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# An Examination of the Relationship between Educational Level and Economic Growth in Indonesia

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A B S T R A C T
This study aims to analyze the effect of education on economic growth in Indonesia using panel data on 34 provinces from 2019 to 2023. The method used is panel data regression analysis, with independent variables including literacy rate, average years of schooling, and government spending on education. The dependent variable in this study is gross regional domestic product. The results showed that literacy rate, average years of schooling and education spending simultaneously had a significant effect on economic growth in Indonesia. Furthermore, partially, the literacy rate variable has a significant negative effect on economic growth. While the average length of schooling and education expenditure variables have a negative effect on economic growth in Indonesia. This study provides evidence that investment in education can be a catalyst for economic growth, hence the government should continue to improve the quality and access to education as a long-term strategy for sustainable economic development.

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## INTRODUCTION

The progress of a country can be seen from its economic growth. Countries with high economic growth tend to have better welfare. Welfare is often associated with economic growth because economic growth is the target of development (Kuncoro, 2010). Many factors can affect a country's economic growth, such as investment, technological progress, government policies, infrastructure and the quality of human resources. Competent human resources have the capability to contribute to the economy, sustainable development and competitiveness (Wahid et all., 2024).

One important element to improve the quality of human resources is education. Education serves as a key determinant of human capital development, innovation, productivity and overall economic performance. In Indonesia, the quality and accessibility of education plays a critical role in shaping the workforce, technological advancement and competitiveness in the global economy. By investing in education, Indonesia aims to improve human capital capacity and drive long-term sustainable economic growth.

Todaro and Smith (2011) emphasize that education is the key to economic progress and adaptation to new technologies. Countries that focus on education, assuming Cateris Paribus, will experience greater economic growth compared to countries that give less priority to education, as expressed by Mankiw (2003).

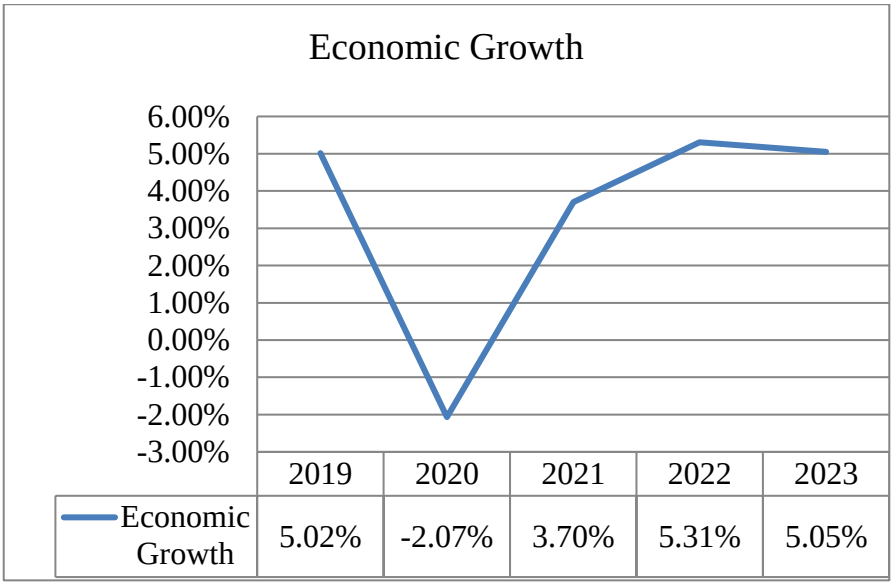


Figure 1. Indonesia's Economic Growth 2019-2023
*Source: Central Bureau of Statistics, Data Processed (2024)*

Education is one of the important factors that can drive economic growth. (Safuridar et al., (2025). In the period of 2019 to 2023, Indonesia experienced various major changes, especially due to the pandemic COVID-19. During the pandemic, teaching and learning activities were conducted online, which caused many students to experience learning difficulties, especially in areas that do not have adequate access to technology. On the other hand, the pandemic also caused Indonesia's economic growth to decline. After that, the government began to encourage improvements in the education sector, such as the Merdeka Belajar

program and increased vocational education. In addition, Indonesia is also in the demographic bonus period, so good education is needed to produce a quality workforce. Therefore, it is important to see how education has affected Indonesia's economic growth over the past five years.

Education can affect productivity and growth through several channels. According to Mankiw (2003) improving the quality of human capital can develop human resources. Human capital refers to education. Education itself plays an important role in creating the ability of a developing country to acquire the latest technology and to create sustainable growth and development (Todaro, 2006). The government can influence the level of real Gross Domestic Product (GDP) by regulating the supply of factors of production through the design of government education spending.

Table 1. Education Budget and Realization

| Education Budget and Realization 2019-2023 | | | |
|---|---|---|---|
| Year | Budget (Trillion) | Realization (Trillion) | Realization (%) |
| 2019 | 492,5 | 460,35 | 93,48 |
| 2020 | 508,84 | 473,66 | 93,09 |
| 2021 | 550 | 479,58 | 87,2 |
| 2022 | 621,3 | 480,26 | 77,3 |
| 2023 | 645,3 | 513,39 | 79,56 |

*Source: Ministry of Finance, Data Processed (2025)*

The budget for education is one of the largest budgets allocated by the government. Based on Table 1, the education budget from 2019-2023 did increase. However, the percentage of the budget fluctuated. The lowest budget percentage of 77.3% occurred in 2022 which decreased from the highest realization percentage in 2019 which reached 93.49%. Although the budget spent on education continues to increase, if it is not maximally absorbed, the improvement of the quality of human resources may be hampered which will affect competitiveness and will affect economic growth.

Research by Mercan and Sevgi (2014) on the impact of the education budget on economic growth in the case study of Turkey, found that there is a positive relationship between the education budget and economic growth in Turkey during the period 1970 - 2012. Thus, this study has shown that a maximally absorbed education budget will make economic growth dynamic.

The realization of the education budget that is not optimally absorbed will certainly affect various aspects of education, such as the scholarship education assistance program and School Operational Assistance (BOS) can be hampered, which ultimately burdens students from underprivileged families and increases the risk of dropping out of school. If this condition persists, the enrollment rate could decline, which will result in a lower average years of schooling (RLS) in Indonesia. Judging from graph 2, the average years of schooling in Indonesia is 6 years and is still far from the average years of schooling in the Organisation for Economic Cooperation and Development (OECD) countries which is 14 years (OECD, 2020).

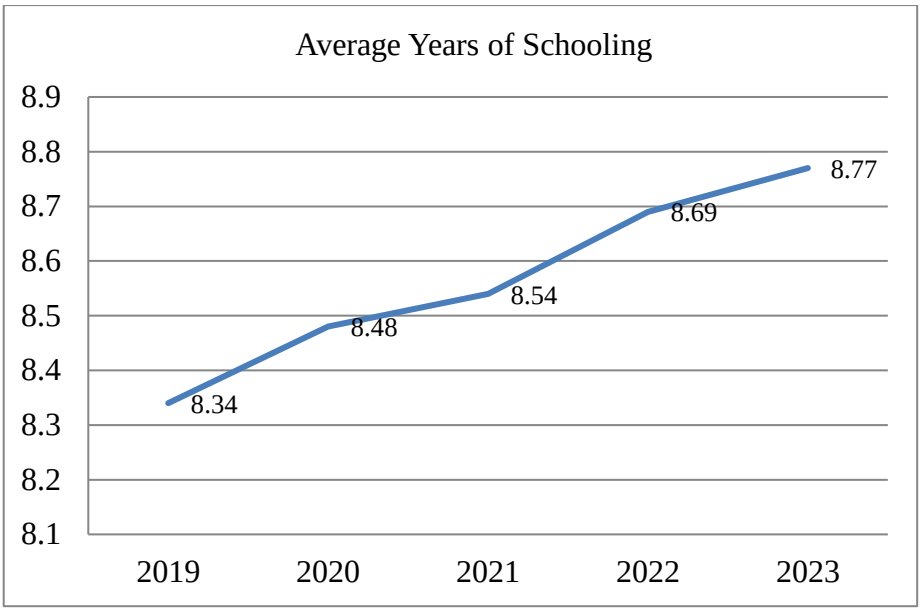


Figure 2. Average Years of Schooling of the Indonesian Population
*Source: Central Bureau of Statistics, Data Processed (2025)*

Handayani et al. (2016) stated that RLS has a positive impact on economic growth. A higher average years of schooling indicates an increase in community access and participation in education. This has the potential to improve the quality of human resources (HR) which is an important factor in increasing labor productivity and skills that can accelerate economic growth (Maulana et al., 2023).

Apart from the average years of schooling, the literacy rate (AMH) is an indicator that can affect economic growth. AMH is an indicator to determine the number of people in an area who have the basic ability to access information, which can increase their knowledge and skills which in turn will contribute to improving the quality of individuals, families and the country in various aspects of life (BPS, 2024).

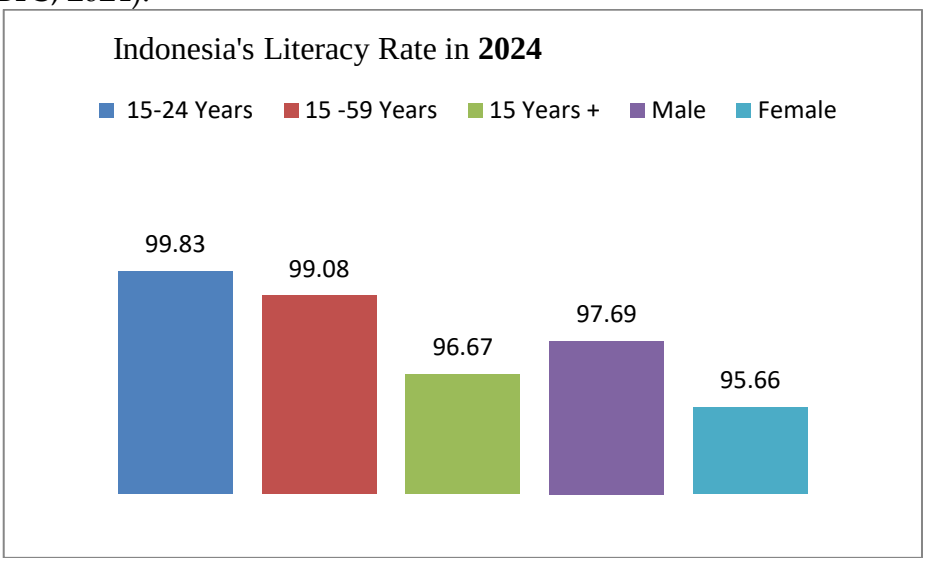


Figure 3. Indonesia's Literacy Rate
*Source: Central Bureau of Statistics (Data Processed, 2025)*

A comparison of AMH achievements for each age group can be seen in Figure 1, where the AMH of 15 years of age and above is lower than the AMH of 15-59 years of age and the AMH of 15-24 years of age. In 2024, AMH age 15-24 years reached 99.83 percent and AMH age 15-59 years reached 99.08 percent while AMH age 15 years and above was only 96.67 percent. This is assumed because the age group of 15 years and above also includes the elderly population whose literacy skills are lacking or many have forgotten and some may not even be able to read and write. In addition, the functional literacy program is also only specifically for the population aged 15-55 years (PKBM Albantani, 2019).

There are several theoretical approaches to the relationship between education, education spending and economic growth, including the neo-classical approach. In the neoclassical approach, economic growth is influenced by human capital factors, which play an important role in the process of changing a country's income (Gumus, 2005). In Indonesia, although the allocation of education funds is high, the realization is not optimal. This is reflected in the increasing average years of schooling, but still lags behind other countries. Meanwhile, economic growth also shows a positive trend, but is still below other countries. This condition is interesting to be studied further to understand how the role of the education sector in influencing economic growth in Indonesia.

## LITERATURE REVIEW

### *Economic Growth Theory*

One indicator to see economic growth in a region is to use Gross Regional Domestic Product (GRDP) data. GRDP refers to the amount of goods and services produced by a country's economy over time. The economic growth of a region is obtained from the increase in GRDP at constant prices which reflects the increase in the production of goods and services from year to year (Arifin, 2019) . It is often considered a key measure of a country's economic success and development progress (Todaro 2005).

Healthy economic growth is characterized by an increase in national income, income per capita, and optimal employment, as well as a decrease in the poverty rate. Factors that influence economic growth include the availability and quality of natural resources, human resources, capital accumulation, managerial and organizational efficiency of production, and technological progress.

### *Human Capital Theory*

The Human Capital Theory developed by Theodore W. Schultz (1960) is one of the most fundamental concepts in development economics. This theory assumes that education and health, as the main components of human capital, have a significant role in increasing individual productivity and overall driving a country's economic growth. The concept was first developed by economists such as Theodore Schultz and Gary Becker in the 1960s, who argued that investments in education and health can increase individual productivity and overall increase economic output. According to this theory, human capital includes knowledge, skills and abilities acquired through formal education, training and work experience, all of which can be considered as investments that generate future income streams. Education, in the context of human capital

theory, is considered an investment. As with investments in physical capital, such as machinery or infrastructure, investments in human capital through education are expected to generate returns in the form of increased labor productivity. This higher productivity then contributes to greater economic output and faster economic growth.

According to Mankiw, Romer, and Weil in their 1992 study, spending on education, training, and research, as well as health improvements, increase the productive capacity of individuals. They argued that an accurate economic production function should include human capital (H) along with technology (A), labor (L), and physical capital (K), with the latter three components equally effective in increasing output. Investment in education benefits not only the individual who receives the education, but also society at large. Higher education is correlated with better welfare, better employment opportunities, and greater contribution to economic growth. In addition, education also plays a role in the reproduction of social strata and class growth, which can affect the economic and social structure of a country.

***Endogenous Growth Theory***

This theory offers a broader theoretical framework for understanding the elements that influence growth from within (endogenous) the economic system itself. Technological advancement is regarded endogenous, whereas economic growth is the consequence of economic actors' decisions to invest in research and technology. Technology and scientific advancements will spur innovation, resulting in higher productivity and economic growth. In this scenario, the quality of human resources influences economic growth (Jhingan, 1996).

According to Romer (1986), knowledge is a type of capital. Science is the most significant factor in the industrial process. Only through research can people develop new ways of manufacturing in order to achieve specific economic rewards. According to Paul Michael, progress in development is not solely driven by external influences; internal elements also influence economic growth. The internal factor is science, which plays an important part in the production process. Science as capital to generate an innovation capable of sustaining a production and increasing revenues.

***Education***

Education is a planned effort in shaping the learning atmosphere and educational process, where students actively develop their spiritual abilities, self-control, character, intelligence, good morals, and potential for the benefit of themselves and social. Education is also the process by which we learn and understand important knowledge, skills, and life values (Septadarman & Rambe, 2024) . In Indonesia, education is considered a basic need that must be accessed by every individual. Education is not only limited to academic teaching at school, but also includes learning values, ethics, and skills needed for social life. The main purpose of education is to develop individual potential in order to contribute positively to society. The elements of education include learners, educators, curriculum, teaching methods and a supportive educational environment.

In Indonesia, the foundation of national education is regulated in the Law of the Republic of Indonesia NO. 20 Year 2003 on the national education system which emphasizes education as a conscious effort to develop the personality and abilities of learners. Education in indonesia is divided into several levels, ranging from early childhood education, primary education, secondary education, to higher education. Each level has specific objectives that are tailored to the stage of development of students. Education also has implementation principles which include democratic principles, sustainable principles, relevance principles, and effectiveness principles. The democratic principle emphasizes the importance of community participation in the education process, while the sustainable principle underlines the importance of education for long-term development. The principle of relevance means that education must match the needs of learners and society, and the principle of effectiveness demands that education can provide maximum results.

According to (Mifrahi & Rahmat, 2023) in the short term primary school enrollment, and higher education have a positive effect on economic growth. While in secondary school enrollment, the positive effect only occurs in short-term conditions. In addition, research conducted by (Frederich et al., 2023) This study shows the results of the average length of schooling has a negative and insignificant effect on economic growth. While the literacy rate is positive and significant on economic growth while according to (Yusuf et al., 202 )2 variables Average years of schooling and expected years of schooling have a significant positive effect on economic growth. Likewise, government spending is very influential on economic growth according to (Hafidh, 2011).

## METHODOLOGY

This research uses secondary data sourced from the Central Bureau of Statistics (BPS). In this study, the authors used panel data of 34 provinces in Indonesia from 2019 to 2023. This study uses a quantitative approach with multiple linear regression analysis with panel data models to examine the effect of independent variables, namely literacy rate, average years of schooling, and government spending on education on the dependent variable, namely economic growth proxied by gross regional domestic product. The data is processed using E-views, as for the stages carried out by the model selection test, namely the chow test and the hausmman test, then continued with the linear regression test which consists of a determination test (R-Square), simultaneous test (F test) and partial test (t test).

The regression equation for the study is:

$$PE_{it} = \beta_0 + \beta_1 AMH_{1it} + \beta_2 RLS_{(2it)} + \beta_3 BP_{3it} + e$$

Where:

PE : Economic Growth (percent)
AMH : Literacy Rate (percent)
RLS : Average Years of Schooling (years)
BP : Government Expenditure on Education (million rupiah)
$\varepsilon$ : *Error term* (error factor)
$\beta_0$ : Constant

$\beta_1 \cdots \beta_4$ : Independent variable regression coefficient
i : Province
$t$ : Year $t$

## RESEARCH RESULT

### *Panel Data Regression Results*

This study uses regression to analyze Economic Growth starting with model testing to ensure the accuracy of the research results. At the initial stage of testing, a Chow test was conducted to determine the use of either CEM or FEM. Furthermore, the Hausman test is used as an additional test to choose between FEM or REM in the analysis process.

In table 2, the chow test probability value of 0.0000 is smaller than 0.05. Therefore, the best model is the Fixed Effect Model (FEM).

Table 2. Chow Test Results

| **Effect Test** | **Prob** |
|---|---|
| Cross Section F | 0.0000 |
| Cross Section Chi-Square | 0.0000 |

*Source: Eviews 9 Data Processing (2025)*

Furthermore, it is necessary to conduct a Hausman test to determine the best model between FEM and REM. The Hausman test table can be seen in table 3.

Table 3. Hausman Test Results

| **Test Summary** | **Prob** |
|---|---|
| Random Cross Section | 0.0000 |

*Source: Eviews 9 Data Processing (2025)*

Based on the results of the Hausman test, the Cross-Sectio Random Probability of 0.0000 is smaller than 0.05. Thus, the best model to use in this study is the Fixed Effect Model (FEM). The results of the reg0072 esi Fixed Effect Model can be seen in table 4.

Table 4. Best Model Regression Results (Fixed Effect Model)

| Variable | Coefficient | t-Statistic | Prob. |
|---|---|---|---|
| **C** | 11.83925 | 5.446445 | 0.0000 |
| **AMH** | -0.086320 | -4.973287 | 0.0000 |
| **RLS** | 0.473546 | 8.505110 | 0.0000 |
| **BP** | 0.154077 | 5.067150 | 0.0000 |
| R-squared | 0.995386 | | |
| Adjusted R-squared | 0.994137 | | |
| F-statistic | | 796. | |
| Fixed Effects (Cross) | | | |
| ACEH-C | -0.460086 | | |
| BALI-C | -0.408922 | | |

| Variable | Coefficient | t-Statistic | Prob. |
|---|---|---|---|
| BANTEN-C | 0.956021 | | |
| BENGKULU-C | -1.059779 | | |
| DIY-C | -0.973816 | | |
| DKI_JKT-C | 1.181363 | | |
| GORONTALO--C | -0.960726 | | |
| JABAR-C | 2.171085 | | |
| JAMBI-C | 0.190637 | | |
| JATENG-C | 1.801277 | | |
| JATIM-C | 2.168468 | | |
| KALBAR-C | 0.212463 | | |
| KALSEL-C | 0.189620 | | |
| KALTENG--C | -0.124987 | | |
| KALTIM-C | 0.753203 | | |
| KALUT-C | -0.876332 | | |
| KEP_BABEL--C | -0.473937 | | |
| KEP_RIAU--C | -0.265161 | | |
| LAMPUNG--C | 0.756013 | | |
| MALUKU--C | -1.887989 | | |
| MALUKU_UTARA--C | -1.436138 | | |
| NTB-C | -0.637520 | | |
| NTT-C | -0.588139 | | |
| PAPUA-C | -0.801011 | | |
| PAPUA_BARAT--C | -0.389375 | | |
| RIAU-C | 1.097212 | | |
| SULBAR-C | -1.296950 | | |
| SULSEL-C | 0.453214 | | |
| SULTENG--C | 0.053934 | | |
| SULTRA-C | -0.740985 | | |
| SULUT-C | -0.632590 | | |
| SUMBAR--C | 0.105535 | | |
| SUMSEL-C | 1.045551 | | |
| SUMUT-C | 0.878847 | | |

*Source: Eviews 9 Data Processing (2025)*

The estimation results of the fixed effects model show that there are differences in the influence between provinces on the dependent variable. The provinces with the highest fixed effects are West Java (2.17), East Java (2.17), and Central Java (1.80), reflecting that the structural characteristics of these regions consistently support better economic or social performance. In contrast, the provinces with the lowest fixed effects are Maluku (-1.89), North Maluku (-1.44), and West Sulawesi (-1.30), suggesting that the underlying conditions in these regions are still an obstacle to the intended performance improvements. This difference emphasizes the importance of policies tailored to the characteristics of each region.

Based on the Fixed Effect Model (FEM) regression results in table 4, the following equation is obtained:

***Panel Data Regression Equation***

The following is a mathematical model of the panel data model:

PE = 11.83925 - 0.086320AMH + 0.473546RLS + 0.154077BP + e

The coefficient value shows the extent to which variable X affects variable Y. The following is a description of the interpretation of each variable:

1. The constant value obtained is 11.83925, it means that if the dependent variable does not change / remain, then the magnitude of the economic growth variable is 11.83925.
2. If the literacy rate increases by 1%, economic growth will decrease by 0.086320% showing a negative and significant effect at a significance level of α: 0.05% with a coefficient of -0.086320.
3. If the average years of schooling increases by 1%, economic growth will increase by 0.473546% showing a positive and significant effect at a significance level of α: 0.05% with a coefficient of 0.473546%.
4. If education spending increases by 1%, economic growth will increase by 0.154077% showing a positive and significant effect at a significance level of α: 0.05% with a coefficient of 0.154077%.

***Coefficient of Determination***

The R-Square or coefficient of determination was found to be 0.995386 in the appendix regression analysis. This value indicates that the majority of economic growth can be attributed to literacy rate, average years of schooling and education expenditure by 99.53% while the remaining 0.47%.

***Simultaneous Test (F Test)***

There is a significant relationship between literacy rate, average years of schooling and education expenditure on economic growth in Indonesia in the period 2019 to 2023. Based on the analysis results, the probability value (F-statistic) is 0.0000, which is smaller than the significance limit of 0.05. Thus, the null hypothesis (H0) is rejected and the alternative hypothesis (H1) is accepted.

***Partial Test (T Test)***

1. *Literacy Rate*

The t test results on the literacy rate variable (X1) have a coefficient value of -0.0863 and a probability of 0.0000 <0.05, so H0 is rejected and H1 is accepted. So, it is concluded that partially the literacy rate has a significant negative effect on economic growth in Indonesia.

2. *Average Years of Schooling*

The t test results on the average years of schooling variable (X2) have a coefficient value of 0.4735 and a probability of 0.0000 <0.05, then H0 is rejected and H1 is accepted. So, it is concluded that partially the average length of schooling has a significant positive effect on economic growth in Indonesia.

3. *Education Expenditure*

The t test results on the education expenditure variable (X3) have a coefficient value of 0.1540 and a probability of 0.0000 <0.05, so H0 is rejected and H1 is accepted. So, it is concluded that partially the average length of schooling has a significant positive effect on economic growth in Indonesia.

## DISCUSSION

### *Effect of Average Years of Schooling on Economic Growth*

The average length of schooling in this study has a positive and significant effect on economic growth in Indonesia. This means that when the average years of schooling increases, economic growth in Indonesia will also increase. Average years of schooling has a positive effect on economic growth because longer education allows individuals to gain higher knowledge, skills and competencies. The longer a person is in education, the greater the opportunity to understand technology, develop a critical mindset, and increase productivity in the world of work. A more educated workforce tends to have better work efficiency and adaptability to market changes and technological innovations. Thus, a high average years of schooling not only improves the quality of human resources, but also directly contributes to increasing the output and competitiveness of a country's economy

Based on data from the Central Statistics Agency (BPS), the average years of schooling of the population aged 15 years and above in Indonesia increased from 8.54 years in 2019 to 8.71 years in 2023. On the other hand, Indonesia's economic growth has recovered from a contraction of -2.07% in 2020 to 5.31% in 2022 and around 5.05% in 2023, indicating a parallel relationship between improved education and economic improvement

The findings of this result are in line with the human capital theory in this study, which states that education as a major component of human capital has a significant role in increasing individual productivity and overall driving a country's economic growth. Higher average years of schooling correlates with increased labor productivity. More educated workers tend to have better proficiency, which can increase economic output. The higher the qualification or education a person has, the higher the income they receive.

The importance of the role of education in the economic growth of a region is in accordance with Todaro's opinion that the education sector plays a major role in shaping the ability of a developing country to absorb modern technology and develop production capacity in order to create sustainable growth and development (Todaro, 2006). In spurring the economic growth of a region, human development is also needed. The importance of improving the quality of human resources is a necessity in producing an advanced society in various fields and has a role in determining the success of a region's development.

The results of this study are in line with previous research conducted by (Frederich et al., 2023; SBM, 2014), (Nurwijayanti, 2017), (Kurniawan, 2019), (Mulyadi & Mulyati, 2023), (Reavindo, 2024), (Suharsih et al., 2022), states that the average length of schooling has a significant positive effect on economic growth. Higher average years of schooling correlate with increased labor productivity. More educated workers tend to have better skills, which can increase economic output.

Meanwhile, the results of this study are not in line with research conducted by (Kumayas et al., 2024) , (Huda & Indahsari, 2021) , (Hepi & Zakiah, 2018) which states that the average length of schooling has no effect on economic growth. The average length of schooling has no effect on economic growth because the high quality of human resources encourages people to look for jobs that are in accordance with their abilities and expected income. Meanwhile, the availability of jobs and wages offered is not as expected. As a result, qualified human resources are willing to delay getting a job that is in accordance with high wages so that this condition can cause unemployment. In turn, an increase in unemployment will have a negative effect on the economy (Huda & Indahsari, 2021).

***Effect of Literacy Rate on Economic Growth***

Literacy rate has a negative and significant effect on economic growth in Indonesia. The results of this study contradict the assumptions of endogenous growth theory. One of the important assumptions is that education and improving the quality of human resources (including literacy) will increase productivity and innovation which will drive economic growth (Wahyuni, 2019). Based on data from the Central Statistics Agency (BPS), Indonesia's literacy rate has increased from 95.66% in 2019 to 96.41% in 2023. While this indicates an improvement in basic reading and writing skills, it does not necessarily reflect an increase in technical skills or productivity required in the job market.

This negative result could be due to the fact that, although many individuals can read and write, if it is not balanced with basic skills, then a high literacy rate has no impact on increasing productivity and does not encourage economic growth. The low skills possessed by human resources will affect the absorption of labor, thus making the unemployment rate increase and hampering economic growth in a region. Many graduates have the ability to read and write, but lack the technical or practical skills required by industry. This mismatch can lead to high unemployment, which negatively impacts economic growth.

The results of this study are in line with research conducted by (Frederich et al., 2023), (Faturrohmin, 2011), (Susanto, 2020), (Arifin. 2019) and (Jayawarsa et al., 2022), which states that the literacy rate has a significant negative effect on economic growth. This negative effect is also due to the fact that literacy rate only reflects the basic ability to read and write, but does not include aspects of technical and cognitive skills needed in the modern world of work (Frederich et al., 2023). As a result, increases in literacy rates are often not in line with increases in labor productivity. Low labor productivity will certainly hamper economic growth. For this reason, an effective way is to improve the quality of education that is able to create resources that are skilled and relevant to industry needs.

Meanwhile, the results of this study are not in line with research conducted by (Mahrany, 2012), (Wahyuni, 2019), (Jojo et al., 2019), (Harahap et al., 2022), (Arifin, 2019) and (Nugroho, 2014) which state that literacy rates have a significant positive effect on economic growth.

***Effect of Education Expenditure on Economic Growth***

Government spending on education has a positive and significant effect on economic growth in Indonesia. These results are in accordance with the human capital theory of this study which states that investment in education and health can increase individual productivity and overall increase economic output. Government spending used to help the community in the field of education, and build infrastructure to support the implementation of education is able to have a positive influence on economic growth in Indonesia. This can be caused because when people get good educational facilities and receive educational assistanceit will create a more skilled and educated workforce. Thus, people get the opportunity to have better jobs, which in turn increases purchasing power and consumption. With increased purchasing power, people can contribute more to the economy.

Based on data from the Ministry of Finance, the education budget allocation continues to increase from Rp492.5 trillion in 2019 to Rp645.3 trillion in 2023. However, when viewed from the percentage of realization, there was a decline from 93.48% in 2019 to 79.56% in 2023. This shows that although budget commitments increase every year, the challenges in budget absorption are also getting bigger. Especially in 2022, the realization of the education budget only reached 77.3%**,** even though it is the year with the second largest allocation after 2023. This imbalance may affect the effectiveness of education spending in directly driving economic growth.

The results of this study are in line with previous research (Hanifah et al., 2023), (Ophelia, 2022), (Tjodi et al., 2018), (Fauzianti & Suparta, 2024), (Mulyadi & Mulyati, 2023) and (Safitri et., 2021), which state that education spending has a significant positive effect on economic growth. Government spending in the education sector is an indirect investment provided by the government in increasing human capital by emphasizing the importance of capital in production (Ladung, 2018). The greater government spending in the education sector will increase human capital which will increase productivity which can then have an impact on economic growth (Mulyadi & Mulyati, 2023).

Meanwhile, the results of this study are not in line with research conducted by (Wahyudi, 2020) and (Aldillah, 2021) which state that government spending in the education sector has no effect on economic growth.

## CONCLUSIONS AND RECOMMENDATIONS

Based on the panel data regression results, the Fix Effect Model (FEM) was obtained as the best model used in this study. Furthermore, partially the average years of schooling and education expenditure variables have a positive and significant influence on economic growth in Indonesia. Meanwhile, the literacy rate variable has a negative and significant effect on economic growth in Indonesia. Meanwhile, simultaneously, the variables of literacy rate, average years of schooling and education expenditure have a significant effect on economic growth in Indonesia in 2019-2023.

Based on the findings of this study, there are several suggestions that can be implemented. First, the government needs to improve efficiency in the realization of the education budget to make it more targeted, especially in

scholarship programs and improving the quality of educators, and ensure transparency in its management. Second, the quality of education should be continuously improved by ensuring that the skills acquired are in line with the needs of industry and the world of work, as well as adjusting the curriculum to technological developments. Third, access to education must be expanded in underdeveloped and remote areas in order to increase the average length of schooling evenly across Indonesia, as well as promoting inclusive education policies. Fourth, closer collaboration between the government and the private sector is needed in the development of vocational education and job training, including industry-based apprenticeship programs. By implementing more effective strategies in education policy, Indonesia's economic growth is expected to be more stable and sustainable in the future.

## ADVANCED RESEARCH

Future research could benefit from expanding the geographic scope to include different countries or regions, allowing for a comparison of how educational investments impact economic growth in various contexts. Additionally, a longitudinal study would provide valuable insights into the long-term effects of education on economic growth, especially beyond the post-pandemic recovery period. Incorporating qualitative data on the quality of education, such as teacher competency, curriculum relevance, and the integration of technology in classrooms, would further enhance understanding of how education influences economic outcomes. Moreover, considering other economic factors, including technological adoption, industry growth, and social capital, would help capture the multi-dimensional nature of economic growth, offering a more comprehensive analysis.

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