Effects of Education on Economic Growth

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Abstract. This study aims to determine the effect of education and economic growth in North Sumatra from 2004 to 2018 and to identify the effect of education on economic growth in North Sumatra. The research method used by researchers is descriptive quantitative. The results of this study indicate that economic growth in North Sumatra during the study period experienced growth despite its fluctuating growth, where the highest growth occurred in 2018. Various theories have shown the importance of education in driving economic growth. This paper proves that empirically proxied education with literacy rates significantly influences economic growth proxied by gross regional domestic product.

Keywords: Economic growth · Literacy rate · Gross regional domestic product

1 Introduction

Life expectancy at birth in North Sumatra reached 68.61. This figure shows the average baby born in 2018 can survive until the age of 68.61 years. In terms of education, the average population of 25 years and over in North Sumatra has been educated up to 9.34 years or equivalent to having graduated from junior high school. While children aged 7 years who enter the world of education are expected to be able to attend school up to 13.14 years or reach Diploma I. In economic aspects, the average expenditure reaches 10.39 million rupiah/capita/year. Public purchasing power reflects the ability of society to spend their money in the form of goods and services [1].

Education contributing significantly to economic development has become axiomatic truth and its existence is recognized. Education is not always regarded as consumption or financing because education is an investment in human resource development, where in the long run its contribution can be felt [2].

Humans are a form of capital or capital like other forms of capital, such as machinery, technology, land, money, and material. Humans as human capital are reflected in the form of knowledge, ideas (ideas), creativity, skills, and work productivity. Unlike other forms of capital that are only treated as tools, human capital can invest itself through various forms of investment, for example formal / informal education, work experience, health, or nutrition, and even migration.

Education has an important role in the life of the nation and state in an effort to create quality human resources. Education is a basic need factor for every human being so that efforts to educate the nation's life, because through education efforts to improve people's welfare can be realized. Education affects the full economic growth of a country (region). This is not only because education will affect productivity, but also

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affect people's fertility. Education can make human resources more quickly understand and ready to face changes and developments in a country.

Improving the quality of human resources which is done through improving the quality of education, health status and improving nutrition, is expected to foster initiatives or initiatives to create new jobs. Thus national and regional productivity can be increased. Development must be based on internal will and ability in the community concerned, which is a process of creating jobs, increasing productivity, contributing and participating, as well as being active and creative in the local community in development.

In general it can be stated that the main factor that supports the development process is the level of community education. In the process, it is based on the consideration that the most efficient way to carry out a country's national development lies in increasing the capacity of its people - education included.

2 Literature Review

2.1 Education

Education is a conscious and planned effort to create an atmosphere of learning and learning process so that students actively develop their potential to have spiritual spiritual strength, self-control, personality, intelligence, noble character and the skills needed by themselves and the community [3].

Education is a form of investment in human resources that must be prioritized in line with physical capital investment because education is a long-term investment. Education has an important role in the life of the nation and state in an effort to create quality human resources.

The Indonesian education system consists of several levels of education. The education level is a long-term process that uses systematic and organized procedures, in which managerial workforce learns conceptual and theoretical knowledge for general purposes. The basic measure of education level is the ability of residents 15 years and over to read Latin letters or other letters (literacy). Literacy is a minimum intellectual ability because most of the information and knowledge is obtained through reading.

2.2 Economic Growth

Economic growth is an effort to increase production capacity to achieve additional output, which is measured using Gross Domestic Product (GDP) and Gross Regional Domestic Product (GRDP) in an area [4].

Economic growth is a process, not an economic picture at a time. According to Sadono Sukirno (2006) economic growth is defined as a quantitative measure that describes the development of an economy in a certain year when compared to the previous year. These developments are always expressed as a percentage change in national income in a given year compared to the previous year. Here we see the dynamic aspects of an economy, namely how an economy develops or changes over time.

There are several factors that affect economic growth in general, including: (1) natural resources; (2) number and quality of population education; (3) science and technology; (4) social system; and (5) market. [5] Then there are several theories that explain the relationship between various factors of production with economic growth. The views of the theory include [6].

2.3 Schumpeter's Theory

Schumpeter's theory in Sadono Sukirno [7], emphasizes the importance of the role of entrepreneurs in creating economic growth. In this theory it is shown that entrepreneurs are a group of people who organize and combine other factors of production to create goods that are needed by the community. They are a group of people who create innovation or renewal in the economy. Updates that can be created by entrepreneurs can be divided into several forms, namely: a) introducing a new item; b) the use of new methods of producing goods; c) expanding the goods market to new areas; d) developing new sources of raw materials; or e) reorganize within a company or industry.

2.4 Solow-Swan Theory

According to Lincolin Arsyad [8], in order to increase economic growth factors needed to influence regional economic growth include labor. Labor growth is considered as one of the positive factors that spur economic growth, so an increase in labor will encourage increased productivity and will spur economic growth. The education sector plays a major role in shaping the ability of a developing country to absorb modern technology and develop production capacity for sustainable growth and development.

2.5 Endogenous Growth Theory

This theory presents a broader theoretical framework in analyzing the factors that influence the growth process from within (endogenous) the economic system itself. Technological progress is considered to be endogenous, where economic growth is the result of decisions of economic actors in investing in science and technology. The development of technology and science will develop innovation so as to increase productivity and lead to increased economic growth. So in this case the quality of human resources is a factor that influences economic growth [9].

According to Paul Michael Romer in Lincolin Arsyad [8] considers science as a form of capital. Science is the most important input in the production process. Only thanks to science can people create new methods of production in order to obtain certain economic benefits. From Paul Michael's opinion it can be concluded that to achieve progress in development, not only driven by external factors, internal factors also affect economic growth. The internal factor is science, where science is the main role in the production wheel. Science as capital to create an innovation that can maintain the existence of a production and increase profits.

2.6 Human Capital

Human resources are one of the factors of production in addition to natural resources, capital, entrepreneurs to produce output. Where the higher the quality of human resources, the more efficiency and productivity of a country also increases. Investment in the field of human resources is the sacrifice of a number of funds (something that can be measured by the value of money) spent and the opportunity to earn income during the investment process. Income obtained in the future is a higher level of income to be able to achieve a higher level of consumption as well, such investment is called human capital. Its application can be done in terms of education, where education is one of the important factors in the development of human resources (HR). Education not only increases knowledge, but also improves work skills, thereby increasing work productivity. Education is seen as an investment whose rewards can be obtained several years later in the form of increased work output [10].

Educational development with humans as its core focus has directly contributed to the economic growth of a country, through increasing the skills and production capabilities of the workforce [11].

According to human capital theory, education influences economic growth through increasing the skills and productivity of the workforce. Rapid economic growth in Asian countries and progressive changes in production towards high-tech industries and services have led to increased demands from the business world for the need for skilled and educated (qualified) human resources. Human Resources as a workforce is very necessary skills in carrying out tasks, improve organizational quality and support economic growth [12].

Education improves the quality of human life and wider social benefits for both individuals and society. Education increases the productivity and creativity of the workforce as well as increasing entrepreneurship and technological progress. In fact, education plays an important role in saving social and economic progress and increasing income distribution.

Education plays a major role in shaping the ability of a developing country to create new knowledge, absorb modern technology, give birth to experts and develop the capacity to create sustainable growth and development. Theories relating to education and economic growth are the Theory of Human Capital. In this theory it states that education has a positive influence on economic growth. If someone with a higher level of education, and the length of time in education will have a better job and wage compared to lower education. If the wages of workers reflect productivity, the more the population has higher education, the higher the productivity and national economy will grow well.

2.7 Previous Research

Research conducted by D. Budiarti, [6] with the title "Effect of Education Level on Economic Growth in Mojokerto in 2000-2011" published in the journal Economic Education. The results of this study said that the development of the number of graduates of high school and tertiary level education during the period of research experienced a significant growth, where the number of graduates was dominated by high school level education compared to tertiary education.

For economic growth in Mojokerto Regency during the period of research in 2000 to 2011 experienced growth despite fluctuating growth, where the highest growth occurred in 2011 of 7.14% this is due to the increasing number of industries in Mojokerto Regency.

Research conducted by Nugroho, S. B. M., [13] with the title "Effects of Education on Economic Growth" published in the journal Media Economics and Management. The results of this study said that education measured by literacy rates had a positive and significant effect on economic growth measured by Gross Domestic Product.

3 Methodology

3.1 Data Sources

In this study, the type of research used by the writer is descriptive quantitative research, which is to determine the effect of two variables, namely the educational variable with the variable of economic growth. The research design is used to show how much influence education (X) has on economic growth (Y). The data used are secondary data from the North Sumatra Central Statistics Agency from 2004 to 2018. Education is proxied with literacy rates, while economic growth is proxied with Gross Regional Domestic Product.

3.2 Analysis Tool

In this study the regression model generated by the estimator is not biased, if it meets the classical assumptions that are free from autocorrelation and normality. To test the normality of the data used the Kolmogorov-Smirnov non-parametric statistical test, ie the residual regression data is normally distributed if the significant value > 0.05. The Durbin Watson test is used for the autocorrelation test, if $dU < d < 4 - dU$ then the decision is no autocorrelation. The analytical tool used is simple linear regression, with the following model:

$$GRDP = \beta_0 + \beta_1 LR + \varepsilon \quad (1)$$

GRDP = Gross Regional Domestic Product

LR = Literacy Rate

β_0, $\beta 1$ = Regression Coefficient

ε = Error Term

4 Results and Discussion

Education data are proxy with Literacy Rate, and economic growth is proxyed with Gross Regional Domestic Product as in the Table below.

Table 1. Literacy Rates and Gross Regional Domestic Product of North Sumatra 2004-2018.

No.	Year	Literacy Numbers	GRDP (in billion)
1	2004	96,64	117.241,671
2	2005	97,00	138.556,297
3	2006	97,03	159.187,945
4	2007	97,03	180.375,388
5	2008	97,08	212.145,470
6	2009	97,15	234.473,454
7	2010	97,32	272.893,353
8	2011	97,46	312.008,082
9	2012	97,51	348.779,087
10	2013	97,84	401.383,442
11	2014	98,57	521.954,952
12	2015	98,68	571.722,009
13	2016	98,88	626.062,907
14	2017	98,89	684.275,444
15	2018	99,07	741.192,694

Source: North Sumatra Central Statistics Agency

The results of the classical assumption test analysis and the coefficient of determination (R^2) using the Statistical Package for the Social Sciences (SPSS) program, can be seen in the following table.

Table 2. One-Sample Kolmogorov-Smirnov Test.

		Unstandardized Residual
N		15
Normal Parameters[a,b]	Mean	,0000000
	Std. Deviation	30222,65551767
Most Extreme Differences	Absolute	,217
	Positive	,128
	Negative	-,217
Kolmogorov-Smirnov Z		,842
Asymp. Sig. (2-tailed)		,478

a. Test distribution is Normal.
b. Calculated from data.

From the results of the normality test in Table 2 it is known that the Kolmogorov-Smirnov probability (Asymp. Sig.) value is 0.478 > 0.05 so it is stated that the residual regression data is normally distributed.

Table 3. Model Summary[b].

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	,990[a]	,979	,978	31363,532	1,475

a. Predictors: (Constant), LR
b. Dependent Variable: GRDP

The autocorrelation test results in Table 3 show that the Durbin-Watson value (d) = 1.475 is greater than the upper limit (dU) 1.3605 and less than 4 - du = 2.6395 so it can be concluded that there is no autocorrelation.

Table 3 shows that the coefficient of determination is 0.979, which means that 97.9% of the ups and downs of Indonesia's Gross Regional Domestic Product (GRDP) can be explained by Literacy Rates. While 2.1% by other factors such as other variables and error factors. This shows a pretty good model.

While based on processing with the program (SPSS), the regression coefficient can be seen in the table below.

Table 4. Coefficients[a].

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-23948509,269	977773,953		-24,493	,000
	LR	248780,746	10003,142	,990	24,870	,000

a. Dependent Variable: GRDP

Table 4 shows that literacy rates significantly influence North Sumatra's GRDP at a significance level of 5%. This can be seen at the significant level of 0,000 which is smaller than 0.05. While the standardized regression coefficient shows a figure of 0.990 which means that every 1 point increase in Literacy Rate will increase North Sumatra's Gross Regional Domestic Product by 0.990 billion rupiah.

5 Conclusion

Based on the results of the analysis and discussion it can be concluded that the development of the number of literacy rates in North Sumatra over the age of 15 years during the study period (2004-2018) has increased by an average of 0.17%. While economic growth during the research period (2004-2018) experienced an increase with an average of 44,567.93 (in billion rupiahs) where the highest growth occurred in 2018 of 5.12%.

Meanwhile, to find out whether or not there was an influence of education on economic growth in North Sumatra, after analyzing the data with the help of the SPSS 21.0 for windows program, it was shown that proxied education with literacy rates had a positive and significant effect on economic growth proxied by gross regional domestic product.

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