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Education and Mediated Effects on Economic Development of Indonesia

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ABSTRACT

Research Originality: This research lies in its comprehensive approach. It utilizes Structural Equation Modeling (SEM) to analyze education levels' direct and indirect impacts on economic growth through various economic indicators.

Research Objectives: This study investigates the impact of primary, secondary, and tertiary education levels on Indonesia's economic growth, specifically examining the mediating effects of Foreign Direct Investment (FDI), credit, exports, and unemployment.

Research Methods: The data from the World Development Indicators (WDI) for 2015-2023 offer a long-term perspective on the trends in education and economic performance in Indonesia.

Empirical Results: The empirical results indicate that none of the mediators significantly influence the relationship between education levels and Gross Domestic Product (GDP) growth. These challenging conventional theories predict a positive impact of education on economic development. This outcome suggests a potential misalignment between Indonesia's educational outputs and labor market demand, underscoring the need for policy reforms.

Implications: The study implies that to foster meaningful economic growth, Indonesian education policy should enhance curriculum relevance and align educational outcomes with key market needs.

Keywords:
education; foreign direct investment; credit; export; unemployment

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INTRODUCTION

Economies grow at different rates depending on resources and policies. Several studies show that human capital, especially education, stimulates long-term economic growth by increasing labor productivity and facilitating technology adoption (Feldman et al., 2016; Liao et al., 2019; Todaro & Smith, 2015). In China, higher education was found to significantly affect economic growth, especially average years of schooling (Lv et al., 2017; Mariana, 2015). Better education is believed to improve people's welfare, strengthen leadership, and accelerate sustainable economic expansion (Benos & Karagiannis, 2016; Hanushek & Woessman, 2020; Kotásková et al., 2018). However, in contrast to (Adawo, 2011), higher education in Nigeria has a negative impact on economic growth. Benos and Karagiannis (2016) found variations in results influenced by factors such as the labor market structure and a country's economic policies, so the relationship between education and economic growth is still an academic debate.

Tanaya & Suyanto (2024) found that secondary education and tertiary education have different effects on the creation of new enterprises, with tertiary education tending to encourage workers to choose multinational companies over entrepreneurship, thus affecting the economy's structure. Al-Mutairi et al. (2024) found a positive relationship between education and economic growth in Palestine, but inflation and unemployment negatively affected this relationship. They emphasized the need to improve the quality of education to make it more relevant to the market by highlighting the negative correlation between tertiary education enrollment and economic growth. Othman et al. (2024) in Malaysia found that education spending is positively correlated with growth, underscoring the importance of strategic investment in education, while Lou & Li (2022) in China showed that export expansion supports intergenerational educational mobility, improving the economic prospects of less educated families. Rönnberg and Candido (2023) found that Nordic countries use education as an export commodity, while Park and Beghin (2023) showed that Asian students in OECD (Organization for Economic Co-operation and Development) countries acquire skills that benefit the economies of their home and host countries. In Turkey, Algül (2024) noted the high unemployment risk among university graduates, suggesting that a mismatch between the number of graduates and market demand can increase unemployment rates. Safitri and Endang (2024) added that a non-robust labor market limits the absorption of highly educated labor, significantly affecting graduates who invested heavily in education. Algül (2024) and Asongu and Odhiambo (2024) emphasized the importance of secondary vocational education and industry collaboration to create more suitable and quality employment opportunities for university graduates.

As one of the developing countries in Southeast Asia, Indonesia has made education a core element of the government's development strategy. This fact is evidenced by the significant increase in public education spending in recent decades. From 2000 to 2006, government spending on education doubled in real terms, and in 2019, the budget allocation for education reached IDR 492,555 trillion, a significant increase compared to IDR 444,131 trillion in 2018. However, despite this substantial financial commitment,

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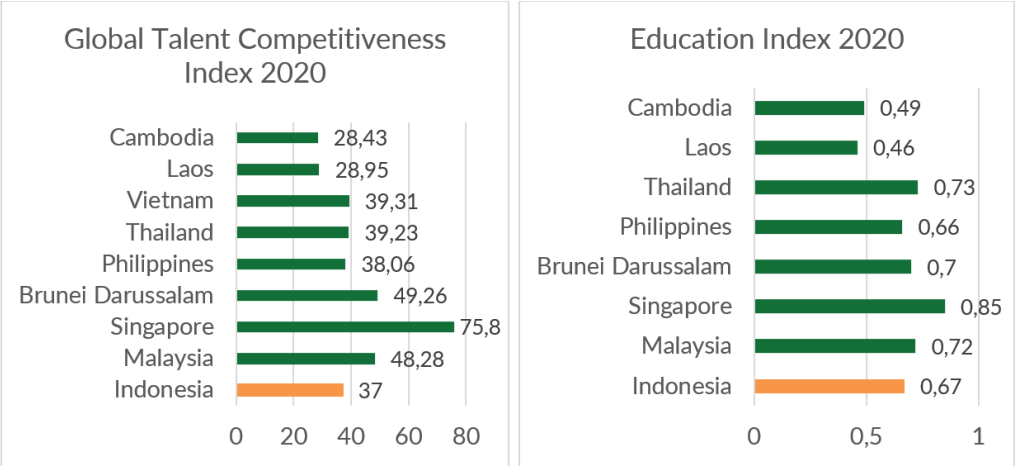
the quality of human resources in Indonesia remains challenging. Indonesia ranks 87th out of 157 countries regarding human capital quality, lagging behind many of its ASEAN neighbors. The country also ranks near the bottom of the Global Talent Competitiveness Index, which further illustrates the mismatch between increases in spending on education and improvements in the quality of human capital. This fact raises critical questions about the effectiveness of Indonesia's education system in driving economic growth.

Figure 1. Position of Indonesia in the *Global Talent Competitiveness Index of ASEAN Countries 2022* and Education Index of ASEAN Countries 2020

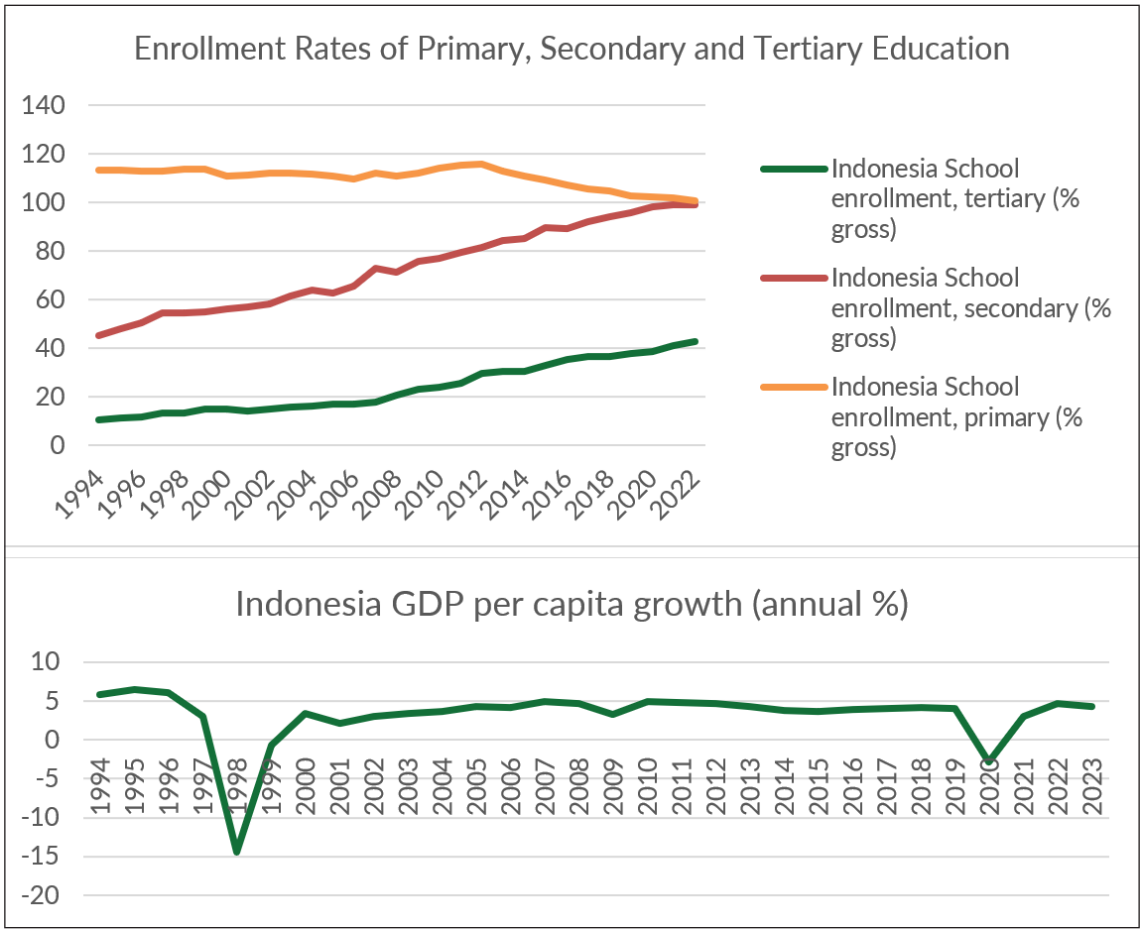


Source: World Bank World Development Indicators (WDI) Database

Based on Figure 1, Global Talent Competitiveness Index in 2022, Indonesia ranks relatively low compared to other ASEAN countries, with a score of 37. Singapore stands out with a score of 75.8, which shows a much higher level of talent competitiveness than other ASEAN countries. Then Malaysia and Brunei Darussalam rank well with scores of 48.28 and 49.26, respectively. Countries such as the Philippines (38.06), Thailand (39.23), and Vietnam (39.31) are slightly above Indonesia but still in a similar range of scores. Meanwhile, Laos and Cambodia ranked the lowest, scoring 28.95 and 28.43, respectively. Based on the 2020 Education Index, Singapore again ranks highest with an Education Index of 0.85, reflecting its excellent quality of education. With scores of 0.73 and 0.72, respectively, Thailand and Malaysia are also in a relatively good position. Meanwhile, Indonesia has an education index of 0.67, which is below Malaysia and Thailand but above countries such as the Philippines (0.66), Brunei Darussalam (0.7) and the countries with the lowest education index, Laos (0.46) and Cambodia (0.49).

School enrollment statistics in Indonesia have improved in recent decades. This condition is expected to reflect the current emphasis on achieving education for all in Indonesia as part of the Millennium Development Goals. Primary school enrollment was nearly 100 percent in 2010, compared to 70 percent in 1975 (Noone & Clare, 2011). The entire evolution of primary, secondary, and tertiary enrollment, along with Indonesia's economy or per capita income based on World Bank World Development Indicators (WDI) data from 1972 to 2018, is shown in Figure 2.

Figure 2. School Enrollment in Primary, Secondary, and Tertiary Education along with Economic Growth in Indonesia 1994-2023



Source: World Bank World Development Indicators (WDI) Database

Despite theoretical predictions, empirical evidence on how education affects economic growth has long been studied. In general, this reflects measurement problems. Most macroeconomic literature on the economy returns to education using measures of the quantity of schooling. The most common measures are enrollment and average years of schooling. Woessmann (2015) estimates the effect of education on economic growth in countries, describing average per capita gross domestic product (GDP) growth over several decades as a function of educational attainment and several other variables considered important for economic growth (Woessmann, 2015).

The purpose of this study is to provide an empirical answer to the question of whether the level of education can explain economic growth in Indonesia. In this context, Indonesia is an interesting case study because the Indonesian education system includes different forms, types, and levels of education. This study analyzes the possible indirect effect of the level of education on economic growth before and after the intervention through the variables of FDI, credit, exports, and unemployment. The results of this study are expected to be useful as recommendations to assist the government in making policies in the area of education related to economic growth. This research is also expected to

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provide input for the government to improve its educational performance and achieve a world-class educational system that is expected to improve economic performance..

METHODS

This research employs a quantitative method with a descriptive approach to examine the relationship between education levels and Indonesia's economic growth. The primary data for the study is sourced from the World Development Indicators (WDI), spanning the years 2015 to 2023. The analyzed variables include school enrollment at the primary, secondary, and tertiary levels, Foreign Direct Investment (FDI), credit availability, exports, and unemployment rates (Alam et al., 2024). The data collected is annual, recorded once per year over nine years. Annual data provides a long-term perspective on trends and relationships between education and economic indicators, critical for understanding educational investments' broader macroeconomic effects. However, it also means that the study focuses on capturing long-term patterns rather than short-term economic fluctuations, which might require quarterly or monthly data (Solikhawati et al., 2024).

This research employs Structural Equation Modeling (SEM) using the SmartPLS version 4 software. SEM is a powerful multivariate technique that allows for exploring complex relationships between variables, including direct and indirect effects. This method is beneficial for examining how education impacts economic growth directly or through mediating factors such as FDI, credit, exports, and unemployment. SEM enables the simultaneous analysis of multiple dependent variables and how they interact within the model.

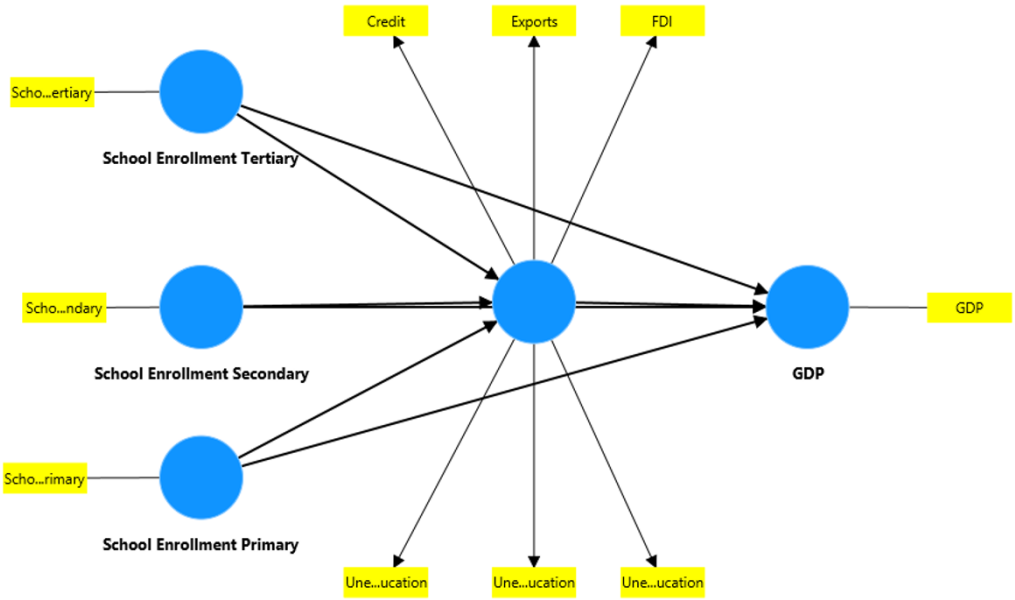
The measurement model is how latent variables (constructs) are measured by their indicators. Measurement models specify the relationships between constructs (latent variables) and associated observed indicators (manifest variables) through either reflective or formative measurement models (Hair et al., 2019). In this study, indicators cause the latent variable using the formative measurement model, with arrows pointing from the indicators to the construct. Unlike reflective models, formative indicators are not expected to be correlated, and changes in the indicators lead to changes in the construct. Formative indicators do not include error terms because they are assumed to be free of measurement error when defining the construct.

Discriminant validity refers to the extent to which a construct in a model is genuinely distinct from another construct, meaning it captures unique variance that is not explained by other constructs. This validity is essential in mediation models to ensure that the mediator and other constructs, such as the exogenous (independent) and endogenous (dependent) variables, are both statistically distinct and conceptually different. In this study, discriminant validity was assessed using the Fornell-Larcker criterion. This approach verifies that the square root of each construct's Average Variance extracted (AVE) exceeds its correlation with other constructs, ensuring that each construct captures unique variance and is distinct from others in the model.

According to Hair, the structural model (inner model) represents the relationships between latent constructs in the model, capturing the hypothesized direct and indirect paths among them (Hair et al., 2019). The structural model includes paths from the independent variable (exogenous construct) to the mediator and from the mediator to the dependent variable (endogenous construct). This setup helps to test whether the mediator carries the effect from the independent variable to the dependent variable. The structural model's key aspects in mediation analysis are as follows: path coefficients. These coefficients show the strength and direction of relationships among constructs. In a mediation model, Hair emphasizes the importance of examining direct and indirect effects (independent to dependent) (through the mediator).

Second, the value of R-square. These values indicate the amount of variance explained in each endogenous construct. Higher R2 suggests more substantial explanatory power in the model, reflecting the mediator's role in explaining the dependent variable. The third is hypothesis testing. Using techniques like bootstrapping, the model assesses the significance of direct and indirect paths. This test is essential to determine if the mediator explains part of the relationship significantly.

Figure 3. Framework Conceptual



RESULTS AND DISCUSSION

This study uses two groups of variables, namely dependent variables or dependent variables and independent variables. In this study, the dependent variable used is GDP, the independent variable used is school enrollment, and the mediating variable used is economic indicators (FDI, export, credit, unemployment). Descriptive statistics is used to determine the description of the data used in the study. The descriptive statistical data measures used are the minimum value (min), maximum value (max), average value

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(mean), and standard deviation (Std. Deviation). Descriptive statistics of the variables used in this study can be seen in Table 1.

Table 1 shows that the minimum enrollment for higher education was 20.809, the maximum enrollment for primary education was 115.964, and the average education enrollment was 102.260. The standard deviation of education enrollment is 13.527. The number of enrollments varies significantly across education levels, indicating that enrollments are quite dispersed, with some levels having much higher or lower enrollment than the average. The minimum FDI figure is 0,338, the maximum is 2.820, and the average FDI is 1.938. the standard deviation of FDI is 0,397. This standard deviation of credit is 2.94e+18. This value indicates that the overall level of variation is moderate among the various periods. The minimum credit figure is 1.82e+17, the maximum credit is 9.29e+18, and the average credit is 5.02e+18. The standard deviation of credit is 2.94e+18. This value indicates that the overall level of credit is high in the economy. The high standard deviation confirms that the range of credit values is vast, which indicates some variability in export performance over time.

Table 1. Descriptive Statistical Analysis Results

Variable	Indicator	Min	Max	Mean	Std. Dev
School enrollment	Tertiary	20809	42633	32387	6606
	Secondary	71427	99097	87458	8701
	Primary	100645	115964	108477	5024
Economic Indicators	FDI	0.33819	2.820	1938	0.3972
	Credit	1819642253 919400000	9.286.578.58 9.620.980.000	5020408296 055600000	22910195284 22400000
	Export	17331	29.808	22670	3158
	Unemployment with advanced education	4097	12.353	6175	2406
	Unemployment with basic education	1985	6.466	3366	1111
	Unemployment with Intermediate education	6209	13,955	8462	2093
Economic growth	GDP	-2,885	4,903	3673	1833

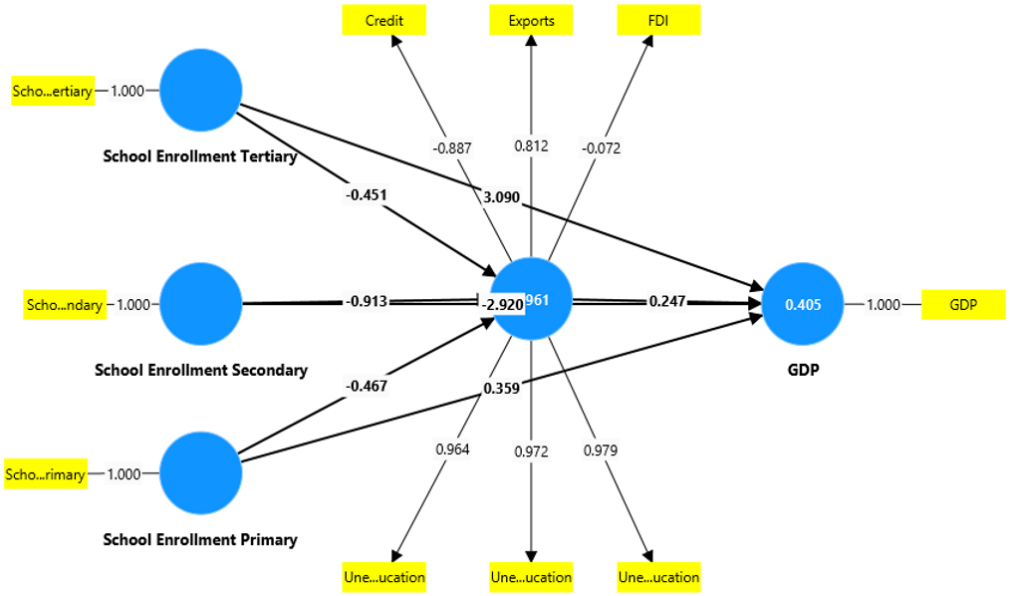
Source: Result processing by SmartPLS (2024)

The minimum unemployment with secondary education is 4.097, the maximum unemployment with secondary education is 12.353, and the average unemployment with secondary education is 2.406. Then, the minimum unemployment with primary education is 6.466, and the maximum unemployment with primary education is 3.366. The standard deviation of unemployment with primary education is 1,111. The minimum unemployment rate with higher education is 6,209, the maximum unemployment rate with higher education is 13,96, and the average unemployment rate with higher education is 8,469. The standard deviation of unemployment with higher education is 2,093.

This value shows that the unemployment rate varies more among those with secondary education than among other levels of education.

The minimum GDP growth rate is -2,89, the maximum average GDP growth rate is 4,90, and the mean GDP growth rate is 3,67. The standard deviation of GDP growth was 1,83. This value indicates that the economy has experienced relatively significant fluctuations in growth rates from year to year. This analysis aims to see how the relationship between variables. Changes in the R-Square value can be used to see how the relationship between variables affects.

Figure 4. Algorithm



Discriminant validity ensures that each concept of a latent variable/construct is different from other latent variables. The measurements in this study use the Fornell Larcker Criterion to evaluate discriminant validity by looking at the extent to which the construct in the model differs from other constructs. Suppose the root value of AVE (Average Variance Extracted) is higher than those outside the diagonal (correlation between constructs). Otherwise, there is an indication that the construct may not be sufficiently different from other constructs in the model.

Table 2 shows that Economic Indicator (Z) has an AVE of 0.587, which exceeds its correlations with other constructs, including GDP (0.240), Primar Enrollment (0.499), Secondary Enrollment (0.951), and Tertiary Enrollment (-0.950). The GDP (Y) demonstrates an AVE of 1.000, surpassing correlations with all other constructs: 0.240 with the Economic Indicator, 0.292 with Primary Enrollment, -0.416 with Secondary Enrollment, and -0.338 with Tertiary Enrollment. Similarly, Primary Enrollment (X1) has an AVE of 1.000, which is greater than its correlations with the Economic Indicator (0.499), GDP (0.292), Secondary Enrollment (-0.873), and Tertiary Enrollment (-0.863). The Secondary Enrollment (X2) also shows an AVE of 1.000, exceeding its correlations

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of -0.951 with the Economic Indicator (-0.950), GDP (-0.338), primary Enrollment (-0.863), and Secondary Enrollment (0.686). Given that all AVE values on the diagonal are more significant than the off-diagonal correlations, the matrix meets the Fornell-Larcker criterion, confirming discriminant validity among the constructs. The AVE root values are more significant than the values of other constructs, and the constructs in the model have good discriminant validity.

Table 2. Discriminant Validity Analysis Result

Variable	Economic Indicator (Z)	GDP (Y)	School Enrollment Primary (X1)	School Enrollment Secondary (X2)	Tertiary School Enrollment (X3)
Economic Indicator (Z)	0.586805556				
GDP (Y)	0.240277778	1.000			
School Enrollment Primary (X1)	0.499305556	0.291666667	1.000		
School Enrollment Secondary (X2)	-0.951	-0.416	-0.873	1.000	
School Enrollment Tertiary (X3)	-0.950	-0.338	-0.863	0.686111111	1,000

Source: Result processing by SmartPLS (2024)

Several studies emphasize the importance of human capital in driving economic growth, mainly through education (Benos & Karagiannis, 2016; Feldman et al., 2016; Hanushek & Woessman, 2020; Kotásková et al., 2018; Liao et al., 2019; Todaro & Smith, 2015). These studies typically find a positive correlation between education and economic outcomes, suggesting that higher levels of education lead to improved productivity, technological adoption, and, ultimately, enhanced economic growth.

However, the result of this study, particularly the specific indirect effects showing negative coefficients for primary, secondary, and tertiary education levels on GDP, challenge this conventional understanding in the context of Indonesia. This discrepancy echoes findings from studies such as (Adawo, 2011), which suggested a negative impact of higher education on economic growth in Nigeria, indicating that the relationship between education and economic performance is not uniform across different countries and contexts.

Moreover, the introduction referenced the importance of quality in education, noting that simply increasing enrollment does not guarantee improved economic outcomes. This condition is particularly relevant to Indonesia, where, despite substantial investments in education, the quality of human capital remains a significant challenge, as indicated by the country's low rankings in various global education and talent indices. The lack of significance in the specific indirect effects reinforces previous research suggesting that

the impact of education on economic growth is contingent on factors such as market relevance and the alignment of educational outcomes with labor market needs (Almutairi, 2024; Safitri & Endang, 2024).

Additionally, the study's result resonates with findings from Tanaya and Suyanto (2024), which identified differences in the impacts of various education levels on entrepreneurship and employment choices. In Indonesia, a significant portion of educated individuals may be drawn to multinational companies rather than pursuing entrepreneurship, which could limit the potential economic benefits of higher education.

The next step is to analyze the structural model. This analysis aims to see how the relationship between variables. Changes in R-Square value can be used to see how the relationship between variables affects. The R-Square value measures the proportion of variable values that are influenced (endogenous), which can be explained by the variables that influence them (exogenous). This result is helpful to see whether a model is good or bad. The R Square value has several criteria, including 0.75, a model is said to be substantial (strong); 0.50, a model is said to be moderate (medium); and 0.25, a model is said to be weak. Below are the results of the R-Square analysis.

Table 3. R-Square (R^2) Result

Variable	R-square	R-square adjusted
GDP (Y)	0.281	0.115

Source: Result processing by SmartPLS (2024)

Table 3 shows that the R Square value of variable Y is 0.281 and the Adjusted R Square value is 0.115, which shows that the ability of variables X1, X2, and X3 to explain Y is 11.5%. This value can be classified as a weak model. The R-squared value indicates the proportion of variance in the dependent variable that the independent variables in the model can explain. R-Square for GDP (Y) is 0.281, meaning that approximately 28.1% of the variance in GDP can be explained by the independent variables included in the analysis.

The adjusted R-square is 0.115, which accounts for the number of predictors in the model and provides a more accurate measure when comparing models with different numbers of predictors. The adjusted R2 of 0.115 suggests that only about 11.5% of the variance in GDP is explained by the model after adjusting for the number of independent variables. The relatively low R-Square implies that although the independent variables have explanatory power regarding GDP, most of the variance remains unexplained, indicating that other factors not included in the model may also play an important role in influencing GDP.

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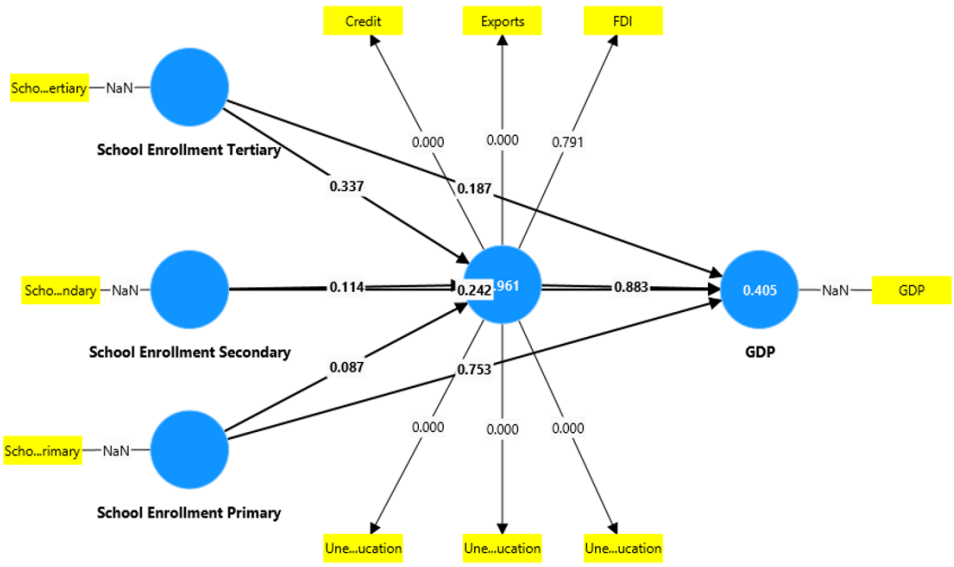
Figure 5. Test Result After Bootstrapping



In testing this hypothesis, the researcher used the direct effect analysis method, which helps test the hypothesis of the direct influence of a variable that influences (exogenous) on the variable that is influenced (endogenous). This direct effect analysis has several criteria, including, firstly, if the path coefficient value is positive, then the influence between variables runs in the same direction secondly if the path coefficient value is negative, then the influence between variables runs in the opposite direction, thirdly if the value P values < 0.05 means the influence between variables is significant, and fourth, if P values > 0.05 then the influence between variables is not significant. Hypothesis test results This can be seen through the Path Coefficient Bootstrapping technique in the Smart-PLS program.

Table 4. Path Coefficient

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values
School Enrollment Primary -> GDP	0.24930556	0.35138889	1.138	0.21875	0.52291667
School Enrollment Secondary -> GDP	-2.920	-2.751	2.497	1.169	0.16805556
School Enrollment Tertiary -> GDP	3.090	3.477	2.341	1.320	0.12986111

Source: Result processing by SmartPLS (2024)

The path coefficients presented in Table 4 illustrate the relationships between school enrollment at different levels and GDP. For the relationship between primary school enrollment and GDP, the original sample coefficient is approximately 0.249, indicating a

positive association; however, the t-statistic of 0.219 and a P value of 0.523 reveals that this relationship is not statistically significant. The original coefficient of -2.920 secondary school enrollment suggests a negative association with GDP, which is unexpected, but the T is statistically significant. Lastly, the path coefficient for tertiary school enrollment is 3.090, implying a positive impact on GDP. Yet, it is accompanied by a t-statistic of 1.320 and a P value of 0.130, further confirming the lack of statistical significance. Overall, none of the path coefficients for school enrollment at any level demonstrate significant effects on GDP, suggesting that further investigation is needed to explore additional factors influencing GDP and to reassess the model and its variables.

The unexpected negative coefficient for secondary school enrollment (-2.920) presents a stark contrast to the consensus found in earlier studies, which typically argue for a positive impact of secondary education on economic outcomes as indicated by (Feldman et al., 2016; Liao et al., 2019; Todaro & Smith, 2015). This finding prompts a reconsideration of the dynamics at play within the Indonesian context, where secondary education may not be adequately aligned with labor market demands or socioeconomic factors may hinder its positive impact on GDP. This result aligns with research that suggests a mismatch between educational outcomes and labor market needs, highlighting the importance of ensuring that educational curricula are relevant and geared towards equipping students with the necessary skills.

The positive coefficient for tertiary school enrollment (3.090) also fails to achieve statistical significance, reinforcing a critical point made in previous studies regarding the need for quality over quantity in higher education. As noted in the introduction, while higher education is often linked to enhanced productivity and economic growth, the impact can vary widely depending on the quality of education provided and the alignment with economic needs. The findings from this study resonate with those of (Almutairi, 2024), which emphasize the importance of improving the relevance of tertiary education to ensure it effectively contributes to economic growth..

Table 5. Specific Indirect Effect

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values
School Enrollment Primary -> Economic Indicator -> GDP	-0.162	-0.125	0.08819444	1.272	0.14097222
School Enrollment Secondary -> Economic Indicator -> GDP	-0.316	-0.230	0.18611111	1.179	0.165277
School Enrollment Tertiary -> Economic Indicator -> GDP	-0.156	-0.237	0.175	0.42986111	0.372222

Source: Result processing by SmartPLS (2024)

Table 5 outlines the indirect effects of school enrollment at various levels on GDP through the economic Indicator, revealing that none of the relationships are statistically

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significant. For the path from primary school enrollment to GDP via the Economic Indicator, the original sample coefficient is -0.162, suggesting a negative indirect effect; however, the t-statistic of 1.272 and P value of 0.141 indicate this effect lacks significance, supporting hypothesis H4, which posits that primary education's impact on GDP through factors like FDI, credit, exports, and unemployment is negligible. Similarly, secondary school enrollment demonstrates a more substantial negative indirect effect with a coefficient of -0.316. However, the t-statistic of 1.179 and P value of 0.165 confirm that this effect is also insignificant, aligning with hypothesis H5. Lastly, tertiary school enrollment shows a negative indirect effect on GDP with a coefficient of -0.156. However, its t-statistic of 0.430 and a P value of 0.372 further indicate a lack of statistical significance.

This result aligns with studies that suggest primary education provides basic literacy and numeracy skills but does not contribute significantly to complex economic activities. Hanushek and Woessmann (2020) found that while basic education is essential, its role in driving economic growth is limited without advanced skills (Hanushek & Woessman, 2020). In contrast, Psacharopoulos and Patrinos (2018) highlighted that primary education has a more significant impact on economic growth in low-income countries, which suggests that the Indonesian economy might already be at a stage where more advanced education is required to drive growth.

The direction of the positive relationship between primary education level and Indonesia's economic growth may not be the primary driver of economic growth in Indonesia, or other factors are more dominant as the primary driver. Quality education is also important in influencing economic outcomes. Primary education may only provide essential skills like reading, writing, and math. However, more complex and relevant skills for the job market are often acquired at the secondary and higher education levels. Therefore, access to higher education significantly impacts economic growth, as it produces a more skilled and innovative workforce. Other more important factors, such as good infrastructure (e.g., roads, transportation, electricity, and internet), support economic activity and can have a more significant impact directly on GDP. Government policies that support innovation, foreign investment, and trade can also strongly influence economic growth. In addition, politically and economically stable countries tend to attract more investment, which promotes faster economic growth.

This negative relationship suggests that a focus on secondary education without being matched by improvements in the quality or relevance of education may produce a workforce that does not match market needs. The secondary education system may produce graduates who are not fully prepared to enter the job market directly or whose skills do not match industry demand. The P-value of 0.16 indicates a 16% chance that the observed relationship occurred by chance, as there is a real relationship. This insignificance suggests that while there is an indication of a negative relationship, the relationship is not strong or consistent enough to prove that secondary education impedes economic growth. If secondary education is not aligned with the economy's needs, graduates may not have the necessary skills to support economic growth. This condition may lead to increased educated unemployment or a less productive workforce.

This finding contrasts with studies like those of Barro (1996) and Benhabib and Spiegel (1994), which argue that secondary education typically plays a crucial role in enhancing workforce productivity and contributing to growth. The negative relationship in this research may indicate a mismatch between the skills acquired in secondary education and the demands of the Indonesian labor market, similar to findings in certain African economies (Adawo, 2011). It reflects potential challenges in the quality or relevance of secondary education in Indonesia, suggesting that the curriculum might not be aligned with market needs. In some cases, an increase in secondary education may lead to educated unemployment if there are not enough jobs that require that level of education or jobs that do not match the skills possessed. In addition, secondary education may become less relevant if the economy shifts from sectors that require medium-skilled labor to sectors that require higher or lower-skilled labor. Other factors, such as investment in infrastructure and fiscal and monetary policies, may be more significant in driving GDP growth than an increase in secondary education.

This finding is consistent with the research of Benos and Zotou (2014), which concluded that higher education positively impacts economic growth by producing a more skilled and innovative workforce. However, the insignificant result in this study echoes findings from Adawo (2011) and Benos and Karagiannis (2016), which highlight that higher education's contribution to growth can be muted if the quality of education or its relevance to industry needs is insufficient. In Indonesia, there may be a skills mismatch, where graduates are not effectively absorbed into the labor market, reducing the potential positive impact of higher education on growth.

Although higher education can theoretically increase economic growth, the quality and relevance of education are essential. If higher education is not tailored to the needs of the labor market or economy, then its graduates will not be effective in promoting economic growth. Suppose there is a mismatch between the skills taught in higher education and those taught in higher education and the skills required by the market. In that case, the graduates will not make an optimal contribution to the economy. This condition may explain why, although there is a positive relationship, the effect is insignificant.

This study suggests that while higher education is important, further emphasis may need to be placed on improving its quality, increasing the relevance of the curriculum to industry needs, and developing policies that support the labor absorption of higher education graduates in order to maximize their impact on economic growth. Primary education may not provide sufficient skills to enable the workforce to contribute significantly to complex economic activities, such as those related to FDI, credit, exports, and exports. Therefore, its impact on economic growth through these channels may be limited.

Skills relevant to increasing foreign investment, credit access, and export capacity may be more likely to be acquired through secondary and higher education. This condition may explain why primary education alone is insufficient to affect economic growth through these variables despite their significant importance. Basic education may also be insufficient

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to prevent unemployment associated with more technical or specialized occupations. Without additional secondary or higher education skills, primary education graduates may be more vulnerable to unemployment, reducing their contribution to economic growth. These findings point to the importance of improving access and quality of secondary and higher education, rather than focusing solely on basic education, to create a workforce that is better prepared to face complex economic challenges and contribute more to economic growth through channels such as FDI, credit, and exports (Islam, 2024).

Secondary education should provide more advanced skills compared to primary education, but perhaps these skills are not enough to significantly drive macroeconomic variables such as FDI, credit, and exports. Secondary education may not provide relevant or sufficient skills to significantly increase productivity or attract foreign investment (Yulianita & Ramadhan, 2023). This insignificance suggests that although there is an indication of a negative relationship, the relationship is not strong or consistent enough to be considered statistically significant. This result means that the effect of secondary education level mediated by FDI, credit, exports, and unemployment on economic growth is unclear.

Secondary education may not be sufficient to prepare a workforce capable of contributing significantly to complex economic activities such as those related to FDI, credit, and exports. Higher and more specific skills, typically acquired from higher education, may be required to drive economic growth through these channels. There may be a mismatch between the skills acquired from secondary education and the needs of more advanced industries or job markets. Without relevant skills, secondary education graduates and the needs of industry or more advanced job markets. Without relevant skills, secondary education graduates may be unable to attract FDI or increase economic productivity, which can drive economic growth. High levels of unemployment among secondary education graduates, especially if education is not relevant to labor market needs, may hinder their contribution to economic growth. These findings point to the importance of improving access to secondary education and ensuring that secondary education is relevant to the needs of the modern economy. There may need to be a greater emphasis on technical, vocational, or industry-specific skills to ensure that secondary education graduates can contribute more to economic growth (Gunawan, 2023).

Although higher education is usually considered a key factor in driving innovation and economic growth, the contribution of higher education graduates may be limited if the skills acquired do not match the needs of the labor market or strategic sectors such as FDI, credit, and exports (Agustina et al., 2023). One reason for this negative relationship is the mismatch between the skills of higher education graduates and the needs of industries in Indonesia. If higher education graduates are not employable or cannot add enough value, this can have a negative impact on economic growth. High unemployment among higher education graduates can reduce their positive economic contribution. If the job market cannot absorb higher education graduates effectively, the positive impact of increasing higher education cannot be realized. This finding suggests that increasing access to higher education alone cannot boost economic growth. It is

important to ensure that higher education is relevant to the needs of industry and the economy and that graduates have the skills required by the job market.

CONCLUSION

The research examines how education at primary, secondary, and tertiary levels impacts Indonesia's economic growth, mainly through mediating factors such as Foreign Direct investment (FDI), credit, exports, and unemployment. The study's findings reveal that none of these mediators significantly influence the relationship between education levels and economic growth. Although theoretical frameworks often suggest a positive link between higher education and economic growth due to increased productivity and skills, the empirical results suggest otherwise. This discrepancy points to a possible mismatch between the skills provided by the Indonesian education system and the needs of the labor market, raising concerns about the current education policies' effectiveness in fostering economic growth.

The policy implications of this study emphasize the need for reforms in Indonesia's educational strategy to address the alignment of educational outcomes with economic demands. Rather than solely focusing on enrollment numbers, the government and educational institutions should prioritize curriculum improvements that cater to market-relevant skills. Policies could focus on enhancing vocational and technical training at the secondary and tertiary levels to reduce the gap between education and employability. Additionally, by fostering industry partnerships and creating pathways for graduates to enter the high-demand sector, the Indonesian government could better utilize its educated workforce to support sustainable economic growth.

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