations and skills. These shortages are found across the skills spectrum, with some medium and high skills occupations experiencing labor shortage pressures. The same is true of many low-skilled jobs. At the same time, there is a sizable proportion of workers who work in jobs that do not match their level of education (OECD, 2024). . This condition ultimately affects the pace of economic growth. When the available labor does not match the needs of the market, productivity becomes suboptimal. Economic growth that should be able to be driven by skilled labor is held back due to the *mismatch* between the skills offered and those needed. Singapore, on the other hand, findings from the report published by (MRSD & MOM, 2025), show that the increase in individual income generally occurs when the workforce moves to more productive industries, such as the Finance & Insurance, Information & Communications, and Professional Services sectors. Workers who move to these industries mostly experience an increase in real income, especially those classified as PMET (Professionals, Managers, Executives & Technicians) and are highly educated. This reflects that sectors that have a large contribution to economic growth (GDP) also tend to have a higher capacity to absorb skilled labor at competitive returns. However, the problem arises because despite the increase in economic growth, the LFPR of the population aged 15 years and above decreased from 68.6% in 2023 to 68.2% in 2024. This decline is due to the phenomenon of population aging, not due to weakening economic performance. In other words, even though GDP is growing, the lfpr does not automatically increase due to the demographic structure. A similar thing is also happening in Thailand, according to (Harry Edmund Moroz, 2021) showing that serious population aging will mechantically decrease the proportion of the age population. Population aging can have a negative impact on economic growth. The report shows that, assuming a constant labor force participation rate based on age and gender, Thailand's projected demographic change will lead to a reduction in overall labor force participation rates of about 5 percentage points between 2020 and 2060 and a reduction in the overall labor force of 14.4 million people.

CONCLUSION

Based on the study's results, GDP Growth and FDI have no statistically significant effect on labor absorption. Only education has an influence on LFPR. Meanwhile, the internet has an adverse effect, even though it has a small effect on labor absorption. However, the use of the internet reveals inefficiencies or misallocations in technology, likely due to its use being dominated by non-productive purposes (entertainment and communication) and a digital skills gap, as evidenced by data from Malaysia and Singapore. Meanwhile, insignificant FDI and GDP growth suggest that conventional economic growth or foreign investment alone is not enough to automatically increase LFPR without targeted interventions on human resource development and more strategic use of technology. Through this research finds more evidence that the FDI and GDP growth have an insignificant effect on labor absorption, this should be taken into consideration by the government while making decisions or policies that involve employment. Because without the proper judgment of the extent, it can be a boomerang to the labor market in local countries. It may lead to more unemployment due to the mismatch skills or automation. Therefore, the authors suggest that governments in

ASEAN countries need to prioritize investment in labor-intensive sectors that absorb more labor as well as invest in quality education. In addition, the government needs to provide relevant policies that are oriented towards digital skills, as well as redefine and improve productive digital literacy through awareness campaigns and training programs targeted at vulnerable groups. With this, the aims of the research to analyze the role of FDI, GDP, Internet Usage and Education to Labor Force Participation rate have been accomplished. This research has several limitations. First, the variables used are limited to FDI, GDP growth, average school age, and internet use, so they do not reflect all factors that affect labor absorption. Second, the research data used is annual aggregate, so it does not capture seasonal or short-term variations in the labor market. Third, the research conducted is limited to 5 ASEAN countries, so it does not reflect the ASEAN region as a whole, so it is necessary to conduct further studies if you want to see its impact on ASEAN comprehensively. Therefore, the author recommends that future researchers expand the observation period and the scope of the country so that they can capture broader dynamics and variations between diverse regions. In addition, the addition of variables such as wage levels, industrial sector composition, and labor market policies can provide a more comprehensive understanding of labor absorption factors. In addition, a mixed approach that combines quantitative and qualitative analysis can also be used to dig deeper between variables. The use of micro data sources from household surveys or company surveys, as well as integration with big data such as online job vacancy trends, can be an alternative to improve the accuracy of analysis and the relevance of findings to real labor market conditions.

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