Exploring the Role of Education and Exports in Indonesia's Economic Growth

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Abstract

The assumption that education positively influences economic growth remains weakly supported. Therefore, this study aims to examine the extent to which education levels explain economic growth by incorporating foreign direct investment, credit, exports, and unemployment as mediating variables. The analysis uses time-series data for Indonesia from 1991 to 2018, obtained from the World Bank's World Development Indicators. The results show that basic education has a negative but statistically insignificant effect on economic growth. In contrast, secondary and higher education have positive and significant effects, with higher education demonstrating the strongest influence. Furthermore, exports significantly mediate the effects of primary and higher education on economic growth, while no mediating variables significantly explain the impact of secondary education. These findings imply that greater investment in secondary and higher education is crucial for promoting sustainable long-term economic growth and strengthening export performance.

Keywords: Education, Economic Growth, Mediator, Mediation Analysis, Direct Impact

Eksplor Peran Pendidikan dan Ekspor dalam Pertumbuhan Ekonomi Indonesia

Abstrak

Asumsi bahwa pendidikan berpengaruh positif terhadap pertumbuhan ekonomi masih lemah. Oleh karena itu, penelitian ini bertujuan untuk menguji sejauh mana tingkat pendidikan menjelaskan pertumbuhan ekonomi dengan memasukkan investasi asing langsung, kredit, ekspor, dan pengangguran sebagai variabel mediasi. Analisis menggunakan data deret waktu untuk Indonesia dari tahun 1991 hingga 2018, yang diperoleh dari Indikator Pembangunan Dunia Bank Dunia. Hasil menunjukkan bahwa pendidikan dasar memiliki pengaruh negatif tetapi secara statistik tidak signifikan terhadap pertumbuhan ekonomi. Sebaliknya, pendidikan menengah dan tinggi memiliki pengaruh positif dan signifikan, dengan pendidikan tinggi menunjukkan pengaruh terkuat. Lebih lanjut, ekspor secara signifikan memediasi pengaruh pendidikan dasar dan tinggi terhadap pertumbuhan ekonomi, sementara tidak ada variabel mediasi yang secara signifikan menjelaskan dampak pendidikan menengah. Temuan ini menyiratkan bahwa investasi yang lebih besar dalam pendidikan menengah dan tinggi sangat penting untuk mendorong pertumbuhan ekonomi jangka panjang yang berkelanjutan dan memperkuat kinerja ekspor.

Kata Kunci: Pendidikan, Pertumbuhan Ekonomi, Mediator, Analisis Mediasi, Dampak Langsung

INTRODUCTION

Economic growth in different countries may differ because of the differences in composition and number of resources. Each country continues to strive to incite economic growth in

various ways. Some countries rely on natural resources to encourage their economic growth and other countries encourage their economic growth by relying on government policies which were expected to significantly influence economic growth such as fiscal policy, monetary policy, and exchange-rate policies (Chugunov et al., 2021; Kharcheva & Kontsevaya, 2016; Kim et al., 2021; Maitah & Smutka, 2016; Mohseni & Cao, 2020).

Human capital or educational achievement in a country has been seen as a crucial factor in increasing economic growth for a long time (Dankyi et al., 2022; Doré & Teixeira, 2023; Kamal & AboElsoud, 2023; Liao et al., 2019). Human capital indicated by the rate of student enrolment, labor participation, and total labor force, has been proven to significantly affect economic growth (Keji, 2021). Countries that have an educated workforce usually have the ability to import technologies for particular production processes which involve sophisticated operations to facilitate the country's workforce to perform more complex and high-tech duties ((Feldman et al., 2016). In addition, the outcome of education could affect individuals' economic well-being (Mazur, 2021), increase the public and private institutions' competition and productivity (Ghulam & Mousa, 2019), establish nation's educated leaders to fill the gap in government, domestic private and foreign private companies, public companies, and any other occupations (Todaro & Smith, 2015), and ameliorate the leaders' potential to succeed in economic sectors in the term of local level democratization (Pelzl & Poelhekke, 2023).

In terms of educational level, workers with different levels of education each have various effects on economic growth (Awad, 2021). It was found that during the period 1996-2010, tertiary education levels had significantly impacted the economic growth in 31 provinces in China and the positive impact of the average school year on economic growth was greater than that of capital investment (Mariana, 2015;Lv et al., 2017).

The quality could be improved by increasing labor productivity and economic growth through education (Benos & Zotou, 2014). Education plays an important role in achieving individual and societal prosperity (Woessmann, 2015). Hence, education investment is presumed to have a positive and significant effect to encourage sustainable economic growth (Liao et al., 2019). So it can be concluded that, so far the research findings indicate solid evidence regarding the positive relationship between education level and economic growth as found by (Kotásková et al., 2018) in India.

Despite the widespread belief that education positively affects economic growth, hitherto the evidence supporting this hypothesis is very weak. Previous studies found no significant contribution from the education subsector to economic growth (Adetokunbo & Edioye, 2020). Adawo (2011) found a negative relationship between higher education and economic growth, while Hamdan et al. (2020) found that higher education does not affect economic growth improvement in Saudi Arabia. However, a substantial bias regarding the positive impact of education on economic growth is found in a survey of 57 study results (Benos & Zotou, 2014). The results of this study suggest that, in general, there is a positive relationship between education and economic growth. It means, countries with higher levels of education tend to have better economic growth. Hence, the contrast from the empirical research results regarding the relationship between education level and economic growth is still debatable.

Beside demographic transition, the expansion of education has a role to expedite economic growth (Cervellati et al., 2023). Education is considered a key item in the Indonesian government's development plans. This is demonstrated by the government's education spending which has continued to increase significantly in recent years, notably in the aftermath of the economic crisis. The budget spending on education, in fact, doubled from 2000 to 2006. In 2007, education spending budget was greater than any other sector, which accounted for more than 16 percent of total government spending.

The allocation of the education budget in the 2019 Government National Budget *Anggaran Pendapatan dan Belanja Negara (APBN)* has increased compared to 2018 to IDR 492.555 trillion. This budget allocation is bigger than the previous year which was only IDR 444.131 trillion. This means that the budget for the education sector in 2019 has increased by IDR 48.4 trillion.
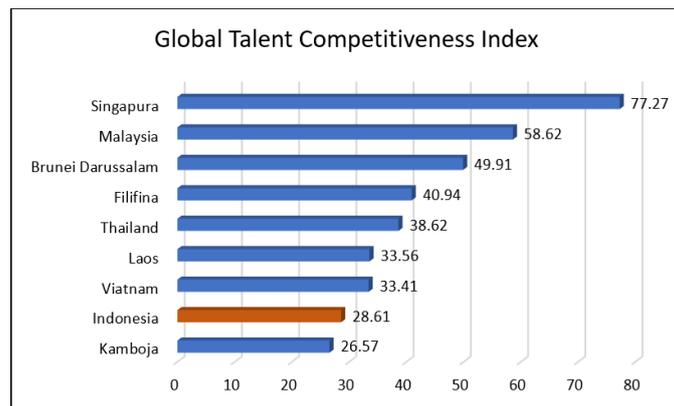

Figure 1. Indonesia's Position in 2019 ASEAN Countries Global Talent Competitiveness
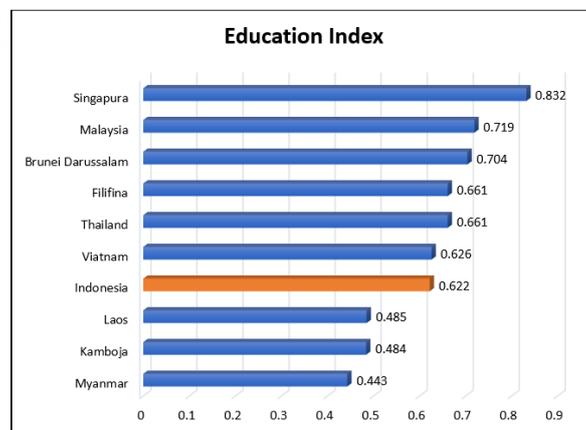Source: Database of World Bank's World Development Indicators (WDI)

Figure 2. ASEAN Countries Education Index in 2017
Source Database of World Bank's World Development Indicators (WDI)

Figure 1 and 2. explains the position of ASEAN countries on the Global Talent Competitiveness Index in 2019 by showing that Indonesia's position is in the second last after Cambodia with a score of 28.61 while the first position belongs to Singapore with a value of 72.27 so it can be known that difference is 43.66. Meanwhile, the 2017 Education

Index shows Indonesia occupies the 7th position among other ASEAN countries. This shows that in terms of quality, Indonesia is still relatively low, so the increase in the national education budget cannot go hand in hand with improving the quality of education in Indonesia's human resources. Looking back at the data released by the World Bank in 2018, it is reported that the quality of Indonesia's Human Resources (HR) is ranked 87th out of 157 countries. In the same year, the competitiveness ranking of Indonesia's human resources was ranked 45 out of 63 countries by Business World. This ranking is considered far behind the two neighboring countries, namely Singapore and Malaysia which ranked 13th and 22nd respectively. The Global Talent Competitiveness Index (GTCI) measures the competitiveness of a country attributed to the country's ability or the human resources' talent by including several assessment index indicators such as income per capita, education, infrastructure in information computer technology, gender, environment condition, level of tolerance and political stability put Indonesia in sixth position with a score of 38.61 in the ASEAN region. Singapore ranks first with a score of 77.27. The second position was occupied by Malaysia (58.62), followed by Brunei Darussalam (49.91), and the Philippines (40.94). On the other hand, the condition of Indonesia's education according to the Education Index issued by the Human Development Reports in 2017, Indonesia occupied the seventh position in ASEAN with a score of 0.622. The highest score is still held by Singapore, with a score of 0.832, followed by Malaysia (0.719) and Brunei Darussalam (0.704). The fourth rank is occupied by Thailand and the Philippines with the same score of 0.661.

Empirical data backs up the current human capital theory's assertion that education is essential to economic progress. One of the primary determinants of economic growth and a major contributor to a nation's technical advancement is its human capital (Benos & Zotou, 2014). This human mode is mostly reliant on the educational system, though workplace learning can also make a big difference. One of the most crucial components of human capital is higher education, which also helps to sustain long-term economic growth. In many nations, obtaining a higher education is regarded as a means of improving social mobility and reaping larger economic rewards (Habibi & Zabardast, 2020).

The increase in education enrolment could increase GDP per capita growth (Habibi & Zabardast, 2020). School enrollment statistics have improved in the last few decades in Indonesia which is expected to reflect the current emphasis on achieving education for everyone in Indonesia as part of the MDGs. In 2010, the enrollment percentage in primary education was nearly 100 percent compared to 70 percent in 1975 (Noone & Clare, 2011). The complete development of the number of registrations at the primary education, secondary education, and higher education levels along with Indonesia's economy or per capita income according to data from the World Development Indicators (WDI) by the World Bank from 1972 to 2018 can be seen in Figure 3 and 4.
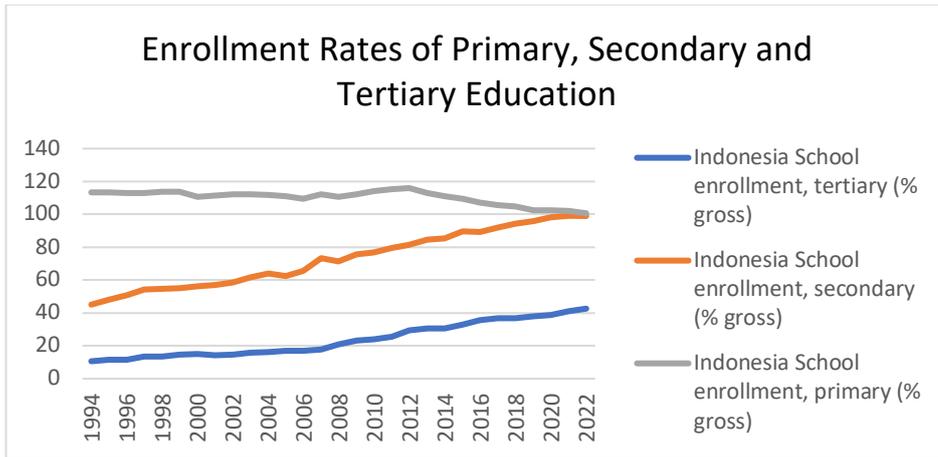
Figure 3. Number of School Enrollments in Primary, Secondary, and Higher
Education Levels
Source: Database of the World Bank's World Development Indicators (WDI)

Figure 3. The economic growth in Indonesia in 1972-2018
Source: Database of World Bank's World Development Indicators (WDI)

Lucas (1988) made one of the most prominent and influential contributions to the theory of the relationship between human capital and economic growth, which is still associated with the earlier theory of Uzawa (1965). In this model, the output level is a function of the human capital stock. In the long term, sustainable growth is attainable if human capitals grow freely, so these two theories are often called the Uzawa-Lucas model. Thus the endogenous growth model based on research analysis and development is an important contribution from Romer (1990) this suggests that growth rates depend in part on the amount of human capital. The principal belief is that human capital is an important input in the development of new ideas. Furthermore, Jones (1995) said that a one-time improvement in the human capital stock will increase the growth rate without limit so that the long-term economic growth rate depends on the level of human capital owned by a country.

At least three educational mechanisms are known that can affect economic growth. The first one is that education could enhance the quality of human capital ingrained in the workforce to increase labor productivity towards a higher output balance (Bayraktar-Sağlam & Yetkiner, 2014). The second one is that education could improve the innovative capacity of the economy, especially GDP per capita because the insight of new technologies, products, and processes could push the economic growth as in the endogenous growth theory (Lucas, 1988). And the third one is, education is able to facilitate the dissemination and transfer of required knowledge to comprehend and process new information and to effectively perform new technologies developed by others that can affect economic growth (Phelps, 1980; Benhabib & Spiegel, 1994).

Apart from theoretical predictions, empirical evidence about the effect of education on economic growth has long been studied. For the most part, this seems to reflect a measurement problem. Most macroeconomic literature on economics returns to education using school quantity measures. The most common measure is the school batch and the average length of school duration. Woessmann (2015) estimates the effect of education on economic growth across countries where the average per capita Gross Domestic Product (GDP) growth over decades is viewed as a purpose of education level and various other variables categorized as significant on economic growth.

Previous studies found that linkages between education and the economy show that education investment may encourage a higher impact compared to other physical investments in the long term. Education as the main stimulus of the economic development dynamics can encourage long-term structural transformation processes because education provides a high rate of return in the coming future (Subroto, 2014). In China, LAU (2010) found enrollment at the primary level stimulated economic growth while investing in secondary schools whereas enrollment at the higher education level had a weak effect on economic growth in China. Furthermore, previous studies found that the level of higher education significantly influences economic growth (Awad, 2021; Maneejuk & Yamaka, 2021; Zhang & Zhuang, 2011) and other study found that a rise in tertiary education and unemployment have a tiny impact on GDP (Agasisti & Bartoletti, 2022). In Greece, Benos & Zotou (2014) and Benos & Karagiannis (2016) found that secondary and higher education positively support productivity, whilst primary education negatively affects productivity. Afterward Liao et al. (2019) found that capital formation has played a crucial role in explaining around 60% of Mauritius' GDP growth rate, followed by growth in human and labor capital accumulation.

Strong evidence is found regarding increased productivity by human capital, indicating that education actually increases productivity rather than being used merely as a means for individuals for signaling their ability level to employers. In Indonesia, education represented by the literacy rate—*Angka Melek Huruf* (AMH)—had positively and significantly affected the economic growth represented by Indonesia's Gross Domestic Product (GDP) (Nugroho, 2016). From then on Hanif & Arshed (2016) using a dynamic panel data model found that the number of enrollments in higher education has the highest impact on economic growth compared to primary and secondary education enrollments for the case of SAARC countries. Mendy & Widodo (2018) further said that education is crucial for Indonesia's economic growth.

Due to the widespread belief that education has a positive impact on economic growth which was considered a weak assumption, this research aims to answer the question empirically, is education level able to explain the economic growth in Indonesia? In this context, Indonesia is considered an interesting case study because the Indonesian education system consists of numerous different forms, types, and levels of education. Therefore, this research is different from previous research, because besides aiming to analyze the direct effect, this research also aims to analyze the indirect effects that may occur from the effect of education level on economic growth before and after the intervention using Foreign Direct Investment (FDI), credit, exports, and unemployment variables as a mediating variable. The findings of this study are expected to be useful as recommendations to assist the government in making policies in the field of education related to economic growth, considering education-related policies could help to improve the education quality which could increase economic growth (Crombach & Smits, 2022; Hanushek & Woessman, 2020). This study is also expected to provide input so that the government could improve its educational performance to attain a world-class education system which is expected to improve economic performance.

METHOD

This study used mediation analysis to examine the impact of education on economic growth, by constructing a set of regression models to examine the value and importance of educational attainment's total, direct and indirect effects on Indonesia's economic growth. The mediators involved are FDI, credit, exports, and unemployment. The results of the direct influence coefficient will be used to calculate the value of the indirect influence through each mediator (Hayes & Preacher, 2013). Following the calculation of the indirect effect value, a bootstrap test is performed to calculate the standard error of each indirect effect to find its significance level (Hayes & Preacher, 2013).

The data is obtained from (1) annual time series data from 1991 to 2018 from World Development Indicators (WDI) of the World Bank, (2) the Education Index of ASEAN Countries in 2017 (Fig. 1), (3) the number of school enrollments in Indonesia along with (4) economic growth from 1972 to 2018 in Indonesia (Fig. 2) (Noone & Clare, 2011). These study variables are economic growth represented by GDP per capita and education levels which are divided into (i) primary school enrollment, (ii) secondary school enrollment, (iii) tertiary education or university enrolment (Phoong et al., 2018). This study used research notation conducted by Russell et al. (2009) and Phoong et al. (2018) to form several regression models to test the total effect, direct effect, and indirect effect. IBM SPSS 26 software is used for processing the data. A multicollinearity test is performed to calculate the Variance Inflation Factor (VIF).

Total effect of each level of education on economic growth is represented by alpha coefficient (αi) model:

$$Model\ 1 = LnGDPPC_t = \ i_1 + \ a_1 PRI_t + a_2 SEC_t + \ a_3 TER_t + e_{1t} \qquad (1)$$

The direct influence of each level of education on economic growth is represented by beta coefficient (β1) model:

$$Model\ 2 = LnGDPPC_t = i_2 + \beta_1 PRI_t + \beta_2 SEC_t + \beta_3 TER_t + m_1 FDI_t +$$
$$m_2 CRE_t + m_3 EXS_t + m_4 UNEP_T + e_{2t} \tag{2}$$

Models 3, 4, 5, and 6 below show the extent to which the independent variables affect each mediator ((Phoong et al., 2018).

$$Model\ 3 = FDI_t = i_3 + \lambda_1 PRI_t + \lambda_2 SEC_t + \lambda_3 TER_t + e_{3t} \tag{3}$$
$$Model\ 4 = CRE_t = i_4 + \gamma_1 PRI_t + \gamma_2 SEC_t + \gamma_3 TER_t + e_{4t} \tag{4}$$
$$Model\ 5 = EXS_t = i_5 + \delta_1 PRI_t + \delta_2 SEC_t + \delta_3 TER_t + e_{5t} \tag{5}$$
$$Model\ 6 = UNEP_t = i_6 + \mu_1 PRI_t + \mu_2 SEC_t + \mu_3 TER_t + e_{6t} \tag{6}$$

Where t represents the year, i_1, i_2, i_3, i_4, i_5, i_6 represents the intercepts of model 1, 2, 3, 4, and 5 respectively, α_1, α_2, and α_3 is the total effect of primary, secondary, and higher education levels on economic growth respectively, GDPPC is per capita income, PRI is primary education level, SEC is the secondary education level, TER is tertiary or higher education level, e_{1t}, e_{2t}, e_{3t}, e_{4t}, e_{5t}, e_{6t} shows variability that cannot be explained in model 1, 2, 3, 4, 5, 6 respectively, β_1, β_2, and β_3 is the direct effects of primary, secondary, and higher education levels on economic growth respectively after adjusted with the mediating effect of the mediators, m_1, m_2, m_3 are mediators of FDI, credit, exports, and unemployment respectively, λ_1, λ_2, and λ_3 indicate the effect of primary, secondary and higher education level, respectively, on FDI mediator, γ_1, γ_2, γ_3 represents the effect of primary, secondary and higher education level, respectively, on credit mediator, δ_1, δ_2, and δ_3 are the effects of primary, secondary, and higher education level, respectively, on export mediator, and μ_1, μ_2, μ_3 are the effects of primary, secondary, and higher education level, respectively, on unemployment mediator.

The hypothesis in this research include:

H1: Primary education level has a significant effect on economic growth in Indonesia

H2: Secondary education level has a significant effect on economic growth in Indonesia

H3: Higher education level has a significant effect on economic growth in Indonesia

H4: FDI, credit, export, and unemployment variables are able to mediate the indirect effect of primary, secondary and higher education level on the economic growth in Indonesia.

Finding and Discussion

Table 1. *Multicollinearity Test Result*

Model	Collinearity Statistics	
	Tolerance	VIF
Unemployment	0.344	2.904
FDI	0.887	1.127
Credit	0.409	2.446
Export	0.545	1.834
Base	0.598	1.672

Based on Table 1, the VIF value of all variables is less than ten and the tolerance value is more than 0.01, so it can be concluded that there is no multicollinearity problem. The tolerance value of the unemployment, FDI, credit, export, and base model is > 0.10 thus the regression result is there are no symptoms of multicollinearity. The VIF value <10 of the entire model, it indicates that there are no symptoms of multicollinearity in the regression model.

Table 2. *Total Effect Model*

Variable	Coefficient	Std. Error	t-statistic	(*p-value*)
Primary Education	-0.132	0.009	-2.038	0.053**
Secondary Education	0.412	0.003	2.537	0.018**
Higher Education	0.466	0.005	2.766	0.011***

$R^2 = 0,969$, F-statistic = 248.860, P-value = 0,0000

Note: * *significant at α = 0,01 **, significant at α = 0,05, *** significant at α = 0,10*

Table 2 demonstrates the results of the total influence of each education level on economic growth. It indicates the level of primary education was not significant, and in contrast, the level of primary education and higher education had a positive and significant effect on economic growth at α = 1%, 5%.

Based on the results in Table 2, primary education has a negative and insignificant effect on economic growth, it differs findings of LAU (2010) which found that the number of enrollments at the primary education level stimulates economic growth in China and Habibi & Zabardast (2020) which found that primary enrollment has a positive effect on economic growth in Middle East countries, where the increase in primary gross enrollment would result in increased per capita GDP growth. This finding also partly contradicts Awad (2021) that found a negative and significant impact of education on economic growth. However, this finding supports the findings of previous studies that found that enrollment in primary education has a weak effect on economic growth (Hanif & Arshed, 2016; Maneejuk & Yamaka, 2021).

Meanwhile, secondary and higher education have a positive and significant effect on economic growth. This study outcome is in line with the findings of previous studies regarding the positive and significant impact of secondary and higher education on economic growth (Awad, 2021; Maneejuk & Yamaka, 2021; Zhang & Zhuang, 2011). Benos & Zotou (2014) and Benos & Karagiannis (2016) found that secondary and higher education positively supports productivity in Greece. Ghulam & Mousa (2019) also found that higher education is able to increase the competition and productivity of public and private institutions.

Amongst the three variables, higher education can provide the greatest influence with a coefficient of 0.466, followed by secondary education with a coefficient of 0.412. In line with this result, Hanif & Arshed (2016) found that the number of enrollments in higher education has the highest impact on economic growth compared to enrollment in primary and secondary education in the case of SAARC countries. Maneejuk & Yamaka (2021) also found that higher education enrollment rates dramatically impacted the economic growth

in Thailand, Indonesia, and Singapore. Mendy & Widodo (2018) further said that education is essential for economic growth in Indonesia.

Table 3. *Direct Effect Model*

Variable	Coefficient	Std. Error	t-statistic	(*p-value*)
Primary Education	-0.075	0.005	-1.912	0.070***
Secondary Education	0.414	0.002	3.385	0.003*
Higher Education	0.468	0.004	3.458	0.002*
FDI	0.048	0.006	2.540	0.020**
Credit	0.175	0.001	5.775	0.000*
Export	0.133	0.001	5.126	0.000*
Unemployment	0.158	0.007	3.673	0.002*

R^2 = 0.994, F-statistic = 447.175, P-*value* = 0,0000

Note: * *significant at* α *= 0,01, **, significant at* α *= 0,05, *** significant at* α *= 0,10*

Table 3 presents the results of the data processing model of the direct impact of the education level without the mediation of mediator variables and the direct impact of the mediator variables on the dependent variable. For primary education, the *p-value* is -0.070 which is greater than the 0.50 significance level, indicating that primary education has a negative but not significant effect on economic growth.

In Table 3, primary education indicates a negative but not significant effect on economic growth, this indication happened due to primary education being a compulsory education in Indonesia so it has no direct effect on economic growth. While secondary and higher education is significant, all mediating variables, namely FDI, credit, exports, and unemployment, in the same way, have a positive and significant effect on economic growth in Indonesia. Nonetheless, enrollment in primary education might increase enrollment in secondary education level which has already been found to increase the economic growth (Maneejuk & Yamaka, 2021).

Table 4 presents the indirect effect of various levels of education on economic growth using mediation analysis. The significance of the indirect effect was checked with a bootstrap confidence interval, where the effect is significant if zero is not included in the confidence interval of the bootstrap LLCI Boot and ULCI Boot, which was obtained within the range of 95% confidence interval.

Looking back to Table 4, using the bootstrapping method, the indirect coefficient of primary education through FDI is -0.0016, through credit -0.0028, through exports 0.0012, and through unemployment 0.0012. Furthermore, from the results of the bootstrap LLCI Boot and ALCI Boot, it was found that only export variables were non-zero within the range of 95% confidence interval, thus it can be concluded that only significant export variables are able to mediate the indirect effect of primary education on Indonesia's economic growth (Hayes & Preacher, 2013). The results of this study support the results of previous studies in terms of the weak effect of primary education enrollments on economic growth (Awad, 2021; Hanif & Arshed, 2016; Maneejuk & Yamaka, 2021). The results of this study contradict the research results of LAU (2010) and Habibi & Zabardast (2020) which found that the number of enrollments at the primary education level stimulated economic growth.

Table 4. *Indirect Effect of Education Level on Economic Growth*

	Effect	BootSE	BootLLCI	BootULCI
Primary Education				
FDI	-0.0016	0.0062	-0.0185	0.0062
Credit	-0.0028	0.0106	-0.0333	0.0086
Export	0.0191	0.0185	0.0670	0.0006
Unemployment	0.0012	0.0055	-0.0089	0.0129
Secondary Education				
FDI	0.0002	0.0002	-0.0001	0.0008
Credit	-0.0009	0.0006	-0.0024	0.0001
Export	0.0012	0.0008	-0.0012	0.0023
Unemployment	0.0012	0.0004	-0.0004	0.0012
Higher Education				
FDI	0.0004	0.0004	-0.0002	0.0015
Credit	-0.0012	0.0010	-0.0034	0.0004
Export	0.0026	0.0011	0.0018	0.0060
Unemployment	-0.0005	0.0014	-0.0028	0.0028

Based on these findings, albeit the level of primary education has a negative effect on economic growth, it is still crucial to continue to invest in this level of education, considering that the output of primary education is an input for the next level of education, namely secondary education and higher education. It should be noted that the primary education level is a compulsory level of education in Indonesia, which is often known as *Wajib Belajar 9 Tahun*—The 9-Year Compulsory Education (completed primary school and middle school education).

According to the results in Table 4, using the bootstrapping method, the indirect coefficient for secondary education through FDI is 0.0002, through credit is -0.0009, through export is 0.0191, and through unemployment is 0.0012. Moreover, by using the confidence interval (CI 95%) from the bootstrap LLCI Boot and ULCI Boot results, it is obtained that all are zero in the 95% confidence interval range, hence, it can be concluded that there is no mediating variable that is able to significantly mediate the indirect effect of secondary education on economic growth in Indonesia (Hayes & Preacher, 2013). The findings of this study are not in line with the findings of Benos & Karagiannis (2016) and Benos & Zotou (2014) in Greece which found that education has a direct positive effect on productivity. Nugroho (2016) also found that secondary education had a direct and significant positive effect on economic growth represented by Gross Domestic Product in Indonesia. Based on the findings, it is important for the government to continue improving the quality and quantity of education at the secondary education level by increasing investment in education so that the number of people who can obtain education at the secondary education level even up to higher education continues to increase in order to incite economic growth in Indonesia.

Based on Table 4, using the bootstrapping method, the indirect coefficient of higher education through FDI is 0.0004, through credit is -0.0012, through export is 0.0026, and through unemployment is -0.0005. Furthermore, by using the confidence interval (CI 95%) from the bootstrap LLCI Boot and ULCI Boot results, only export variables are obtained that do not have zeros in the 95% confidence interval range, thus it can be concluded that only export variables are able to mediate the indirect effect of higher education on economic growth significantly in Indonesia (Hayes & Preacher, 2013). The findings of this study are in line with the previous studies which found that the level of higher education greatly influences economic growth (Awad, 2021; Hanif & Arshed, 2016; Maneejuk & Yamaka, 2021; Zhang & Zhuang, 2011), positively supports productivity (Benos & Zotou, 2014), and improves productivity and competition amongst public and private institutions (Ghulam & Mousa, 2019). Generally, this finding supported the findings of (Nugroho, 2016) that education has a significant impact on economic growth.

Table 5. *Result of the Hypothesis*

Hypothesis	Coefficient	P-value	Interpretation
H1: Primary education level has a significant effect on economic growth in Indonesia	-0.132 (negative)	0.053 (not significant)	The primary education level has a negative effect on economic growth but is not statistically significant. This suggests that primary education alone does not contribute significantly to Indonesia's economic growth, likely due to its compulsory nature.
H2: Secondary education level has a significant effect on economic growth in Indonesia.	0.412 (positive)	0.018 (significant)	Secondary education has a positive and significant effect on economic growth. It increases labor productivity and contributes to economic development, although no mediating variables (FDI, credit, export or unemployment) were significant in transmitting this effect.
H3: Higher education level has a significant	0.466 (positive)	0.011 (significant)	Higher education shows the highest positive and significant effect on

effect on economic growth in Indonesia.		economic growth. It plays a crucial role in contributing to advanced skills and knowledge, significantly boosting economic development. Export is the only variable that mediates this effect.

Table 6. *Result of the Hypothesis 4*

Hypothesis 4	BootLLCI	BootULCI	Interpretation
Primary education through FDI	-0.0185 (not significant)	0.0062	FDI does not mediate the influence of basic education on economic growth. The confidence interval includes zero, indicating that FDI does not play a significant role in channeling the effects of basic education.
Primary education through credit	-0.0333 (not significant)	0.0086	Credit also does not significantly mediate the influence of basic education. The confidence interval includes zero, indicating that credit does not have a strong mediating effect.
Primary education through expor	0.0006 (significant)	0.0670	Exports have successfully mediated the influence of basic education on economic growth significantly. The confidence interval does not include zero, emphasizing the important role of exports as a significant mediator.
Primary education through unemployment	-0.0089 (tidak significant)	0.0129	Unemployment does not mediate the influence of basic education on economic growth, as the confidence interval includes zero.
Secondary education through FDI	-0.0001 (not significant)	0.0008	FDI does not play a role in mediating the influence of secondary education on economic growth, as the confidence interval includes zero.

Secondary education through credit	-0.0024 (not significant)	0.0001	Credit also does not show a significant mediating effect on the influence of secondary education on economic growth.
Secondary education through expor	-0.0012 (not significant)	0.0023	Unemployment does not mediate the influence of secondary education on economic growth.
Higher education through FDI	-0.0002 (not significant)	0.0015	FDI does not mediate the influence of higher education on economic growth. The confidence interval includes zero, indicating that FDI does not play a role as a mediator.
Higher education through credit	-0.0034 (not significant)	0.0004	Credit does not mediate the influence of higher education significantly, as the confidence interval includes zero.
Higher education through expor	0.0018 (significant)	0.0060	Exports have successfully mediated the influence of higher education on economic growth significantly. The confidence interval does not include zero, confirming the role of exports as an important mediator.
Higher education through unemployment	-0.0028 (not significant)	0.0028	Unemployment does not show a significant mediating effect on the influence of higher education.

Considering previous studies and the findings of this study, it is important for the government to continue to improve the education's quality (Hanushek & Woessman, 2020) and quantity (Agasisti & Bartoletti, 2022; Cervellati et al., 2023), particularly at the higher education level by continuing to increase the investment (Ghulam & Mousa, 2019) and enhancing the education system through research performance and subject specialization (Agasisti & Bartoletti, 2022), so that the number of Indonesians who are able to obtain education at this level continues to increase to improve the quality of human resources which expected to be able to encourage Indonesia's economic growth.

CONCLUSION

This study examines the direct and indirect impact of education level on economic growth. By utilizing the mediation analysis as the main assessment, this study intents to identify whether the chosen mediators such as FDI, credit, exports, and unemployment are able to transmit the influence of the independent variables of primary, secondary, and higher

education to the dependent variable of economic growth. Mediation analysis later examined the total, direct, and indirect effects of education on economic growth. The results of the total effect model indicate that all levels of education have a significant effect on economic growth and the total effect of higher education is the greatest amongst all education levels followed by secondary education and primary education. Secondary and higher education show a positive correlation with economic growth, while primary education has a negative effect on economic growth. The direct effect model calculates the extent to which economic growth changes when the number of enrollments at the primary, secondary, and higher education levels changes without going through a mediator. The results show that the level of basic education has a negative and significant effect on economic growth, this is significant because primary education is a mandatory program in Indonesia. Meanwhile, it is found that secondary and higher education levels have a significant positive direct effect on economic growth.

However, the indirect effect model indicates the effect of different levels of education on economic growth through FDI, credit, exports, and unemployment as mediators. At the primary education level, it was found that only the export variable was significant in transmitting the effect of the primary education level on economic growth. At the secondary education level, none of the mediating variables were found to be able to significantly mediate the effect of the secondary education level on economic growth. Meanwhile, at the higher education level, it was also found that only the export variable could significantly mediate the effect of the higher education level on Indonesia's economic growth. In general, it can be concluded that this study found that the indirect effect of all levels of education on Indonesia's economic growth was found to be greater than the direct effect.

The limitation of this research is the study's results that explained the three levels of education namely primary, secondary, and higher education. So, the data obtained does not focus on results and in-depth discussion at just one level. Based on the results of this research, it is crucial for policymakers to continue to increase investment in the education sector, such as by consistently maintaining the state budget of at least 20 percent for the education budget at the entire levels of education, namely primary education, secondary education, and higher education levels, in order to increase the human resources quality in Indonesia. This policy needs to be carried out on an ongoing basis to enhance the quality of human resources which are expected to be able to promote Indonesia's economic growth both now and in the future.

Implications for policymakers is investment in secondary and higher education is crucial to driving long-term economic growth, and enhancing the quality of education can further improve the country's export capabilities. This study shows that education policies should prioritize higher education to maximize economic growth.

Suggestions for further research are to focus the research on one level of education so that the results can show the overall results of one level of education. If this suggestion is carried out, it can focus on evaluating a specific education level. For future research, mediating variables need to be added, for example, the Human Development Index variables, school enrollment rates, and population numbers to demonstrate more comprehensive research results concerning the effect of education on economic growth, especially in Indonesia.

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