

THE EFFECT OF HEALTH SECTOR SPENDING, EDUCATION AND PER CAPITA INCOME ON LIFE EXPECTANCY IN INDONESIA

THE EFFECT OF HEALTH SECTOR SPENDING, EDUCATION AND PER CAPITA INCOME ON LIFE EXPECTANCY IN INDONESIA

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Abstract

This study aims to determine the effect of government expenditure in the health sector, government expenditure in the education sector, and per capita income on life expectancy in Indonesia. This type of research is quantitative. The data used is secondary data sourced from the World Bank. The analysis technique used is time series data regression analysis using autoregressive distributed lag (ARDL). The scope of the study used Indonesian data for 20 years from 2000-2019. Life expectancy variables as dependent and health sector expenditure variables, education and per capita income as independent. The results showed that health sector expenditure had a significant and positive effect on long and short term life expectancy, education sector spending for the short term had a significant and positive effect on certain periods and the long term had a significant and negative effect on life expectancy, Negative and insignificant short-term per capita income has a negative and significant influence on life expectancy.

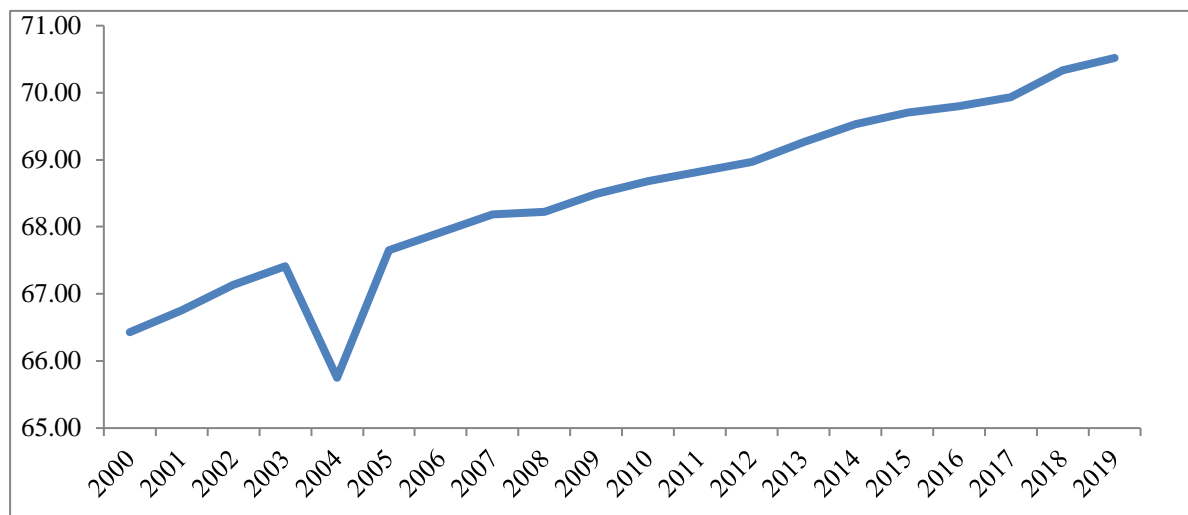
Keywords: Health Sector Expenditure, Education Sector Expenditure, Per Capita Income, Life Expectancy (AHH), Human Capital.

1. INTRODUCTION

All citizens have a vital role in the national economy. This became the basis Government Indonesia to prioritize policies related to improving the quality of human resources. One of the policy targets is directed at the health sector. One of the public health status in Indonesia is life expectancy (Kristanto et al., 2019). Improving the quality of life of the people of a region cannot be separated from the role of the government in implementing policies and programs related to improving the quality of life of the community through government spending in education and health. The size of the allocation of government spending in education and health will have an impact on life expectancy (Nurvita et al., 2022). The higher the AHH, the more successful the health development of the region, while the low life expectancy in a region indicates unsuccessful health development (Young et al., 2019).

In Figure 1 of the graph is the movement of life expectancy in Indonesia within 20 years from 2000-2019, as illustrated by the graph it can be seen that life expectancy has increased significantly but in 2004 the year which has the lowest life expectancy in Indonesia which is in the range of 65.75 years is explained in (Dewi & Karim, 2017) Factors behind the high and low quality of life in a region, income is always linked to people's ability to access health services Since 2004, newborn mortality rates have dropped dramatically.

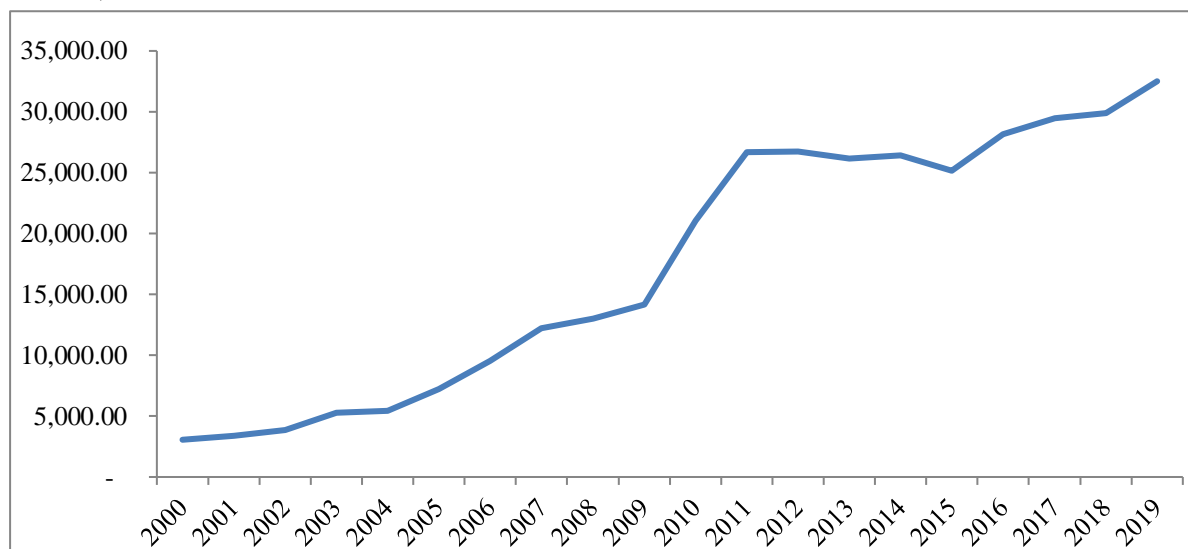
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Source: World Bank

Figure 1 Indonesia's Life Expectancy 2000-2019

Life expectancy in Indonesia continues to increase from year to year as an indicator of the average length of life of the population (Bashir & Hidayat, 2022) which can be said that life expectancy in Indonesia must provide a good sign to be able to realize the welfare of the community in the field of Health and at every level of society in Indonesia in 2019 can live for 70.52 years. Low life expectancy indicates that health development has not been successful, and the higher the AHH, the more successful health development in the area is (Shaifulloh et al., n.d.)



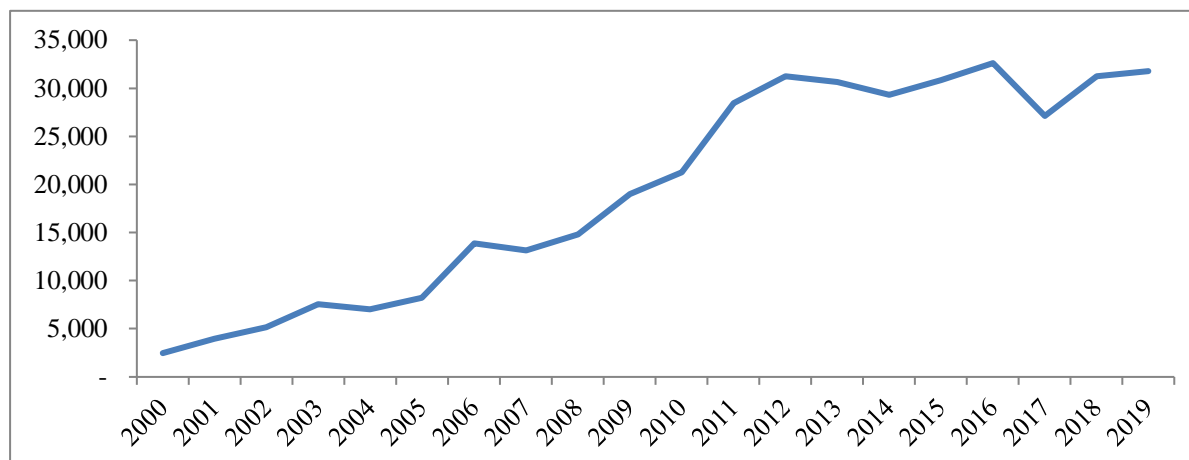
Source: World Bank

Figure 2 Development of Health Sector Government Expenditure in 2000-2019

Referring to Figure 2, the lowest point was in 2000 with a range of 3,057.80 million US Dollars and the highest point was in 2019 with a range of 32,509.13 million US Dollars. This increase is something to look forward to because it can provide a better indication of the state of public health and shows that those involved in the management of the public health sector have done their best to distribute government spending, especially for the health sector.

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In addition to health, education also affects human quality so that the use of funds for educational needs is also fundamental for progress in human resources.

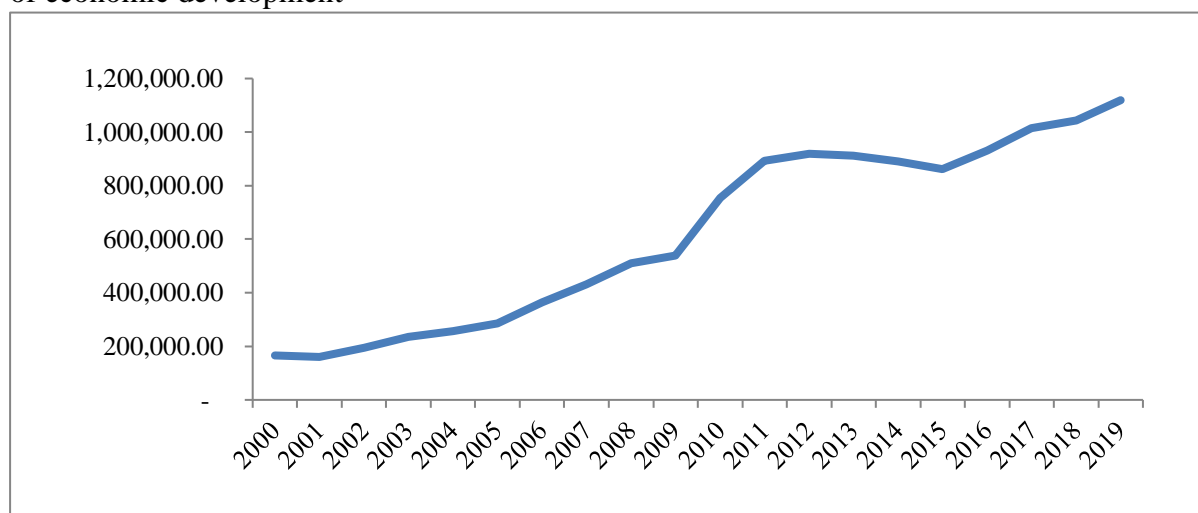


Source: World Bank

Figure 3 Development of Education Sector Government Expenditure in Indonesia 2000 -2019

The development of government spending in the education sector in Indonesia from 2000-2019 has increased and decreased unsteadily every year. Research (Amelia et al., 2019) explained that with the obligation to allocate a budget for education of at least 20 percent of the APBN and APBD, it is expected that the standard of educational achievement in Indonesia will also increase. What happens to government spending in this sector is in unstable conditions or with gradual figures. Which in 2000 with the lowest value of 2.475 million US dollars and at the highest point in 2016 with the highest value of 32.616 million US dollars will contribute to society through good education

A high level of Gross Domestic Product (GDP), increasing along with increasing economic growth and welfare levels is one of the media used to calculate the degree of success of economic development



Source: World Bank (processed)

Figure 4 Development of Indonesia's Per Capita Income (GDP) in 2000-2019

Development Growth of Indonesia's per capita income in 2000 to 2019 from Figure 4 has fluctuated, in this case it can be said that the role of the government is very important in

boosting GDP because according to research (Pay et al., 2021) which states that GDP is one of the main factors influencing the variation in health spending across countries especially in developing countries. It was seen in 2001 to be the lowest year of 160,446.95 million US Dollars and increased in 2019 by 1,119,099.87 million US Dollars with the highest year. So when compared from the lowest year to the highest year, Indonesia's per capita increase has a difference of 5.97 percent

Considering background information, it is clear that the purpose of this study is to examine how government spending affects health, education, and per capita income from a health standpoint in relation to life expectancy. Thus, the purpose of this study is to find out how government spending on health and education sectors as well as per capita income affect Indonesia's life expectancy.

2. LITERATURE STUDY

Human Capital Theory

In human capital theory, there is a positive relationship between income and life expectancy. High income can have a positive effect on people's life expectancy. With sufficient income, a person can meet his basic needs such as food, clothing, shelter, education, health, sanitation and a safe environment. As a result, communities can contribute to healthy lifestyles, including access to adequate health services, good nutrition, and a clean environment, leading to Hope for life.

Theory of Government Spending

Government expenditures are used to pay for government administration, development projects, salaries of government employees, public health and education systems, military force expenses, and various infrastructure projects (Sadono, 2019). Keynes believed that increased public spending could accelerate economic growth. There is a link between government spending and economic growth, From a Keynesian perspective, relatively large government spending drives aggregate demand, which then spurs economic growth (Wahyudi, 2020). According to Wagner, when per capita income increases in an economy, government spending also increases proportionally. Wagner understood that as the economy grew, so did the complexity or difficulty of the relationship between industry, society, and other factors Wagner's law had the disadvantage of not having the support of the idea of public good selection. Considers the government as an individual who is free to act independently of the rest of society. (Haniko, 2022).

In research Amrullah, (2022) This explains why the variable GDP per capita affects the level of community welfare positively and significantly, so that it becomes a variable that significantly affects the level of community welfare on Madura Island. The level of welfare of the people of Madura Island is not significantly influenced by health budget variables, meaning that this variable does not have a major effect on the level of community welfare. Andiny & Sari, (2018) The study also explains that public sector spending on public sector spending on education and public sector spending on health sector have a beneficial impact on HDI as these two sectors are not different in terms of HDI. Langsa city. Government spending in health and education has a major impact on the HDI of Langsa City. Government spending on education and government spending on health have a significant influence on HDI variables Kristanto et al., (2019)

3. RESEARCH METHODOLOGY

This study examines the relationship between the effect of government spending in the health sector, education, per capita income on life expectancy (AHH) using Indonesian data per

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year for 20 years, namely from 2000-2019. The data used in this study is secondary data in the form of time series. The time used in this study for 20 years from 2000-2019, using data on government spending in the health sector, education, per capita income and life expectancy.

The analytical technique used in this analysis is a quantitative descriptive analysis technique using *Time series* data. Quantitative analysis using autoregressive distributed lag (ARDL), Autoregressive distributed lag (ARDL) method is a dynamic model in econometrics because it describes the flow of time in the dependent variable in relation to values in the past. ARDL is a combination of autoregressive (AR) and distributed lag (DL) methods. Lag means that a past value will be used to see future values. The AR method is a method that uses one or more past data from the dependent variable, while DL is a regression method that involves data on the present and past time of the independent variable.

$$Y_t = \beta_0 + \phi_1 Y_{t-p} + \dots + \phi_p Y_{t-p} + \beta_0 X_t + \beta_0 X_{t-1} \dots + \beta_q X_{t-1} + \varepsilon_{et}$$

Information:

Y_t = Observed variable

β_0 = Constant

ϕ_1 = dependent coefficient

β_1 = Koefisien Independent

$t-1$ = Previous Time

This study aims to determine the effect of government spending in the health sector, education, per capita income on life expectancy in Indonesia, then the model for this study is in a simplified linear form and expressed as follows:

$$AHH_t = f(HEALTH_t, EDU_t, GDP_t)$$

Information:

AHH = Life Expectancy

HEA = Health Sector government spending

EDU = Education Sector Government Expenditure

GDP = Per Capita Income

t = Time researched

Then in estimating the relationship between the dependent variable and the independent variable in the long term, the autoregressive distributed lag (ARDL) model is written in the following equation:

$$AHH_t = \delta_0 + \sum_{i=1}^q \alpha_1 AHH_{t-1} + \sum_{i=1}^{q1} \alpha_2 HEALTH_{t-i} + \sum_{i=0}^{q2} \alpha_3 EDU_{t-i} + \sum_{i=0}^{q3} \alpha_4 GDP_{t-i} + \mu_t$$

If this model has a known cointegration relationship through bound tests, it will be tested using the *Error Correction Model* (ECM) which is written as follows:

$$\Delta AHH_t = \theta + \sum_{i=1}^q \beta_1 \Delta AHH_{t-k} + \sum_{i=1}^{q1} \beta_2 \Delta HEALTH_{t-k} + \sum_{i=0}^{q2} \beta_3 \Delta EDU_{t-k} + \sum_{i=0}^{q3} \beta_4 \Delta GDP_{t-k} + \delta_{ecm_{i-1}} + \mu_t$$

Information:

AHHI = life expectancy against GDP in period t

δ_0 = Intercept

Δ = difference between the current year's data change and the previous year's

α = long-term relationship equation

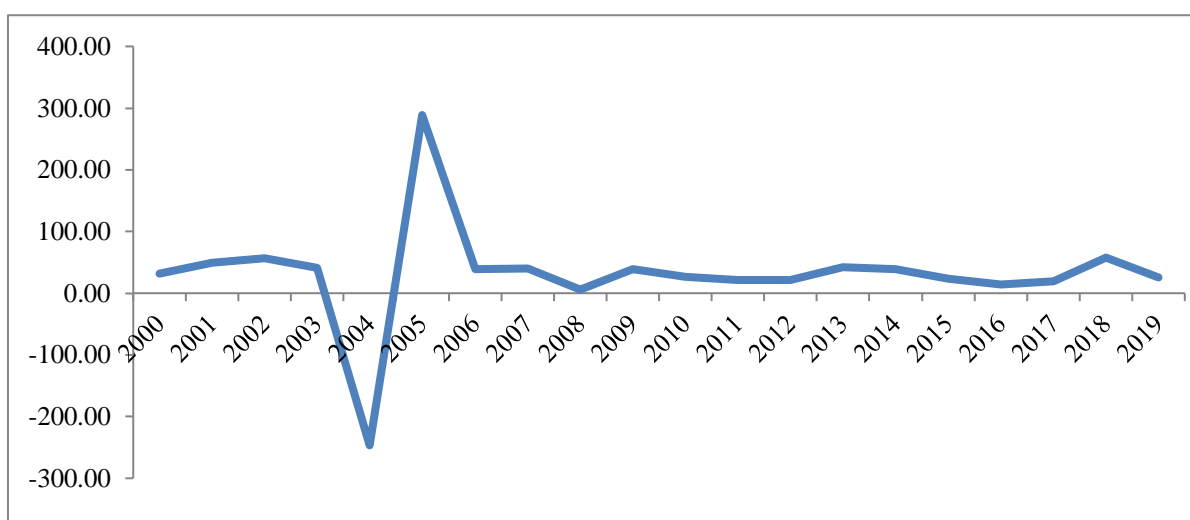
ECMI-L = short-term relationship equation

μt = Error term in period t

q = Optimum lag

4. RESULT AND DISCUSSION

High life expectancy (AHH) reflects a decrease in mortality or also means an increase in the number of elderly who exist. This has a negative impact because it will cause population problems such as one of which is burdening the population who are in productive age or said to be a dependent burden.



Source: World Bank (processed)

Figure 5 Growth in Indonesia's Life Expectancy in 2000-2019

In Figure 5 is the growth of life expectancy in Indonesia within 20 years from 2000-2019, as illustrated by the graph it can be seen that life expectancy provides a difference in the form of a significant increase in percentage between each year but in 2004 the year that has the lowest life expectancy in Indonesia which is in the range of -246.69 percent years is described in (Dewi & Karim, 2017) Factors behind the high and low quality of life in a region. This needs attention so that life expectancy in Indonesia continues to increase from year to year, which can be said that life expectancy in Indonesia must provide good signs to be able to realize community welfare in the health sector and at every level of society in Indonesia.

Table 1 Level ADF Stationary Test

Variable	Level			Prob	Information
	Level Significant	Critical Value	ADF		
AHH	1%	-3.857386	-0.501400	0.8696	Non-stationary
	5%	-3.040391			

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Variable	Level		ADF	Prob	Information
	Level Significant	Critical Value			
Health	10%	- 2.660551	-2.208623	0.2097	Non-stationary
	1%	- 3.831511			
	5%	- 3.029970			
	10%	- 2.655194			
Edu	1%	- 3.831511	-3.574670	0.0170	Stationary
	5%	- 3.029970			
	10%	- 2.655194			
	1%	- 3.831511			
GDP	5%	- 3.029970	-1.695146	0.4176	Non-stationary
	10%	- 2.655194			
	1%	- 3.831511			

Source: Data processed with Eviews 10

The results of the Stationary test in Table 1 are known that at the stationary test stage at the level level as a means of measuring all variables. Insufficient standard results are obtained from the criteria because the variables ahh, health, and gdp look not stationary at the level stage, it can be said that the variables are not stationary at the level level and continue the step at the first difference level.

Table 2 First Difference Level ADF Stationary Test

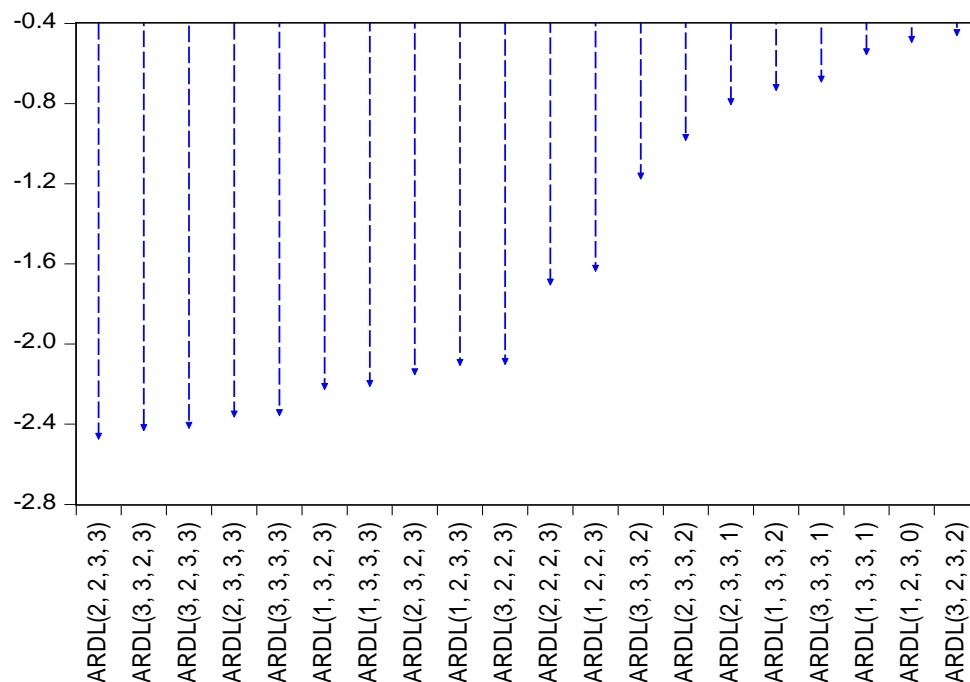
Variable	Level Significant	First Difference		Prob	Information
		Critical Value	ADF		
AHH	1%	- 3.959148	-6.959272	0.0001	Stationary
	5%	- 3.081002			
	10%	- 2.681330			
Health	1%	- 3.857386	-2.985095	0.0555	Stationary
	5%	- 3.040391			
	10%	- 2.660551			
	1%	- 3.920350			

Variable	Level Significant	First Difference		Prob	Information
		Critical Value	ADF		
Edu	5%	- 3.065585	-2.279033	0.1895	Non-stationary
	10%	- 2.673459			
	1%	- 3.857386			
GDP	5%	- 3.040391	-3.147849	0.0408	Stationary
	10%	- 2.660551			

Source: *Data processed with Eviews 10*

The test results using the Table 2 stationary test which uses the first difference limit which is used as a measurement of all variables, obtained the results that ahh, health and gdp are stationary. It can be seen that the results on the test at the level level are only variable edu or government expenditure in the education sector for AHH as life expectancy, government expenditure in the health sector (health) and per capita income (gdp) are significant at the level of First difference.

In this study, the determination of the optimum lag length using the akaike information criteria (AIC) approach. It can be seen from the optimum lag test results in figure 6 below:
Akaike Information Criteria (top 20 models)



Source: *Data processed with Eviews 10*

Figure 6 Determination of Optimum Lag of Akaike Information Criteria (AIC)

Based on Figure 6, there are 20 models in the results of the Akaike Information Criteria (AIC) approach. It can be seen that the number of lags chosen and best used in this study is (2,2,3,3).

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Then the test is carried out with a cointegration test used to provide a picture of which variable variations are cointegrated in the long term in a study. Here is the cointegration test in Table 3.

Table 3 Bound Test Cointegration Test

<i>Test Statistics</i>	Value	K
F-statistic	52.987583	3
Critical Value Bonds		
Significance	I(0) Bound	I(1) Bound
10%	2.37	3.2
5%	2.79	3.67
2,5%	3.15	4.08
1%	3.65	4.66

Source: Data processed with Eviews 10

It can be seen from the test results of Table 3 according to the results of the Bound Test it can be seen that the F-statistic in this model is greater than the critical value at the upper bound bound, both at the level of 1 percent (4.66), 5 percent (3.67), 10 percent (3.2) .so that at this stage the cointegration model has a cointegration relationship in long-term adjustment, which means this model has a short-term balance leading to a long-term one.

Table 4 Long-Term Coefficients

Variable	Coefficients	t-Statistic	Std.Error
Health	38.48314**	8.272755	4.651793
Edu	-22.38158**	-10.39863	2.152358
GDP	-18.15996**	-5.254326	3.456192
C	120.332**	9.315324	12.91764

Source: Data processed with Eviews 10

*Description:),**),and*) Significance at real level 1%, 5%, 10%*

In the long run, the variables of government expenditure, the education sector and per capita income have a negative and significant influence on life expectancy with a coefficient value of -22.38158 for edu and -18.15996 for GDP. This caused a negative influence because in the period of the year of observation of the study, the government expenditure budget in the education sector and per capita income was still not good enough when compared to other government expenditure allocations. The variable government expenditure in the health sector has a significant and positive effect below the level of 10 percent at the coefficient value at 38.48314. That is, in the long run if there is an increase in government spending in the health sector by one unit, it will increase life expectancy by 38.48 percent.

Table 5 Short-term Koefisen ARDL

Variable	Coefficients	t-Statistic	Std.Error
C	14.92649**	14.92649	9.214617
D(AHH(-1))	-0.13482**	-1.371465	0.098304
D(HEALTH)	11.50845**	4.379542	2.627775
D(HEALTH(-1))	-14.1887**	-10.33765	1.372527
D(EDU)	-5.690374**	-6.623812	0.859078

D(EDU(-1))	8.719819**	6.83758	1.275278
D(EDU(-2))	0.783199**	2.069454	0.378457
D(GDP)	-4.398151**	-1.289555	3.410597
D(GDP(-1))	-1.313864**	-0.850529	1.544761
D(GDP(-2))	-8.130305**	-5.48697	1.481748

Source: *Data processed with Eviews 10*

Remarks: ***,**), **), and *) Significance at the real level of 1%, 5%, 10%

In short-term testing, life expectancy will be influenced by the life expectancy itself in the previous year (t-1), but only in the short term. These results illustrate that the performance of life expectancy is not good or bad will affect life expectancy in the future the value of life expectancy now with a coefficient of -0.134820 so that it has a negative effect at the level of 1 percent, it can be said that there needs to be an increase in life expectancy in the present so that it will lead to a good life expectancy and have a positive impact in the future by using the ARDL test, It will be seen that life expectancy is not only influenced by macro variables but the state of life expectancy has an important role.

The results of the regression show that the variable government expenditure in the health sector (Health) in the short term has a significant influence on life expectancy in period t and has a positive effect, in the short term period t-1 in period t government expenditure in the health sector is significant and has a positive impact on life expectancy at the stage of 5 percent with a coefficient of 11.50845 while T-1 has no significance and positive for life expectancy at the 1 percent stage with a coefficient of -14.18870. This means that if government spending in the health sector has a positive impact, it will increase life expectancy by 11.50 percent and if in the short term there is an increase in government spending in the health sector, it will affect life expectancy by -14.18 percent in that year period. The results of this study are in line with research conducted by (Rahmi & Putera, 2019) which states that the results of the model estimation obtained by government expenditure variables have a positive and significant effect on life expectancy in Aceh. This relationship explains that government spending in the health sector can increase life expectancy, so district and city governments in Aceh need to maintain the quality and consistency of spending on this sector. Then in a study conducted by (Sihaloho, 2019) said that life expectancy (AHH) is an indicator used as an indicator of the success of health development in the regions.

In period t the edu variable has a significant effect and has a negative impact with a coefficient of -5.690374 it can be said that if there is an increase in government spending in the education sector in a certain period it will have an influence on life expectancy of 5.69 percent in that period, then in t-1 it has a positive and significant effect of 8.719819 it can be said that if it has a positive impact it will provide an increase in the number of expectations Life by 8.71 percent and on T-2 has a positive and insignificant effect, with a coefficient of 0.783199 if there is an increase it will reduce life expectancy by 0.78 percent in that period. Education plays a role in opening up greater opportunities to earn higher incomes called instrumental benefits. Education greatly determines the ability to absorb and manage sources of economic growth both in relation to technology to institutions that are important for economic growth. With good education, the use of technology or technological innovation becomes possible (Fajri, 2021). With better education, it will expand educational opportunities for underprivileged children and so that education can be enjoyed not only in the upper class but also in the lower class. The government is a key policy instrument that should pay close attention to the main things in the process of economic development, through the availability of good and quality human resources will later be the importance of economies of scale and the formation of expertise and quality of prosperous people (Handani Epi, Daulay Toyib Muhammad, 2020)

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The regression results showed that the variable per capita income in the short term in periods t and $t-1$ had an insignificant influence and had a negative impact on life expectancy with coefficients of -4.398151 and -1.313864 . Then in $T-2$ per capita income has a negative and significant influence with a coefficient of -8.130305 so if per capita income increases in a certain year it will result in a decrease in life expectancy in that period. For the next period, if per capita income increases in $t-1$, it will give a decrease in life expectancy of -1.31 while $t-2$ has a good influence on life expectancy in that year. (Tamberi, 2013) which states that showing economic growth can be harmed by increased life expectancy. Because consuming more increases life expectancy as we age, the findings suggest that a country's growth can be stunted in the long run. In essence, retirement age is the best time to unwind so that residents are no longer productive when the average age is over 65 years. However, different views from the research conducted by (Felangi & Yasa, 2021) which states that it can be concluded that the GDP per capita has a positive and significant effect on clean and healthy living behavior in the Regency / City of Bali Province, the Regency / City Government of Bali Province is expected to allocate its budget for expenditure which is expected to spur provincial economic growth so as to increase GDP per capita so that life expectancy continues to increase.

5. CONCLUSION

Government spending in the health sector in the long run has a positive and significant influence on life expectancy, from this finding the most consistent result in influencing life expectancy is the health variable because it provides a positive motion for life expectancy, of course, this provides an answer for researchers that the allocation of government spending to the health sector in Indonesia has shown good signs, even so the government must continue to provide health programs that are easily accessible to all groups of society without exception, because the facilities provided by the government are the rights of the whole community if this continues to give positive signs in accordance with this study it can be said that the government has succeeded in increasing life expectancy in Indonesia through the health sector. The variable government expenditure of the education sector for the short term has a significant and positive effect on certain periods, then in the long run has a significant effect and has a negative impact on life expectancy. Allocation Government expenditure in the study contributes not good enough for the long and short term, the results of this study mean that public interest and government programs in the education sector are still uneven, and public awareness of the importance of education is still underestimated, the government should emphasize more to the community through various extension programs, meaning that people who have not attached importance to education then of course This will adversely affect people's life expectancy. The variable Per Capita Income in the short term has a negative and insignificant influence on life expectancy but in a certain year in the short term per capita income has a positive and significant effect on the short term, in the long run Per Capita Income has a negative and significant influence on life expectancy in Indonesia. The findings of this study provide an assumption that per capita income will not always give a positive sign for life expectancy, it can be seen that in this study has a negative influence, this may happen because of course with increasing age, especially those who have entered an unproductive age, it will hinder to meet their basic needs, then of course this will affect and give a bad sign for numbers life expectancy in Indonesia.

Allocation in the health and education sectors needs to be increased and must always be considered and improved by the government in Indonesia in order to improve access and facilities to better health and education in Indonesia. For parties who have direct interests and who should take care of this field, it is hoped that they can overcome problems that occur both

in the short and long term per capita income to be able to improve the welfare of citizens, so that this can improve the level of life expectancy in Indonesia.

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