IMPACT OF THE NATIONAL HEALTH INSURANCE PROGRAM ON ECONOMY, HUMAN DEVELOPMENT INDEX AND POVERTY

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ABSTRACT

This study analyzes the influence of the National Health Insurance program (NHI), spending on infrastructure and health expenditures on economic growth, the Human Development Index (HDI) and Poverty. Data retrieval is done from secondary data, data analysis using path analysis. The results of the discussion are known as National Health Insurance (NHI) influential in supporting economic growth. Health spending affects supporting economic growth, the development of health infrastructure affects supporting economic growth. NHI is influential in supporting the HDI. Health is influential in supporting HDI. Development of Hospital Infrastructure influential in supporting the HDI. Health spending does not affect poverty. NHI does not affect the overall level of poverty. Economic growth does not affect the level of poverty. Human Development does not affect the level of poverty. Poverty level through Economic Growth and HDI. Health does not affect the level of poverty through economic growth and HDI as an intervening variable. Development of Hospital Infrastructure does not affect the level of Poverty through Economic Growth and HDI as Intervening Variables.

Key words: NHI, HDI, Health Expenditures, Infrastructure, Economic Growth, Poverty.

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1. INTRODUCTION
Economic development has a high measure of economic growth [1]–[7]. Economic growth is the measure of success in improving the welfare of the community [8]–[10]. The low welfare of the community, one of which raises a low level of health. Not only happens in Indonesia but health problems also occur in almost all countries in the world even in developed countries. The problem does not stop there, people who are classified as unhealthy in a country can be relatively healthy compared to residents of countries such as the United States [11]. Therefore, health is touted as a global problem. Globality of health problems that are so seizing the attention of the international community is reflected as one of the targets of the world improvement indicators listed in the Millennium Development Goals (MDGs) [12]; which emphasizes on health aspects. Health development as a measure of growth [13]–[15]. However, the problem that occurs if development raises disparities. Disparities in development between regions can be seen from gaps in (a) per capita income, (b) quality of human resources, (c) availability of facilities and infrastructure such as transportation, energy and telecommunications, (d) social services such as health, education etc., and (e) access to banking [16]–[19].

Human development, according to the UNDP definition is the process of expanding people’s choices [20]–[24]. Of the many choices, three choices are considered the most important, such as longevity and health, education, and access to resources that can meet a decent standard of living. Other options considered to support the three choices above are political freedom, human rights and respect for personal rights. Thus, human development is more than just economic growth, more than just increasing income and more than just a commodity production process and capital accumulation.

In 1990 the United Nations Development Program (UNDP) introduced the "Human Development Index" (HDI) or the Human Development Index (HDI). According to Drapper (1990), in his introduction to the 1990 Human Development Report, the emergence of HDI does not mean to neglect the role of GDP, but how to translate that GDP into human development [25]. The translation process is sometimes successful, but not infrequently it also fails.

![Figure 1 Indonesian Human Development Index from 2000-2017](image-url)
The increase in Indonesia's HDI, in addition to its relatively small size, has not yet spread to regencies that have a large rural area structure. Urban area HDI is enormous compared to rural area HDI. It is one of the causes of the decline in health indicators over the years. Lack of health development can also cause high levels of poverty.

![Figure 2 Percentage of Poor Population from 1996-2017](image)

A large number of poor people, especially in rural areas as a reflection of the level of health of rural communities, needs to be considered. In addition to the Education sector, the development of the health sector is the basis for determining the Government's Policy on Health Insurance for the wider community.

The existence of the NHI Program encourages National Economic Growth. With a growing number of patients, the number of patients who come for treatment to the Primary Service Health Facilities and Referral Service Health Facilities (Hospitals) is increasing rapidly [26]–[29] People do not worry about the fees that will be paid because they have become BPJS participants, something that did not happen in previous years because the majority of people were reluctant to go to health services because of cost problems. With the increasing number of patients in economics called demand, it will make primary services and hospitals which in this case supply to help improve their quality and quantity [30]. One of the benefits of the NHI Program is that it contributes to Indonesia's Economic Growth. Based on BPJS data after NHI sustainability for three years, NHI has contributed IDR 152.2 trillion of National Economic Growth. The cash flow in the NHI Program is very high, reaching trillions. With this amount of money will drive economic growth related to the health sector and other sectors [31]. Hospital construction makes the flow of money continue to flow and involves many sectors. Like property contractors, construction workers, material sellers, and others. It also encourages economic growth in the surrounding community. A full hospital will also make the community's business crowded too. Likewise, with the pharmaceutical industry, high drug demand will benefit pharmaceutical companies [32]. Increased health degrees, productive and optimal workers, reduced morbidity rates will produce quality human resources which will then increase Indonesia's economic growth [33].

2. THEORIES

Neo-classical growth theory was developed by Solow and Swan [34]. The Solow-Swan model uses elements of population growth, capital accumulation, technological progress (exogenous), and the amount of output that interacts with each other. The main difference
with the Harrod-Domar model is the inclusion of elements of technological progress [35]. Besides, Solow-Swan uses a production function model that allows substitution between capital (K) and labor (L). The growth rate comes from three sources, such as capital accumulation, increasing labor supply, and technological progress. This technology can be seen from the increase in skill or technical progress so that productivity increases. In the Solow-Swan model, technological problems are considered functions of time [36]–[39].

The Solow-Swan theory considers that in many ways the market mechanism can create the balance so that the government does not need to influence or interfere in the market too much. Government interference is only limited to fiscal policy and monetary policy [40]. The supply of goods in the Solow model is based on a public production function, which states that output depends on the capital stock and labor force.

$$Y = F(K, L)$$

The Solow growth model assumes that the production function is constant returns to scale. This assumption is often considered realistic, as we will see below, this assumption. The Solow growth model assumes that the production function is constant returns to scale. This assumption is often considered realistic, as we will see below, this assumption helps to facilitate analysis. Remember that the production function has a constant return scale if:

$$zY = F(zK, zL)$$

With z positive value. If we multiply capital and labor by z, we also multiply the amount of output by z. The production function with a constant returns scale allows us to analyze all variables in the economy compared to the number of labor forces. To see the truth, use $z = 1 / L$ in the equation above to get:

$$zY = F(zK, zL)$$

This equation shows that the amount of output per worker $Y / L$ is a function of the amount of capital per $K / L$ worker. (The number "1" is, of course, constant so that the assumption of a constant return scale shows that the magnitude of the economy as measured by the number of workers does not affect the relationship between output per worker and capital per worker. The authors declare this in lower case, so $y = Y / L$ is output per worker, and $k = K / L$ is capital per worker then we can write the production function as:

$$\frac{Y}{L} = F\left(\frac{K}{L}, 1\right)$$

This equation shows that the amount of output per worker $Y / L$ is a function of the amount of capital per $K / L$ worker. (The number "1" is, of course, constant so that the assumption of a constant return scale shows that the magnitude of the economy as measured by the number of workers does not affect the relationship between output per worker and capital per worker. The authors declare this in lower case, so $y = Y / L$ is output per worker, and $k = K / L$ is capital per worker then we can write the production function as:

$$Y = F(k)$$

Where we define $f(k) = F(k, 1)$. Figure 2 shows this production function, when the amount of capital increases, the production function curve becomes more flat, which indicates that the production function reflects the marginal product of capital which is decreasing. When $k$ is low, the average worker has little capital to work, so an additional unit of capital is so useful and can produce much additional output. When $k$ is high, the average worker has much capital, so an additional unit of capital only slightly increases production. The production function shows how the amount of capital per worker $k$ determines the amount of output per worker $y = f(k)$. The slope of the production function is the marginal product of capital: if $k$ increases by 1 unit, $y$ increases by MPK unit. The production function becomes flattered when $k$ is risen, which indicates a decrease in the marginal product of capital.
3. METHODOLOGY
The study was conducted at the BPJS Health office with quantitative research methods with
the aim of knowing the National Health Insurance Program Influencing Economic Growth,
HDI and Poverty. For the data collection method used in this study consists of secondary data
in the form of literature or books that are related to this research and previous studies. The
independent variable for this study is the Impact of the National Health Insurance Program
while the dependent variable is the Economy, Human Development Index, and Poverty. The
structural equation for the model is:

\[
\begin{align*}
Y_1 & = PY_1 X_1 + PY_1 X_2 + PY_1 X_3 + \varepsilon_1 \text{ (substructure 1)} \\
Y_2 & = PY_2 X_1 + PY_2 X_2 + PY_2 X_3 + PY_2 Y_1 + \varepsilon_2 \text{ (substructure 2)} \\
Y_3 & = PY_3 X_1 + PY_3 X_2 + PY_3 X_3 + PY_2 Y_2 + PY_3 Y_2 + \varepsilon_3 \text{ (substructure 3)}
\end{align*}
\]

Path analysis is a development of multiple linear regression. This testing technique is to
determine the amount of contribution shown by the path coefficients in each path diagram of
the causal relationship between variables X1, X2, X3 to Y3, Y2 and their impact on Y1.

4. RESULT AND DISCUSSION
The results of the study stated that the effect of NHI on poverty through economic growth and
HDI used path analysis. The magnitude of the error value for each effect of the independent
variable on the dependent is obtained through the following calculation:

\[
Pe_1 = \sqrt{1 - 0.9202} = 0.153
\]

\[
Pe_2 = \sqrt{1 - 0.2662} = 0.929
\]

In trimming theory testing the validity of the research model is observed through the
calculation of the total determination coefficient as follows:

\[
R^2_m = 1 - P2e_1 \cdot P2e_2
\]

\[
= 1 - (0.153)2 (0.929)2
\]

\[
= 1 - (0.02) (0.86)
\]

\[
= 0.98 = 98.0\%
\]

The coefficient of determination of 0.98 indicates that 98.0% of the information contained
in the data can be explained by the model, while the remaining 2% is explained by errors and
other variables outside the model. The number of coefficients in this model is relatively large,
so it is worth making the further interpretation. From the SPSS output, the standardized beta
d value for NHI is 0.920 and is significant at 0.000, which means that NHI affects economic
growth. The standardized beta coefficient of 0.920 is the path value or path P2. In the SPSS
output table 4.19, the standardized beta values for NHI 0.266 and Economic Growth of -0.374
are all insignificant. The standardized beta value of NHI 0.266 is the path value or path P1,
and the standardized beta value of 0.373 is the path value or P3 path.

\[
e_1 = (1 - 0.838)2 = 0.026
\]

\[
Equation I = Y_1 = 0.920 X_1 + 0.026 \varepsilon_1
\]

\[
e_2 = (1 - 0.266)2 = 0.538
\]

\[
Equation II = Y_2 = 0.246 X_1 - 0.374 Y_1 + 0.538 \varepsilon_2
\]

\[
e_3 = (1 - 0.129)2 = 0.758
\]

\[
Equation III = Y_3 = 0.246 X_1 - 0.373 Y_1 + 0.373 Y_2 0.758 \varepsilon_3
\]
Figure 3 Path Analysis of NHI on Poverty through Economic Growth and HDI

The results of the path analysis show that NHI can have a direct effect on Poverty and can also have an indirect effect, such as from NHI to Economic Growth and the Human Development Index (as an intervening variable) then to Poverty. The amount of direct influence is 0.920 while the magnitude of the indirect effect must be calculated by multiplying the indirect coefficient, such as \((0.246) \times (-0.374) = -0.092\) or the total effect of NHI on poverty \(= 0.920 + (0.246 \times (-0.374)) \times 0.373 = 0.886\). Because of the value \((P2 \times P3 \times P4 < P1)\) then Economic Growth and Human Development Index do not function as intervening variables. From the calculation results obtained show indirect effects through Economic Growth and Human Development Index (HDI) are smaller than the direct influence on Poverty. These results indicate that NHI has no effect on Poverty through Economic Growth and the Human Development Index (HDI) as an intervening variable, or it can be concluded that Economic Growth and the Human Development Index (HDI) are not variables that mediate between NHI and Poverty. Based on this, the research hypothesis which states that NHI influences Poverty through Economic Growth and the Human Development Index (HDI) does not get empirical support, or it can be concluded that the hypothesis is rejected.

The existence of health influence on poverty through economic growth and HDI has used path analysis. The magnitude of the error value for each effect of the independent variable on the dependent is obtained through the following calculation:

\[
P_{e1} = \sqrt{1 - 0.9842} = 0.031
\]
\[
P_{e2} = \sqrt{1 - 0.3992} = 0.840
\]

In trimming theory testing the validity of the research model is observed through the calculation of the total determination coefficient as follows:

\[
R2m = 1 - P2e1 \cdot P2e2
\]
\[
= 1 - (0,031)^2 (0,840)^2
\]
\[
= 1 - (0,00) (0,70)
\]
\[
= 0,70
\]
\[
= 70,0 \%
\]

The coefficient of determination of 0.70 indicates that 70.0% of the information contained in the data can be explained by the model, while the remaining 30% is explained by errors and other variables outside the model. The number of coefficients in this model is relatively large, so it is worth making the further interpretation. From the results of SPSS output, the standardized beta value for Health is 0.984 and is significant at 0.000, which means that
Health affects Economic Growth. Standardized coefficient value beta 0.984 is the path value or path $P_2$. In SPSS output table 4.23 the standardized beta value for Health 1.966 and Economic Growth of -2.800 are all insignificant. Health standardized beta value 1.966 is the path value or path $P_1$ and the standardized beta value of HDI 1.117 is the path value or path $P_3$.

$$e_1 = (1 - 0.966)^2 = 0.066$$

Equation I = $Y_1 = 0.984X_2 + 0.066\, e_1$

$$e_2 = (1 - 0.399)^2 = 0.840$$

Equation II = $Y_2 = 1.966X_2 - 2.800Y_1 + 0.840\, e_2$

$$e_3 = (1 - 0.021)^2 = 0.999$$

Equation III = $Y_3 = 1.966X_2 - 2.800Y_1 + 1.117Y_2 - 0.999\, e_3$

\[ e_1 = 0.066 \]

\[ P_2 = 1.966 \]

\[ P_3 = 2.800 \]

\[ P_1 = 0.984 \]

\[ P_4 = 1.117 \]

\[ e_3 = 0.999 \]

\[ e_2 = 0.840 \]

\[ HDI (Y_2) \]

\[ Poverty (Y_3) \]

\[ Health (X_2) \]

\[ Pert_Esko (Y_1) \]

Figure 4. Path of Health to Poverty through Economic Growth and HDI

The results of path analysis show that Health can have a direct effect on Poverty and can also have an indirect effect from Health to Economic Growth and the Human Development Index (as an intervening variable) then to Poverty. The amount of direct influence is 0.984 while the magnitude of the indirect effect must be calculated by multiplying the indirect coefficient, such as $(1.966 \times (-2.800)) = -5.504$ or the total effect of health on poverty $= 0.984 + (1.966 \times (-2.800) \times 1.117) = -5.164$. Therefore the value $(P_2 \times P_3 \times P_4 < P_1)$ then Economic Growth and Human Development Index (HDI) does not function as an intervening variable. From the calculation results obtained show indirect effects through Economic Growth and Human Development Index (HDI) are smaller than the direct influence on Poverty. The magnitude of the error value for each effect of the independent variable on the dependent is obtained through the following calculation:

$$Pe_1 = \sqrt{1 - 0.9872} = 0.025$$

$$Pe_2 = \sqrt{1 - 0.3382} = 0.885$$

In trimming theory testing the validity of the research model is observed through the calculation of the total determination coefficient as follows:

$$R^2m = 1 - P_2e_1 \cdot P_2e_2$$

$$= 1 - (0.025)^2(0.885)^2$$

$$= 1 - (0.00)(0.78)$$

$$= 0.78$$

$$= 78.0\%$$
The coefficient of determination of 0.78 indicates that 78.0% of the information contained in the data can be explained by the model, while the remaining 22% is explained by errors and other variables outside the model. The number of coefficients in this model is relatively large, so it is worth making the further interpretation. From the SPSS output, the standardized beta value for Hospital Infrastructure is 0.987 and is significant at 0.000, which means that the Hospital Infrastructure affects Economic Growth. Standardized coefficient value 0.987 beta is the path value or path \( P_2 \). In the SPSS output table 4.27, the standardized beta value for Hospital Infrastructure is 1.693 and Economic Growth of -2.485 is all insignificant. The standardized beta value of Hospital Infrastructure 1.693 is the path value or \( P_1 \) path, and the HDI 1.063 standardized beta value is the path value or \( P_3 \) path.

\[
e1 = (1 - 0.973)^2 = 0.053
\]

\[
Equation I = Y_1 = 0.987 \times X_3 + 0.053 \times e1
\]

\[
e2 = (1 - 0.338)2 = 0.885
\]

\[
Equation II = Y_2 = 1.693 \times X_3 - 2.485 \times Y_1 + 0.885 \times e2
\]

\[
e3 = (1 + 0.076)2 = 1.005
\]

\[
Equation III = Y_3 = 1.693 \times X_3 - 2.485 \times Y_1 + 1.063 \times Y_2 1.005 \times e3
\]

\[
e1 = 0.053
\]

\[
Pert_Eko (Y_1)
\]

\[
Inf_RS (X_3)
\]

\[
Poverty (Y_3)
\]

\[
HDI (Y_2)
\]

\[
P_2 = 1.693
\]

\[
P_1 = 0.987
\]

\[
P_3 = -2.485
\]

\[
P_4 = 1.063
\]

\[
e3 = 1.005
\]

\[
e2 = 0.885
\]

\[
Pert_Eko (Y_1)
\]

\[
Inf_RS (X_3)
\]

\[
Poverty (Y_3)
\]

\[
HDI (Y_2)
\]

\[
P_2 = 1.693
\]

\[
P_1 = 0.987
\]

\[
P_3 = -2.485
\]

\[
P_4 = 1.063
\]

\[
e3 = 1.005
\]

\[
e2 = 0.885
\]

**Figure 5.** Infrastructure Path towards Poverty through Economic Growth and HDI

Hospital infrastructure can have a direct effect on Poverty and can also have an indirect effect from Hospital Infrastructure to Economic Growth and Human Development Index (as an intervening variable) then to Poverty. The amount of direct influence is 0.987 while the magnitude of the indirect effect must be calculated by multiplying the indirect coefficient, such as (1.693 x (-2.485) = -4.207 or the total influence of Hospital Infrastructure on Poverty = 0.987 + (1.693 x (-2.485) x 1.063) = -3.485. Because of the value (P2 x P3 x P4 < P1) then Economic Growth and Human Development Index do not function as intervening variables. Total influence is the sum of the direct and indirect effects, while the indirect effect is the multiplication of all the direct effects that are passed (exogenous variables to the endogenous variables).
The results of the data analysis revealed that National Health Insurance dramatically affects Economic Growth. These results prove that National Health Insurance is influential in supporting Economic Growth. Based on Law No. 24 of 2011 National Health Insurance is organized by the Social Security Administering Agency (BPJS) Health. With NHI, the health of all Indonesian people can be guaranteed. Even the poor can get free health services after being registered with BPJS Health. Those who can afford it do not need to pay for medical expenses directly in the Hospital (out of pocket) because they have paid monthly fees. This contribution is used for NHI financing. NHI guarantees comprehensive health services ranging from health promotion (promotive), prevention of illness (preventive), treatment of diseases (curative), and recovery of health (rehabilitative), including medicines and medical consumables. Hospital construction makes the flow of money continue to flow and involves many sectors. Like property contractors, construction workers, and material seller. It also encourages economic growth in the surrounding community. A full hospital will also make the community's business crowded too. Likewise, with the pharmaceutical industry, high drug demand will benefit pharmaceutical companies.

5. CONCLUSIONS
The National Health Insurance Program significantly affects Economic Growth. National Health Insurance greatly influences the Human Development Index. National Health Insurance does not affect the level of poverty. National Health Insurance does not affect the overall level of poverty. However, government expenditure on health greatly affects economic growth. Government spending on health greatly influences the Human Development Index. Government spending in Health is influential in supporting the Human Development Index. Government expenditure in Hospital Infrastructure greatly affects Economic Growth. Government expenditure in Hospital Infrastructure greatly influences the Human Development Index. Economic growth does not mediate the influence of National Health insurance on the level of Poverty through Economic Growth and the Human Development Index as Intervening Variables. Health spending does not affect the level of poverty through economic growth and the Human Development Index as an intervening variable. Hospital
Infrastructure Development does not affect the level of Poverty through Economic Growth and the Human Development Index as Intervening Variables.

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