This study aims to answer the question of whether government expenditure on health, education, housing and public facilities, and social protection functions influence the Human Development Index using multiple linear regression. This study found that government spending on health, education, and social protection functions significantly influences the HDI value. The education and social protection functions have a positive effect, while the health care function has a negative effect. The housing and public facilities function does not affect the HDI value.

Keywords: government expenditure; health; education; housing and public facilities; social protection; HDI

Introduction

There are at least three paradigm shifts in economic development, according to Nanga (2020). Initially, the development paradigm emphasized economic growth.

This paradigm states that development success can be seen from gross domestic product (GDP) economic indicators. On the other hand, problems such as unemployment, poverty, and income disparities between individuals are seen as secondary problems. This paradigm developed from the 1950s to the 1960s.
Many countries eventually realized that growth is different from development. Growth only measures the increase in output of domestic goods and services, but development has a broader dimension than that. Then the development paradigm that focuses on equity began to develop.

Development strategies and policies implemented under this paradigm should aim to eliminate or reduce unemployment, poverty, and income disparities between individuals. This paradigm began to emerge in the 1970s. The paradigm was criticized for tending to see people only as objects of aid and philanthropic strategies.

Eventually, a development paradigm that prioritizes human development emerged. The main goal of development in this paradigm is directed at human development following the realization of human values or potential, such as self-confidence, human dignity, self-esteem, empowerment, and others.

The United Nations Development Programme (UNDP) was the first agency to develop means of measuring human development. UNDP is the UN agency responsible for promoting sustainable development, reducing poverty, improving quality of life, and achieving sustainable development goals worldwide.

In 1990, UNDP proposed the Human Development Index (HDI) to measure human development. The HDI is published through the Human Development Report (HDR), which is published annually. The HDI is a measurement of the average achievements in the main dimensions of human development, consisting of the health, education, and standard of living dimensions.

The HDI has a range of values in the form of a 0-1 scale, where the higher the value of the HDI in a country, the more advanced the country is considered to be in the field of human development. A country is categorized as developed if its HDI exceeds 0.800, and developing if its HDI is 0.500-0.799. A country with a HDI below 0.500 is categorized as a country which is still at a low stage of human development.

The Indonesian government has a serious commitment to human development. All dimensions of human development are mandated in the 1945 Constitution.

Article 28H, paragraph 1, states that every person has the right to live in prosperity, to have a place to live, and to have a good living environment. Article 34, paragraph 1, states that all citizens have the right to education. The health and education dimensions are specifically regulated down to the level of budget allocation.

Law No. 36 of 2009 Article 171 states that health sector spending must be implemented. The central government in the State Budget must provide a health budget allocation of at least 5% of total expenditure. In comparison, the provincial and district/city governments must allocate a health budget allocation of at least 10% of the Regional Budget.

As for education, the 1945 Constitution Article 31 Paragraph 4 stipulates that the education budget should be at least 20% of the State and Regional budgets. The budget allocation for education is then regulated in Law No. 20/2003 article 49.

The determinants of the Human Development Index are varied, while the resources that the government can spend are limited.

Considering the importance of the contribution of each dimension to the HDI, the study examines the impact of government expenditure based on health, education, social protection, and housing and public facilities function on the HDI in Indonesia.
Literature review

Past studies have reached two conclusions about the relationship between government spending and the Human Development Index. On the one hand, some studies suggest that government spending positively affects the HDI.

Safitri (2016) stated that a more extensive health service budget positively and significantly increases the HDI.

Astri et al. (2013) found that a higher education sector budget significantly affected the HDI.

Similarly, Edeme (2014) stated that government spending on health, education, and infrastructure significantly affected the HDI. On the other hand, some studies do not see a significant effect of government spending on the HDI, such as research conducted by Prasetyo & Zuhdi (2013), which states that government spending on health, education, and subsidies is not always efficient in improving the HDI.

In addition, Badrudin & Khasanah (2011) revealed that spending on education, health, and infrastructure did not significantly influence the HDI in Yogyakarta Special Region Province. Most previous studies examined the effect of government spending on education and health, while the standard of living dimension has yet to be specifically studied.

This may be due to difficulty determining which government expenditure is included in the standard of living dimension. Referring back to Article 28H paragraph 1 of the 1945 Constitution, the state guarantees the welfare rights to life and housing. Welfare living can be linked to the social protection function. The social protection function aims to alleviate poverty.

Having a place to live and getting a good and healthy living environment can be linked to the housing and public facilities function. The Housing and public facilities function is used to finance the organization of housing provision and support public facilities that are the government's responsibility. These two government expenditure functions represent the dimensions of living standards which will then be tested for their influence on the HDI in Indonesia.

Research Hypothesis

Health is one of the main factors contributing to improving the quality of human resources, human welfare and development. When the government increases spending on healthcare, people will have better access to quality health services. In the long run, access to good health services can help improve the overall health of the population and increase life expectancy.

H1: Government spending on health function affects the HDI

With adequate government spending on education, access to education can be improved. In this case, it is vital to build schools, improve educational institutions, and reduce the gap between urban and rural areas. With better access to education, more people will have the opportunity to receive a better education. Adequate spending on education also helps improve the quality of education. Sufficient funds can be used to recruit qualified teachers, provide adequate training, and update curriculum and teaching methods. In addition, spending on education can also be used to provide modern learning facilities, such as science laboratories and libraries.
This can improve the quality of human resources in the country, which can positively impact a country's economic and social progress because individuals with higher levels of education tend to have better skills and knowledge and are better able to adapt to changes in technology and the labor market.

H2: Government spending on education function affects the HDI

Adequate housing is an essential factor in determining living standards. Adequate housing should fulfill basic requirements such as safety, comfort, and basic amenities such as clean water, sanitation, and electricity. Poor housing quality, such as uninhabitability, overcrowding or lack of access to public facilities, can affect the overall health and comfort of a community. Adequate public facilities such as roads, public transport, clean water and sanitation systems also improve living standards. Easy and affordable access to these facilities allows people to meet their basic needs and improve their quality of life. Standards of living are also affected by the availability of public facilities such as parks, open spaces, and recreational areas. Safe and comfortable open spaces allow people to engage in physical activities, socialize and enjoy their leisure activities.

H3: Government spending on housing and public facilities function affects the HDI

Spending on social protection functions can help ensure that all people meet their basic needs and achieve a decent standard of living. Social protection includes various programs and policies, such as social rehabilitation, empowerment, and social security. The main objective of social protection is to help those in need, whether they are socially deprived, have social problems, or are at risk of becoming poor or socially marginalized. The risk of inability to maintain a life that meets minimum basic needs due to social shocks is also included in the scope of social protection. Social protection also covers the financing of activities that provide guarantees to all people to meet the basic needs of a decent life. This directly contributes to improving their standard of living. Social protection can help reduce poverty and inequality so that all people have equal opportunities to achieve a decent standard of living. This can create a more stable and sustainable environment and can help improve overall welfare and prosperity. Adequate and targeted spending on social protection can help create a more equitable social environment, reduce social inequality and improve people's overall standard of living.

H4: Government spending on social protection function affects the HDI

Research methods

This is a qualitative study that examines the impact of function-based government expenditure on the HDI in Indonesia at the national level. The conceptual framework of this study can be seen in Fig. 1. The HDI is used as the dependent variable in this study, while government expenditure is used as the independent variable based on functions that correspond to the dimensions of the human development index. The health dimension is measured using government expenditure on the health function. The education dimension is measured using government expenditure on the education function.

The standard of living dimension is measured using government expenditure on housing and public facilities, and government expenditure on social protection functions. The study sample uses data from 2008 to 2021.
The operational definitions of the variables in this study are:

1. Human Development Index is the Human Development Index (HDI) value of Indonesia issued by UNDP.
2. Health Function Expenditure is government expenditure on the health function obtained from the Central Government Financial Statements audited by the State Auditor.
3. Education Function Expenditure is government expenditure on education function obtained from the Central Government Financial Statements audited by the State Auditor.
4. Social Protection Function Expenditure is government expenditure on social protection function obtained from the Central Government Financial Statements audited by the State Auditor.
5. Housing and Public Facilities Function Expenditure is government expenditure on housing and public facilities function obtained from the Central Government Financial Statements audited by the State Auditor.

This research model uses multiple linear regression analysis methods. The regression equation can be explained as follows:

\[ \text{HDI} = \alpha + \beta_1 \text{KES} + \beta_2 \text{PEN} + \beta_3 \text{PFU} + \beta_4 \text{SOS} + \varepsilon \]

Description:

- **HDI**: Human Development Index
- **\( \alpha \)**: Constant
- **\( \beta_1 - \beta_4 \)**: Coefficient
IMPACT OF GOVERNMENT EXPENDITURE ON

KES : Health Function Expenditure
PEN : Education Function Expenditure
PFU : Housing and Public Facilities Function Expenditure
SOS : Social Protection Function Expenditure
$\varepsilon$ : Standard error

Results of the study

Descriptive Statistics

Descriptive statistics provide an overview of the data and help to get systematical understanding of the main characteristics of the observed data.

Tab. 1 shows that the PEN variable has the highest average among other variables, indicating that the average APBN expenditure on the education function is the highest compared to the APBN expenditure on the health function, social protection function, and housing and public facilities function. This is reasonable since the education function receives a minimum annual budget allocation of 20%.

It should also be noted that the KES and SOS variables have a standard deviation greater than the average, indicating that the KES and SOS variables have a considerable variation in value. State budget expenditure for health function

Table 1 – Descriptive statistics
(Source: made by the author)

<table>
<thead>
<tr>
<th></th>
<th>Min</th>
<th>Max</th>
<th>Avg</th>
<th>Std. Dev.</th>
</tr>
</thead>
<tbody>
<tr>
<td>IPM_UNDP</td>
<td>0.646000</td>
<td>0.716000</td>
<td>0.687429</td>
<td>0.021725</td>
</tr>
<tr>
<td>KES</td>
<td>10.89000</td>
<td>211.3300</td>
<td>49.68857</td>
<td>54.79378</td>
</tr>
<tr>
<td>PEN</td>
<td>55.29000</td>
<td>162.3500</td>
<td>121.7550</td>
<td>31.56613</td>
</tr>
<tr>
<td>PFU</td>
<td>12.44000</td>
<td>33.79000</td>
<td>23.79286</td>
<td>6.436458</td>
</tr>
<tr>
<td>SOS</td>
<td>2.980000</td>
<td>295.5200</td>
<td>90.87143</td>
<td>107.5556</td>
</tr>
</tbody>
</table>

Classical Assumption Test

The classical assumption test is a set of statistical tests used to check whether the data used in linear regression analysis meets several classical assumptions so that the results are valid and can be interpreted correctly. The carried out tests include normality, multicollinearity, autocorrelation, and heteroscedasticity tests. The classical assumption test needs to be carried out first to test whether the data sample that has been collected is of good quality and to evaluate whether the resulting regression equation meets the criteria of the best linear unbiased estimator.

A test of normality is a statistical test used to test whether a data sample of data is drawn from a normally distributed population or whether it is close to a normal distribution. The decision-making in this test is based on the probability number of the Jarque-Bera test.

If the value is below 0.05, the data used is normally distributed.

According to Fig. 2, it is known that the Jarque-Bera value is 0.104395, and the probability value is 0.949141. The probability value is above 0.05; therefore, the data used in this research model is normally distributed.
The multicollinearity test is used in linear regression analysis to identify a strong linear relationship between two or more independent variables. The Variance Inflation Factor (VIF) is used to measure the level of multicollinearity in linear regression. A VIF value greater than 10 indicates the presence of multicollinearity.

Tab. 2 shows that the VIF value of all independent variables in the model is below 10, indicating no multicollinearity.

<table>
<thead>
<tr>
<th></th>
<th>KES</th>
<th>PEN</th>
<th>PFU</th>
<th>SOS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Centered VIF</td>
<td>4.177540</td>
<td>3.465061</td>
<td>1.538354</td>
<td>6.155715</td>
</tr>
</tbody>
</table>

An autocorrelation test is used to identify a linear relationship between the residual value (the difference between the observed value and the predicted value) at a certain time \( t \) and the residual value at the previous time. The autocorrelation test is performed using the Lagrange-Multiplier Test (LM-test). If the probability value is above 0.05, the regression model is free of autocorrelation. Based on Tab. 3, the probability value is 0.7772, therefore it is concluded that there is no autocorrelation in the residuals.

<table>
<thead>
<tr>
<th>F-statistic</th>
<th>0.130739</th>
<th>Prob. F(2,7)</th>
<th>0.8795</th>
</tr>
</thead>
<tbody>
<tr>
<td>Obs*R-squared</td>
<td>0.504124</td>
<td>Prob. Chi-Square(2)</td>
<td>0.7772</td>
</tr>
</tbody>
</table>

The Breusch-Pagan-Godfrey test can be used to prove whether heteroscedasticity occurs or not. Heteroscedasticity refers to inconsistency in residual variance (inhomogeneity of variance) in a regression analysis.

If the probability value is above 0.05, there is no heteroscedasticity in the regression model. Judging from Tab. 4, the obtained probability is 0.1045, above 0.05. Based on these results, the tested regression model is homoscedastic.

<table>
<thead>
<tr>
<th>F-statistic</th>
<th>2.724964</th>
<th>Prob. F(4,9)</th>
<th>0.0975</th>
</tr>
</thead>
<tbody>
<tr>
<td>Obs*R-squared</td>
<td>7.668297</td>
<td>Prob. Chi-Square(4)</td>
<td>0.1045</td>
</tr>
</tbody>
</table>

**Regression results**

The research model was then tested using the F-statistic, t-statistic, and coefficient of determination tests. Tab. 5 shows the results of three tests.

The F-statistic test is carried out to see the effect of the independent variables as a whole and together on the dependent variable.

Tab. 5 shows that the probability of F-statistic is 0.000000, below 0.05. It is concluded that all independent variables consisting of health function expenditure (KES), education functions expenditure (PEN), housing and public facilities function expenditure (PFU), and
IMPACT OF GOVERNMENT EXPENDITURE ON social protection function expenditure (SOS) have a significant impact on the dependent variable, namely the HDI simultaneously.

Table 5 – F-Statistic, t-Statistic, Coefficient of Determination
(Source: made by the author)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Statistic</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>0.608273</td>
<td>0.005634</td>
<td>107.9742</td>
<td>0.0000</td>
</tr>
<tr>
<td>KES</td>
<td>-0.000137</td>
<td>3.77E-05</td>
<td>-3.635736</td>
<td>0.0054</td>
</tr>
<tr>
<td>PEN</td>
<td>0.000585</td>
<td>5.95E-05</td>
<td>9.817045</td>
<td>0.0000</td>
</tr>
<tr>
<td>PFU</td>
<td>0.000328</td>
<td>0.000195</td>
<td>1.685514</td>
<td>0.1262</td>
</tr>
<tr>
<td>SOS</td>
<td>7.68E-05</td>
<td>2.33E-05</td>
<td>3.297821</td>
<td>0.0093</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.980555</td>
<td>F-Statistic</td>
<td>113.4622</td>
<td></td>
</tr>
<tr>
<td>Adjusted R-squared</td>
<td>0.971913</td>
<td>Probability (F-Statistic)</td>
<td>0.000000</td>
<td></td>
</tr>
</tbody>
</table>

Furthermore, a t-statistical test is carried out to see the effect of the independent variable on the dependent variable partially or respectively. The probability value of the t-statistic for each independent variable is 0.0054 for health function expenditure (KES), 0.0000 for education function expenditure (PEN), 0.1262 for housing and public facilities function expenditure (PFU), and 0.0093 for social protection function expenditure (SOS). The t-test findings are as follows:

1. Expenditure on health functions (HSF) has a significant impact on the HDI.
2. Expenditure on education (PEN) has a significant impact on the HDI.
3. Expenditures on housing and utilities (PFU) do not affect the HDI.
4. Expenditure on the social protection function (SOS) has a significant impact on the HDI.

The coefficient of determination is a measure that assesses the ability of a linear regression model to predict or explain an outcome. In other words, the coefficient of determination is the proportion of the change in the dependent variable that can be explained by the independent variable.

Tab. 5 also shows that the adjusted R-squared value is 0.971913. This means that the variation in the Human Development Index value that can be explained by the independent variables of the model is 97.19%. The remaining 2.71% is determined by other variables.

The multiple linear regression equation based on the calculation results in Tab. 5 is as follows:

IPM = 0.608273 - 0.000137 KES + 0.000585 PEN + 0.000328 PFU + 0.0000768 SOS

The interpretation of the regression equation in this study is as follows:

The constant value of 0.608273 is interpreted as an estimate of the HDI value, which is not affected by spending on health, education, housing and public facilities, and social protection functions.

KES coefficient -0.000137 means that every increase in expenditure on health functions by 1 trillion rupiah will reduce the HDI by 0.000137, ceteris paribus.

PEN coefficient of 0.000585 means that every 1 trillion rupiah increase in education function expenditure will result in an increase in the HDI of 0.000585, ceteris paribus.

PFU has no significant effect on the HDI.
The SOS coefficient is 0.0000768 means that every 1 trillion rupiah increase in expenditure on social protection function will result in increase in the HDI by 0.0000768, ceteris paribus.

The test results in this study show a negative and significant influence between government expenditure on the health function and the HDI. There are three possibilities why health expenditure has a negative impact on the HDI, namely regional inequality, inappropriate allocation, and the Covid-19 pandemic.

Fadilah et al. (2018) argue that government spending on the health sector has a negative impact on undeveloped regions.

Mittal (2016) states that a poor system has a negative impact on suburban communities compared to urban communities.

Sanggelorang et al. (2015) argue that health expenditure negatively affects the HDI because the budget allocation is mainly used to procure hospitals or health centers. Capital expenditure has the characteristic that the added value obtained is not instantaneous but requires time to feel it.

Mongan (2019) states that allocating central government expenditure in the health sector still needs attention.

Research by Varlitya et al. (2023) stated that government spending on the health sector positively influenced the HDI only in the years before the Covid-19 pandemic. The pandemic caused an increased risk of death which made the Life Expectancy Rate fall, which in turn caused the value of the HDI to fall while spending on health functions rose dramatically to minimize the impact of the pandemic.

The test results in this study show a positive and significant influence between government expenditure on the education function on the HDI.

Edeme (2014) found that education and human development have a positive relationship and that education spending affects human development. Astri et al. (2013) also found that local government spending on education affects the HDI.

The test results in this study did not show a significant impact on government expenditure on housing and public facilities functions on the HDI. These results are consistent with research conducted by Fajar & Indrawati (2020), namely that government spending in the housing and public facilities sector individually has no significant effect on the value of the HDI.

Nnenna & Onyenwe (2020) also stated that housing lending has no significant effect on the HDI.

The test results in this study show a positive and significant impact on government expenditure on social protection function on the HDI. The results of this study are consistent with Ikbal (2021), which states that expenditure on social protection functions has a positive and significant impact on the HDI directly.

Conclusions

Based on the results of the study and discussion presented above, government expenditure on the health function has a negative and significant impact on the HDI. This is likely due to regional inequality, inappropriate allocation, and the Covid-19 pandemic.

The pandemic caused an increased risk of death, which led to a drop in life expectancy, which in turn has caused the HDI value to fall. In contrast, health function expenditure has
increased dramatically to minimize the impact of the pandemic. Despite the negative effect, government spending on health function should not be reduced excessively because the pandemic has been declared over.

Future life expectancy is expected to be no longer affected by the effects of the pandemic. Government expenditure on education functions positively and significantly affects the HDI. This shows that government expenditure on education is consistent with the goal of creating a robust education system and infrastructure.

Government expenditure on housing and public facilities does not affect the value of the HDI, so investment in housing and public facilities must be more effective. Government expenditure on social protection functions has a positive and significant impact on the HDI, indicating the effectiveness of expenditure in improving the standard of living of the Indonesian people.

References:


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