Determinant Factors of Human Development and Its Impact on Level of Productivity in ASEAN Countries

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Abstract. In ASEAN countries, human development and level of productivity are still diverse where several countries have achieved higher level of development while the others are still in the middle and low. Human development has three main aspects namely education, health, and the economy and therefore needs a holistic view including the aspect of economy, politics, and policy support. This study examines the influence of determinant factors of human development that includes the aspect of economy, politics, and public policies, and how human development influence productivity. This study uses data of ASEAN countries from 2002 to 2019 and utilizes panel regression method. The results show that foreign direct investment, industry, index of political stability and absence of violence/terrorism, voice and accountability index, health spending, education policy, and health policy have a significant and positive effect on the HDI. On the other hand, the index of maintained debt has a negative and significant effect on the HDI. This study also found that HDI has a positive and significant influence on the level of productivity. The results of this study can serve as a basis for consideration in improving human development and productivity particularly by maintaining economic and political stability and strengthening public policy support.

Keywords: Economy, Education Policy, Health Policy, Productivity, Human Development.

1 Introduction

Human development is important to boost productivity. The aspects contained in human development, namely health and education are important inputs for human quality in their role as components of human capital and labor in the production function. Improving public health and education has an important role in development efforts (Todaro and Smith, 2015). Human resources who have a good level of health and education will then be able to make a more optimal contribution to the production

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process. In a more optimal and efficient production process, it can produce better added value thereby supporting higher economic acceleration in a country.

However, the conditions of development in ASEAN countries, including from the aspect of human development, are still very diverse. Based on the publication of the 2020 Human Development Report (HDR), the human development index in ASEAN shows uneven development. There are countries with very high HDI levels such as Singapore (0.94), Brunei Darussalam (0.84), and Malaysia (0.81). On the other hand, Laos (0.61), Cambodia (0.59), and Myanmar (0.58) have low HDI.

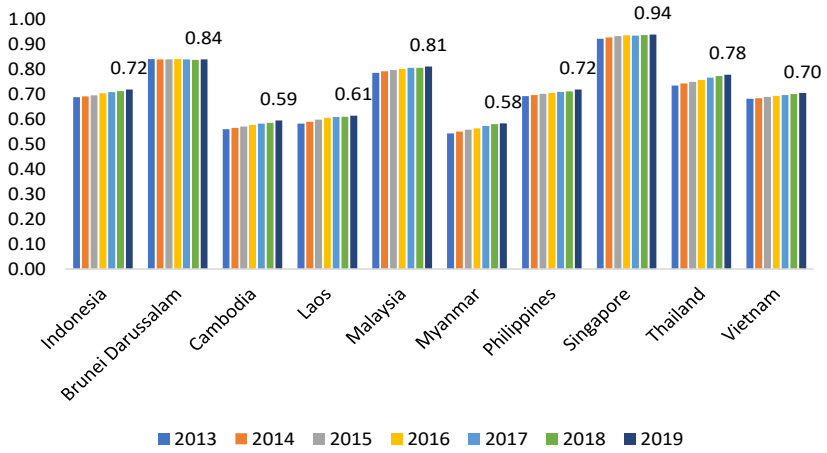

Fig. 1. Estimating the Effect of Independent Variables on the Human Development Index
Source: United Nations Development Programme, 2020 Human Development Report

This inequality can also be seen in various components of human development. From the economic component or in terms of public income (constant USD PPP 2017), Singapore has the highest per capita income in ASEAN with USD88,155, followed by Brunei Darussalam with USD63,965. Meanwhile, other countries recorded quite low, such as Myanmar USD4,961, and Cambodia USD 4,246. In the aspect of education, Singapore is also the highest with an average school of 11.6 years, and Malaysia 10.4 years, higher than Myanmar and Cambodia which have an average of 5 years. An overview of the unequal future of education can also be seen through expected years of education which Singapore recorded at 16.4 years, Thailand at 15 years, while Laos is still at 11 years, and Myanmar at 10.7 years.

The quality of health in ASEAN countries also has various challenges. Challenges in the health aspect include issues related to stunting and other health issues such as tuberculosis (TB), malaria, improved nutrition, and the need for acceleration to increase access to health for the community. From the human development component, the health side, which uses life expectancy levels, still varies. The life expectancy rate for Singaporeans is recorded high at 83.6 years, followed by countries such as Thailand at

77.2 years and Malaysia at 76.2 years, while countries such as Cambodia, Laos, and Myanmar have life expectancies below 70 years.

The level of productivity of ASEAN countries is also very diverse. From 2019 World Bank data, productivity calculated from GDP per working population (constant $ PPP 2017), shows that there are countries with very high levels of productivity such as Singapore (163,233) and Brunei Darussalam (132,940). Several other countries are still in the middle category, such as Malaysia (57,000), Thailand (32,366), Indonesia (24,362), and the Philippines (21,864). On the other hand, there are countries that are still below 20,000 such as Vietnam (17,976), Laos (14,994), Myanmar (10,935), and Cambodia, whose productivity are still very low at 7,859. This very unequal difference needs attention, especially to advance development in ASEAN countries.

To strengthen human development, a comprehensive approach is needed. Human development has broad dimensions, namely education, health, and the economy. For this reason, human development policies require support from various factors such as the economy, politics, and policies from the government. The various mix of influences from these aspects will improve human development that will contribute to promoting the country's productivity.

From the economic side, investment and the industrial sector are milestones in accelerating development. Most ASEAN countries are developing countries, so investment is an important source of capital to encourage economic activity. Based on the Partnership for Growth and Development forum adopted in 1996 at the 9th conference by the United Nations Conference on Trade and Development organization (cited in Schutter, et al., 2013) it is stated that FDI has an important role in development. In addition, W. Arthur Lewis stated that the more advanced a country, the economy will move towards a more modern, industrial-based economy and have a more sustainable development (Todaro and Smith, 2015). Meanwhile, Hollis B. Chenery stated that structural changes in a country move from the traditional agricultural sector to industry (Todaro and Smith, 2015).

Politics and community involvement are seen as having a major role in development. Stable politics and good community participation will further enhance the effectiveness of development programs so that higher quality human development can be achieved. Without political stability, countries can become failed states filled with conflict and war. The politics and democracy of a country have a positive influence on human development (Gerring, et al., 2012). Political stability is an important factor for a country to produce effective policies and programs. Fukuda-Parr (2003) states that democratic governance through political institutions expands the power and voice of the people and ensures accountability of decision makers is important in promoting human development.

Public policy is an important instrument to achieve development objectives. In terms of dimensions, policies in education and health have a close relation with human development. According to Todaro and Smith (2015) public financing for education provides good returns for human quality and productivity, while health financing will create healthy and productive individuals. Fiscal policy is crucial in ensuring the availability of development financing, but it needs to be healthy managed. Fiscal sources of debt are considered to have a sensitive side. Debt has a negative and

significant effect on economic growth and development (Annisa, et al., 2022). Meanwhile, public policy programs of education and health programs are also very much needed. Educational policy has a direct connection to human development given its dimensions, namely the expected year of schooling, and the average school year. In addition, the health policy is also a necessary aspect of human development especially in providing health access and making a healthier society.

Human development will bring more benefits to the development of a country where better human quality will support the country's productivity. The eighth SDG goal states that sustainable development including aspects of human development is aimed at boosting productivity and supporting inclusive economic growth. Human resources are the main actors for improving productivity (Ravianto, 1986). For that, human development is very important. A quality and productive workforce is crucial because other production factors are also influenced by the quality of the workforce that uses it (Simanjuntak, 1985). Thus, productivity is closely related to labor. Nicholson (2008) said that labor productivity is seen from the ratio of output per number of workers. From these perspectives, the better the quality of development, namely the aspects of education, health and economy will boost productivity and accelerate the country's development.

From the explanation above, human development needs a holistic approach including economy, politics, and policies. Previous empirical studies were more partial and looked more at the economic and fiscal policy sides, while reviewing the political, educational and health policies on human development was still limited. Study about debt and development is also still limited and no studies that look at the debt levels in terms of both the proportion of government debt to GDP and the proportion of government debt to state income. Study that analyzes public policies in terms of program in education and health is limited. Majority of previous studies only investigated human development index, but still limited in analyzing the components of human development that includes the aspect of education, health, and economy.

Based on the description above, the researcher conducted a study entitled "Determinant Factors of Human Development and Its Impact on Level of Productivity in ASEAN Countries". Researchers used the coverage of ASEAN countries considering ASEAN's position as part of the global community which aims to create a highly competitive economic region, and an economy that is increasingly integrated both in the ASEAN region and with the global economy.

2 Literature Review

Literature on human development increasingly requires a comprehensive and multi-aspect approach. For this reason, empirical research based on data on the impact of wide-ranging aspects such as economics and politics, and how policy interventions are carried out to influence human development is needed. In addition, empirical studies are also needed on how human quality in terms of education, health, and economic levels, in this case the level of income can boost the level of work productivity.

Furthermore, this study discusses how previous theories and research regarding the interrelationship of the aspects of economic in this case foreign direct investment (FDI), and the industrial sector, politics, and public policies on human development, and how the quality of human development affects the level of productivity.

FDI can support a country's economy because each country has limited resources. Dollar (1992), Sachs and Warner (1995) as quoted in Ali, et al. (2019) stated that a country with good foreign investment will have strong productivity and high growth. FDI can support human development, especially in terms of per capita income. FDI has a significant effect on per capita income growth while the effect of per capita income growth is significant in increasing HDI (Sofilda, et al., 2015). Nonetheless, FDI also has an impact on other components of human development. Ali, et al. (2019) said that FDI has a significant positive impact on human development both in terms of the income component and excluding the income component. In addition, Srivastava and Talwar (2020) say that there is an interrelated relationship between human development and FDI and economic growth. This illustrates that FDI, and human development will support accelerated economic development. Additionally, Bayar, et al. (2020) stated that there is a positive reciprocal relationship between human development and FDI. For this reason, it is necessary to look at how FDI interacts with the components in HDI.

Countries with advanced development generally have a good industrial sector, considering that industry has a high added value to spur economic growth. The richest and fastest growing economies are those with large industrial sectors (Chang and Zach, 2019). In developing countries, economic transformation generally starts from the primary sector (agriculture, fisheries, and mining) to the secondary production sector (industry, manufacturing, construction) and then to the tertiary sector (services and trade) (Taryono and Purnomo, 2012). However, the industry also has negative aspects. Li, et al. (2022) states that the level of economic development and the level of openness have a significant impact on the level of human development, but industrialization plays a negative role. Nonetheless, the industry can support development. Industry and medium technology levels have a large positive impact on development (Klafke, et al., 2018). Industry has relatively good added value, productivity, and efficiency. The performance of the manufacturing industry has a significant and positive effect on employment and the human development index (Masruri, 2022).

Political dynamics and the lack of public voice often become a challenge in public policy. Political upheaval can be counterproductive. Politics and good governance are prerequisites for a country to be more effective in growth and human development (Pradhan and Sanyal, 2011). In addition, Khan (2015) says that there is a strong link between the quality of human development, institutions, and politics. Rontos, et al. (2019) revealed that perceptions of corruption and income levels, human development, government effectiveness and the quality of the political system are closely related. Good community participation will provide an opportunity for people's aspirations to improve their welfare. Fukuda-Parr (2003) states that democratic governance through political institutions that expands the power and voice of the people and ensures accountability of decision makers is an important condition for promoting human development. Community participation plays a role in human development. Ahmad and

Saleem (2014) Government Effectiveness, Political Stability, Corruption Control and Regulatory Quality have a significant effect on human development. Maiorano and Manor (2017) found that human development is closely related to the political capacity and participation of society. With a better level of political capacity and opportunity, the community will be more able to proactively voice their interests and have the capacity to improve their welfare.

In Keynesian economic theory, the role of government is very important in development and economic stability. The role of the government is related to policies on state revenues and spending in achieving development goals. The policies taken by the government regarding the adjustment and allocation of the state revenue and expenditure budget for the national development target are referred to as fiscal policies (Sudirman, 2011). In this study, researchers focus on fiscal policies in relations with human development. By looking at the components of human development which include four main indicators, namely life expectancy, years of schooling, average years of schooling, and spending per capita adjusted for purchasing power parity, education and health expenditures are closely related to human development. Regarding the importance of the educational aspect, Hamzah, et al. (2012) found that the allocation of government funds spent on education is positively related to the quality of human development. Meanwhile, Sofilda, et al. (2015) found a positive relationship between education spending and human development. This is also emphasized in Edeme, et al. (2017) which states that education spending has a positive impact on human development. On the other hand, Ranis, et al. (2000) found that public spending on education on human development has a two-way relationship that influences each other. On the other hand, health spending is aimed at increasing access to health services for the community. Sofilda, et al. (2015), Edeme (2017), and Çağlayan-Akay and Van (2017) who found a positive relationship from health spending to human development. The important role of government spending to improve health services is also emphasized by Bhowmik (2018) who recommends increasing health spending for the community.

In addition, in looking at its relation to human development, this research will also examine fiscal policy from the perspective of government debt policy. The government's debt policy is basically motivated by limited sources of financing which are known as the state budget deficit. The budget deficit is the difference between state revenue and expenditure which is negative, or from this understanding, expenditure is greater than revenue. To cover the budget deficit and to finance development, large financing is needed. One of the sources in seeking financing is debt policy. In fiscal policy, financing can be done through debt and non-debt where non-debt financing can come from, among other things, excess budget balances, receipt of installment repayments on loans, and results of asset management. Nonetheless, the government's debt policy is basically motivated by limited sources of financing or non-debt financing (see among others: Samuelson & Nordhaus, 2001; Rosen, 2005). The study about debt and human development is still limited and the majority investigated debt with proportion to GDP, but not included the proportion of government debt to state revenue.

Public policy programs are crucial to achieve development objectives. The education policy in this study focuses on compulsory education policy. Arwildayanto (2019) says

that the compulsory education program accelerates educational equity and has a significant impact on improving human development by increasing literacy rates, average length of schooling. In addition, regardless of the level of development of a country, compulsory education and investment in education can improve welfare (Lu, 2020). There is a causal relationship between education and sustainable economic growth (Liao, et al., 2019). However, the previous literature was not specific using years of compulsory education and was more on qualitative analysis. Meanwhile, immunization is one of the health policy programs that has been implemented in various countries. Doherty, et al. (2016) stated that immunization supports the use of health services and general welfare, cognitive development, and economic productivity, so that ensuring the success of a sustainable immunization program can be the responsibility of individuals, health workers, government, and industry. In addition, globally, the HDI score is positively related to an increase in a country's vaccine coverage (Hayman, 2018). Previous journals were still limited and looked more at immunization policies using qualitative methods.

The quality of human resources is important in driving productivity. The level of human development is one of the main factors influencing the growth of labor productivity (Elmawazini, et al., 2016). Human resources who have good levels of health and education will then be able to make a more optimal contribution to economic activity. As in human development, education and health are the main components. Baharin, et al. (2020) said that education and health had a significant positive effect on labor productivity. In addition, the quality of human resources (higher education level and better health status) increases the level of labor productivity, although the impact of health on labor productivity is greater than the education aspect (Arshad and Malik, 2015).

Discussion regarding the role of economic, political, and public policy on human development is still developing. This is an opportunity for researchers to continue to elaborate on various comprehensive aspects to produce optimal policy recommendations. Focusing on human development is an important prerequisite in the development of a country and supports productivity.

3 Research Methodology

This study aims to investigate the influence of determinant factors of human development that includes the aspect of economy, politics, and public policies, and how human development influence productivity. Accordingly, this study investigates the impact of political stability index and absence of violence/terrorism influence, vote index and Accountability, Education Expenditure, Health Expenditure, Maintained Debt Level, Education Policy (Compulsory Education) and Health Policy (Immunization Coverage) on the Human Development Index, and how human development influences productivity in ASEAN countries. This research utilizes panel regression method. The choice of this method was based on the fact that the panel model can produce good estimates (de la Fuente, 2000). In addition, the panel regression model uses a larger number of observations so that it can make the estimation results

stronger (Hsiao, 1995). The panel method has been widely used in various economic studies. According to Gujarati (2003), in various studies, the panel data method has various names including pooled data, combination time series and cross-section data, micro panel data, longitudinal data, event history analysis, and cohort analysis. Data processing is done using the Stata application.

This research was conducted based on the 2020 Human Development Report database, using data from 2002 to 2019. In this research, the first element is to look at how FDI, industry, political stability index and absence of violence/terrorism influence, vote index and Accountability, Education Expenditure, Health Expenditure, Maintained Debt Level, Education Policy (Compulsory Education) and Health Policy (Immunization Coverage) on the Human Development Index. In addition, this study will look at how the independent variables interact with the components of human development index consisting of education, health, and the economy. Then, this study will see how the influence of HDI and the components of HDI on productivity.

The use of these variables refers to previous studies. FDI variable refers to research by Sofilda, et al. (2015), Ali, et al. (2019), and Srivastava and Talwar (2020), who examined FDI as a factor that has an influence on HDI. Industry variables follow research from Chang and Zach (2019), Li, et al. (2022), and Klafke, et al. (2018) regarding industrialization and development, and Masruri (2022) about manufacturing industry and human development. From politics, variable stability politics and the absence of violence/terrorism refers to research by Gerring, et al. (2012), Pradhan and Sanyal (2011), and Khan (2015) who looked at aspect political using World Governance Indicators by the World Bank. Then Rontos et al. (2019), who saw quality system politics and political stability in development. Meanwhile, voice and accountability based on Fukuda-Parr's (2003) research on the importance of voice and accountability in human development, Ahmad and Saleem (2014) about the effectiveness of government, political stability, control of corruption and quality of regulation, as well Maiorano and Manor (2017) about society participation in politics. From the aspect of fiscal policy, education spending refers to research from Hamzah, et al. (2012), Sofilda, et al. (2015), Edeme, et al. (2017) who looked at the relationship between education spending and human development, and Ranis, et al. (2000) regarding the relationship between public spending on education and human development, and Bhowmik (2018) regarding government spending on education. On the health expenditure, this study refers to the research of Sofilda, et al. (2015), Edeme (2017), and Çağlayan-Akay and Van (2017) regarding health spending on human development, as well as Bhowmik's (2018) recommendations regarding health spending for the community.

In terms of debt policy, this study refers to previous studies and then builds a maintained debt level index. This study refers to the methodology of Moodys credit rating that looks at debt in terms of the proportion of to GDP and to state income, which means that the lower the debt level, the better the index (Moodys, 2019). Debt policy on development is based on research by Viddy, et al. (2019), Mezni and Djebali (2022) regarding the importance of government debt in development, and Annisa, et al. (2022) regarding the need to maintain debt levels, as well as Cecchetti, et al. (2011), Zaghdoudi, (2018) regarding the need for debt management at a moderate level, because at a high level, it will have a negative impact. In terms of education and health policy, this research refers to related previous research. The education policy in this

study, namely the compulsory education policy refers to Arwildayanto (2019), and Lu (2020) regarding the importance of compulsory education policy factors in development, and Liao, et al. (2019) regarding the crucial role of education for sustainable economic growth. Then from the health policy side, this study refers to the research of Doherty, et al. (2016) regarding the importance of immunization for health services, welfare, productivity, and Hayman (2018) regarding the relationship between immunization coverage and HDI.

Then, the aspect that will be studied further, namely the relationship between human development and productivity, is also based on previous research literature. Improving human quality is an important factor in the development of a country. The previous research used was Elmawazini, et al. (2016) regarding the positive relationship between human development and labor productivity, Baharin, et al. (2020) regarding the importance of education and health on labor productivity, and Arshad and Malik (2015) regarding the relationship between the quality of human resources seen from higher levels of education and better health status with increased labor productivity.

The model used is as follows

$$IPM\ it = \alpha + \beta\ 1\ FDI\ it + \beta\ 2\ IDT\ it + \beta\ 3\ STP\ it + \beta\ 4\ SAK\ it + \beta\ 5\ BPD\ it + \beta\ 6\ BKH\ it + \beta\ 7\ KTU\ it + \beta\ 8\ KPB\ it + \beta\ 9\ KKI\ it + e\ it \quad (1)$$

Where: IPM is human development index, FDI is direct investment, IDT is industry, STP is stability in politics and no exists violence/terrorism, SAK is voice and accountability, BPD is education expenditures, BKH is health expenditure, KTU is maintained debt level index, KPB is education policy, KKI is health policy, and e is error coefficient.

This research will also further examine the interaction between the dependent variables to the sub-components of the human development index consisting of education, health, and the economy to investigate whether they have the same impact.

Subsequently, this study will examine how the HDI in regards the impact of the independent variables influences productivity, hence the model as follow:

$$PDV\ it = \alpha + \beta\ 1\ IPMFitted\ it + e\ it \quad (2)$$

Where: PDV is labor productivity, IPM Fitted is fitted value of HDI.

In addition, this research investigates the interaction between sub-HDI (IPMP/ education, IPMK/health and IPME/economic) on productivity.

This study uses statistical procedures to select panel data estimates. Widarjono (2007) states that there are three tests, namely the F statistical test (Chow test) to choose between the Common Effect method or the Fixed Effect method, the Hausman test to choose between the Fixed Effect or the Random Effect method, and the Lagrange Multiplier (LM) test to choose between methods Common Effect or Random Effect method. According to Nachrowi and Usman (2006) the choice of the Fixed Effect method or the Random Effect method can be carried out by considering the purpose of analysis in research, but there is also the possibility that the data used in the model is only correct if it is processed by one of the methods due to technical mathematical calculations.

4 Results And Finding

Through a series of panel data regression statistical testing techniques, namely the Chow Test and Hausman Test, the test results obtained that the best equation model is the Fixed Effect Model. Based on the estimation results of the panel data model using the fixed effect model, the estimation results are obtained in the following table:

Table 1. Estimating the Effect of Independent Variables on the Human Development Index

Dependent Variable: Human Development Index			
Independent Variables	**Fixed Effect**		
	Coefficient	**Std. Error**	**Prob**
Foreign Direct Investment	0.0023	0.000660	0.000 ***
Industry	0.0026	0.000438	0.000 ***
Political Stability and Absence of Violence/Terrorism	0.0330	0.005283	0.000 ***
Voice and Accountability	0.0474	0.006998	0.000 ***
Education Expenditure	0.0018	0.002918	0.541
Health Spending	0.0415	0.006878	0.000 ***
Level of Maintained Debt Index	-0.0058	0.002185	0.008 ***
Education Policy (Compulsory education)	0.0043	0.001094	0.000 ***
Health Policy (Immunization)	0.0012	0.000229	0.000 ***
Constant	0.4543	0.027830	0.000
R-squared	0.9134		
Model Selection Test			
Method	**Chi-square**	**Probability**	**Conclusion**
Chow Test	878.89	0.0000	Fixed effect
Hausman Test	143.68	0.0000	Fixed effect

Source: Researcher, Data processed
Key: *** p<0.001, ** p<0.01, * p<0.05

The variables of FDI, Industry, Political Stability Index and Absence of Violence/Terrorism, Voice and Accountability Index, Health Spending, Education Policy, and Health Policy have a positive and significant effect on HDI. Meanwhile, the Education Expenditure variable has a positive but not significant effect on the Human Development Index. On the other hand, the variable Level of Maintained Debt has a significant negative effect on the Human Development Index. The R-Square value recorded at 0.9134 illustrates that the variation of the dependent variable from the regression equation in this model can be explained by the independent variable in the equation of 91.34 %. Fiscal policies are noted to have had various effects on the HDI. Education spending policy has a positive but not significant effect on HDI. Meanwhile, Health Expenditure has a significant positive effect on HDI with a one % increase in the value of Health Expenditure will increase HDI by 0.0415. On the other hand, the Maintained Debt Index has a significant negative effect on HDI with every increase of one unit of Maintained Debt Index will be followed by a decrease in HDI by 0.0058.

In addition, public policies from a technical perspective, namely education and health policies, have a significant positive influence on HDI. Compulsory education policy has a significant positive effect with every one-year increase in compulsory education followed by an increase in HDI of 0.0043. In terms of health policy, every one percent increase in immunization coverage will be followed by an increase in HDI of 0.0012.

This research also conducts further examination on the interaction between the dependent variables to the sub-components of the human development index consisting of education, health, and the economy to investigate whether they have the same impact or might be different.

Table 2. Estimating the Influence of Independent Variables on the Components of Human Development Index Including Education, Health, and Economy

Independent Variables	HDI Education (Mean Years of Schooling and Expected Years of Schooling)		HDI Health (Life Expectancy at Birth)		HDI Economy (Income per Capita)	
	Fixed Effect		Fixed Effect		Fixed Effect	
	Coefficient	Prob	Coefficient	Prob	Coefficient	Prob
Foreign Direct Investment	0.0366	0.002 **	0.1677	0.000 ***	0.0194	0.001 **
Industry	0.0312	0.000 ***	0.0282	0.133	0.0331	0.000 ***
Political Stability and Absence of Violence/Terrorism	0.3984	0.000 ***	1.7335	0.000 ***	0.3450	0.000 ***
Voice and Accountability	1.0053	0.000 ***	1.6837	0.000 ***	0.3111	0.000 ***
Education Expenditure	0.0519	0.356	0.4183	0.003 **	-0.0212	0.431
Health Spending	0.6937	0.000 ***	2.1512	0.000 ***	0.3274	0.000 ***
Level of Maintained Debt Index	-0.0609	0.095	-0.1716	0.042 *	-0.0682	0.001 **
Education Policy (Compulsory education)	0.0939	0.000 ***	0.2835	0.000 ***	0.0211	0.058
Health Policy (Immunization)	0.0186	0.000 ***	0.0933	0.000 ***	0.0091	0.000 ***
Constant	6.2257	0.000	57.6888	0.000	7.3428	0.000
R-squared	0.8635		0.9762		0.9572	
Model Selection Test						
Method	**Chi-square**	**Probability**	**Chi-square**	**Probability**	**Chi-square**	**Probability**
Chow Test	469.35	0.0000	520.32	0.0000	2221.37	0.0000
Hausman Test	126.58	0.0000	129.83	0.0000	158.51	0.0000

Source: Researcher, Data processed
Key: *** p<0.001, ** p<0.01, * p<0.05

In the model of the influence of the independent variables on the HDI Education, most of the independent variables have the same direction as in the model of the influence of the independent variables on HDI. FDI, Industry, Political Stability Index and Absence of Violence/Terrorism, Voice and Accountability Index, Health Spending, Compulsory Education Policy, and Health Policy (Immunization Coverage) have a significant positive effect on HDI Education (Average School Years and School Year

Expectations). Meanwhile, Education Expenditure has no significant positive effect, and the Maintained Debt Level Index has a negative but not significant effect on HDI Education.

In the model of the influence of the independent variables on HDI Health, most of the independent variables also have the same direction as in the model of the influence of the independent variables on HDI. FDI, Political Stability Index and Absence of Violence/Terrorism, Voice and Accountability Index, Health Spending, Compulsory Education Policy, and Health Policy (Immunization Coverage) have a significant positive effect on the Human Development Index on the Health side (Life Expectancy). Meanwhile, industry has no significant positive effect. On the other hand, the Maintained Debt Index has a significant negative effect on the HDI for Health. An interesting finding is that education spending has a significant positive effect on HDI health, whereas the previous impact on HDI was found to be insignificant.

In the model of the influence of the independent variables on the HDI Economy, most of the independent variables show the same direction as in the model of the influence of the independent variables on HDI. FDI, Industry, Political Stability Index and Absence of Violence/Terrorism, Voice and Accountability Index, Health Spending, Compulsory Education Policy, and Health Policy (Immunization Coverage) have a significant positive effect on the Economic HDI (Per Capita Income). Meanwhile, the Maintained Debt Level Index has a significant negative effect on the Economic HDI. On the other hand, Education Expenditure has no significant negative effect, and Compulsory Education Policy has a positive but not significant effect.

Table 3. Model Estimation Results of Human Development and Productivity

Dependent Variable: Productivity			
Independent Variable	Coefficient	Std. Error	Prob
Human Development Index on Productivity			
Human Development Index	6.6155	0.744039	0.000 ***
Constant	5.4719	0.517885	0.000
R-squared	0.9695		
HDI Education on Productivity			
HDI Component of Education (School Year & School Year Expectations)	0.2834	0.045302	0.000 ***
Constant	7.2287	0.453367	0.000
R-squared	0.9691		
HDI Health on Productivity			
HDI Component of Health (Life Expectancy)	0.1473	0.014431	0.000 ***
Constant	-0.5169	1.035232	0.618
R-squared	0.9526		
HDI Economy on Productivity			
HDI Component of Health (Life Expectancy)	0.9466	0.073714	0.000 ***
Constant	1.2389	0.690648	0.073
R-squared	0.9689		

Source: Researcher, Data processed

Key: *** $p<0.001$, ** $p<0.01$, * $p<0.05$

This study also looks at how the Human Development Index influences productivity by using the fitted value of the independent variable model equation on the dependent variable above. Based on the estimation results of the panel data model using the fixed effect model, the estimation results are obtained in the following table 3.

The results of the estimation of the influence of HDI and Sub HDI of Education, Health, and Economy on the level of productivity show consistent results in these models. Thus, the HDI, and the Education, Health, and Economic sub HDI both have a positive and significant influence on the level of productivity. The R-Square value of each model, namely HDI on productivity, was recorded at 0.9695, illustrating that the variation in the dependent variable from the regression equation in this model can be explained by the independent variable in the equation of 96.95 %. Meanwhile, the R-Square value of each model of the HDI Sub-HDI for productivity was recorded in the Education Sub HDI (0.9691), Health HDI Sub (0.9526), and Economy Sub HDI (0.9689). The results of the model test show that the HDI and each aspect in Sub HDI have a significant positive influence on the level of productivity in ASEAN countries.

5 Discussion

Foreign Direct Investment has a positive influence on HDI. The influence of Foreign Direct Investment is also consistent for each Sub HDI of education, health, and the economy. These results show that the flow of foreign investment into a country will bring an increase in the quality of human development. Investment supports economic activity, business climate and productivity so that residents have greater opportunities to improve their standard of living and level of welfare. This is in accordance with Bhowmik (2018) about the importance of investment inflows for human development, and Ali, et al. (2019), Srivastava and Talwar (2020), and Bayar, et al. (2020) who found a positive relationship between human development and FDI.

Industry has a significant positive effect on HDI. Industry also has a significant positive effect on HDI Education and Economy, but not significant on HDI Health. This result is in line with Chang and Zach, (2019) that found that developed economies have advanced industrial sectors. On the other hand, these results contradict Li, et al. (2022) who said industrialization had a negative impact. Nonetheless, this result confirms the theory that industry can support human development. This is in line with Klafke, et al. (2018) that industry and medium technology levels have a positive impact on development. The results of this study are also in line with Masruri (2022) which says that the performance of the manufacturing industry has a positive effect on employment and human development.

The Index of Political Stability and Absence of Violence/Terrorism has a significant positive effect on HDI. These results are consistent with the effect on HDI Education, Health, and Economy. The results of this study are in line with Pradhan and Sanyal (2011) who stated that with good politics and governance, countries can be more effective in their development processes towards higher levels of human growth and development, and Gerring, et al. (2012), Khan (2015), Rontos, et al. (2019), and Fukuda-Parr (2003) who found that there is a strong link between the quality of human development and political stability.

The Voice and Accountability Index has a significant positive effect on HDI. These results are also consistent with the effect on HDI Education, Health, and Economy. The results of this study are also in line with research from Fukuda-Parr (2003) which states that voice of the people and accountability will become an important condition for human development. In addition, this research is in line with Ahmad and Saleem (2014) who said that government effectiveness or accountability, political stability, corruption control and regulatory quality have a significant effect on human development. This research is also in line with Maiorano and Manor (2017) who found that human development is closely related to the political capacity and participation of society.

Education spending has no significant effect on HDI. The effect of Education Spending is also not significant on Education HDI and Economic HDI. On the other hand, Education Expenditure has a positive and significant influence on HDI Health. The result of the study does not confirm the findings of previous studies due to the partial level of significance. In addition, these results also show that education spending in ASEAN in general still needs to be optimized. Although most of the effect of education spending on HDI and sub HDI is not significant, the findings in this study

show an interesting fact that education spending has a positive influence on HDI Health. This is because proper and appropriate education spending will increase the number of educated people. People who are increasingly educated will pay more attention to the level of health both for themselves and for their family members. A good level of health will be able to improve the life expectancy of the community.

Health spending policies have a positive and significant effect on human development. These results are consistent with the effect on HDI Education, Health, and Economy. This result is in line with Sofilda, et al. (2015), Edeme, et al. (2017) stated that health spending has a positive impact on human development. This result is also in line with Ranis, et al. (2000) who found that public spending on health on human development has a two-way relationship that influences each other, and Bhowmik (2018) who stated the importance of increasing government spending on education and health. Meanwhile, these results are also consistent with Çağlayan-Akay and Van (2017) who found a positive relationship between health spending and human development.

The Maintained Debt Level Index has a significant negative effect on HDI. This effect is consistent with each of the HDI Sub-Components except for the Education HDI which is not significant. The results of this study are in line with Viddy, et al. (2019) who said that government debt had a positive and significant impact on human development, and Mezni and Djebali (2022) who said that the flow of loans through credible institutions had a positive influence on the human development index. On the other hand, these results contradict research from Annisa, et al. (2022) who said that debt has a negative and significant effect on economic development (Annisa, et al., 2022). Meanwhile, partially these results also do not match the research from Cecchetti, et al. (2011), and Zaghdoudi (2018) that debt at a moderate level will increase welfare and increase growth, but at a high level it will be detrimental.

Compulsory education has a significant positive effect on HDI. These results are also consistent with the interaction of compulsory education on the HDI for Education and Health, but not significantly for the HDI Economics. The results of this study are in line with research from Arwildayanto (2019) which says that compulsory education is positively related to development. Then, these results are also in line with research from Lu (2020) which states that education policies which include compulsory education and investment in education have a close relationship with improving people's welfare. This is in line with research from Liao, et al. (2019) who said that education and sustainable economic growth have a mutually influencing relationship.

Immunization policy has a significant positive effect on HDI. These results are consistent with interactions with HDI in terms of Education, Health, and the Economy. This result is in line with Doherty, et al. (2016) which states that immunization supports the utilization of health services, general welfare, cognitive development, and economic productivity, so that collaboration between individuals, health workers, government and industry is needed. In addition, these results are in line with Hayman (2018) which states that HDI is positively related to an increase in a country's immunization coverage.

The results of the estimation of the influence of HDI and Sub HDI of Education, Health, and Economy on the level of productivity show consistent results in various model tests in this study. HDI, and sub HDI Education, Health, and Economy both have

a positive and significant impact on the level of productivity. The results of this study are in line with Elmawazini, et al. (2016) who said that human development is one of the main factors influencing the growth of labor productivity. Humans with good quality in terms of education, health and economy will be more productive and support the effectiveness and efficiency of production. This is also in line with research from Baharin, et al. (2020) which says that education and health have a significant positive effect on labor productivity. The results of this study also confirm the results of research from Arshad and Malik (2015) which said that the quality of human resources (higher education level and better health status) can increase the level of labor productivity, although the impact of health on labor productivity is greater. compared to the educational aspect.

6 Conclusions And Recommendations

This study shows that economic aspects, political aspects, fiscal policy support, and education and health policies have a crucial influence on human development, while human development can lead to better productivity. From the aspect of economy, FDI has a positive and significant effect on HDI. FDI has been shown to have an important role in human development in ASEAN. Meanwhile, Industry has a significant positive effect on HDI in ASEAN. The industrial sector also has a significant positive effect on the Education and Economy, but not significant effect on the sub-Health HDI. These results confirm the importance of the industrial sector in improving the quality of human development in ASEAN countries.

Subsequently, political aspects also have a significant influence on human development. The Political Stability Index and Absence of Violence/Terrorism along with Voice and Accountability Index have a significant positive effect on HDI. These results indicate the importance of stable politics play an important role in improving the quality of human development. Political stability and a good level of security are indispensable for inclusive development. The results of this study also confirm that the role of community participation in the country's development is very crucial.

Fiscal policies have various effects on HDI. Education spending does not have a significant effect on HDI but has a positive and significant influence on health HDI. These results show that education spending in ASEAN in general still needs to be optimized. Meanwhile, Health expenditure has a significant positive effect on HDI. On the other hand, the Maintained Debt Index has a significant negative effect on the HDI. The results of this study indicate that the role of debt is still very crucial to development in ASEAN countries and is still an important source of financing.

Public policies in education and health are also found to have an influence on human development. Compulsory education policy has a significant positive effect on HDI. This positive effect is consistent with the interaction of the compulsory education policy variables on the Education and Health sub-HDI, but not significant on the Economic HDI. Meanwhile, health policy, in this case, immunization coverage, has a positive and significant effect on HDI. Immunization is found to have an important role in public health.

The results of the estimation of the effect of HDI and Sub HDI of Education, Health, and Economy on the level of productivity show consistent results in various model tests in this study. HDI and each of the aspects in the Sub HDI have a significant positive influence on the level of productivity in ASEAN countries. The results of this study can underline the importance of countries in ASEAN being more active in improving the quality of human development so that it can spur a good level of productivity.

The results of this study indicate that the aspects of economy, politics, fiscal policies, and education and health policies have a crucial influence on human development. This can serve as a basis for policy recommendations. In terms of economy, especially foreign direct investment, and development of the industrial sector, need to be intensified. The government needs to strengthen policies to support investment climate through improving domestic competitiveness along with strengthening industrial sector. In terms of politics, political stability must be maintained and accompanied by community participation. Meanwhile, public policies for education and health need to be further optimized. In terms of education, steps that can be taken include establishing programs based on measurable outputs and outcomes. The Government must strengthen cooperation and collaboration in every line to oversee the implementation of education programs. In terms of health, the Government needs to strengthen the role of the health budget and encourage better implementation of health programs. The government should encourage increased access to health services in the community and try to reduce the proportion of out of pocket spending. Immunization policy also needs to be continuously improved by ASEAN countries. Meanwhile, the government should maintain the fundamentals of fiscal policy by strengthening the quality and productive side of state revenue and spending. The governments of ASEAN countries should increasingly consider the important role of human development in supporting country productivity by strengthening development priorities in education, health, and the economy.

References

1. Ahmad, Z., & Saleem, A. (2014). Impact of Governance on Human Development. *Pakistan Journal of Commerce and Social Sciences, Vol. 8(3), 612-628.* Retrieved from http://www.jespk.net/publications/198.pdf
2. Ali, L., Manzoor, A., & Yousaf, S. (2019). Contribution of Foreign Direct Investment in Economic Development of Pakistan: A Human Development Perspective. *GMJACS Volume 9, Number 1, 50-64.* Retrieved from https://gmjacs.bahria.edu.pk/index.php/ojs/article/view/78
3. Annisa, N., Nairobi & Taher, ARY (2022). The Effect of Foreign Debt, Labor Force, and Net Exports on Indonesia's Economic Growth in Period of 1986 Q1 - 2020 Q4. *Journal of Economics and Business Jagaditha, 9(1), 39-46.* Retrieved from https://dx.doi.org/10.22225/jj.9.1.2022.39-46
4. Arshad, M.N.M., & Malik, Z.A. (2015). Quality of Human Capital and Labor Productivity: A Case of Malaysia. *International Journal of Economics, Management and Accounting 23, no. 1, 37-55.* Retrieved from https://journals.iium.edu.my/enmjournal/index.php/enmj/article/view/289
5. Arwildayanto (2019). Examining the effectiveness of prodira policy on improving human development index at Province of Gorontalo. *IOP Conf. Series: Earth and Environmental Science 314, 012074.* Retrieved from https://doi.org/10.1088/1755-1315/314/1/012074
6. Association of Southeast Asian Nations (ASEAN) (n.a.). About ASEAN
7. Central Bureau of Statistics (2022). Released Indonesian Statistics
8. Baharin, R. Aji, R.H.S., Yussof, I., & Saukani, N.M. (2020). Impact of Human Resource Investment on Labor Productivity in Indonesia. *Iranian Journal of Management Studies (IJMS), Vol. 13, No. 1, pp. 139-164.* Retrieved from https://doi.org/10.22059/ijms.2019.280284.673616
9. Bayar, Y., Remeikiene, R., Androniceanu, A., Gaspareniene, L., & Jucevicius, R. (2020). The Shadow Economy, Human Development and Foreign Direct Investment Inflows. *Journal of Competitiveness, 12(1), 5–21.* Retrieved from https://doi.org/10.7441/joc.2020.01.01
10. Bhowmik, D. (2018). Nexus Between Growth and Human Development Index: Evidence from India and Indian States. *Journal of Interdisciplinary Research (AU- eJIR): Vol. 3. Issue.2.* Retrieved from http://www.assumptionjournal.au.edu/index.php/eJIR/article/view/4118
11. Çağlayan-Akay, E. & Van, M.H. (2017). Determinants of the Levels of Development Based on the Human Development Index: Bayesian Ordered Probit Model. *International Journal of Economics and Financial Issues, 7(5), 425-431.* Retrieved from https://www.econjournals.com/index.php/ijefi/article/view/5271
12. Chang, H.J. & Zach, K. (2019). Industrialization and Development in Asian Transformations: An Inquiry into the Development of Nations. Edited by Deepak Nayyar, Oxford University Press
13. Cecchetti, S., Mohanty, M., & Zampolli, F. (2011). The Real Effects of Debt. *BIS Working Papers, No. 352, Bank for International Settlements.* Retrieved from https://ideas.repec.org/p/bis/biswps/352.html
14. De la Fuente, A. (2000). Mathematical Methods and Models for Economists. Cambridge University Press

15. Doherty, M., Buchy, P., Standaert, B., Giaquinto, C., & Cohrs, D.P. (2016). Vaccine impact: Benefits for human health. *Vaccine 34, 6707–6714.* Retrieved from https://doi.org/10.1016/j.vaccine.2016.10.025
16. Dollar, D. (1992). Outward-Oriented Developing Economies Really Do Grow More Rapidly: Evidence from 95 LDCs, 1976-1985. *Economic Development & Cultural Change, 40, 523-544* Retrieved from https://doi.org/10.1086/451959
17. Edeme, R.K., Nkalu, C.N., & Ifelunini, I.A. (2017). Distributional impact of public expenditure on human development in Nigeria. *International Journal of Social Economics Vol. 44 No. 12, p. 1683-1693.* Retrieved from https://doi.org/10.1108/IJSE-05-2016-0152
18. Elmawazini, K., Saleeby, E.G., Farouk, A.I.E., & Al-Naser, B. (2016). Tripartite decomposition of labor productivity growth, FDI and human development: evidence from transition economies. *Econ Change Restruct.* Retrieved from https://doi.org/10.1007/s10644-016-9197-7
19. Fukuda-Parr, S. (2003) The Human Development Paradigm: Operationalizing Sen's Ideas on Capabilities. *Feminist Economics, 9:2-3, 301-317.* Retreived from https://doi.org/10.1080/1354570022000077980
20. Gerring, J., Thacker, S.C., Alfaro, R. (2012). Democracy and Human Development. *The Journal of Politics, Vol. 74, No. 1, 1–17.* Retrieved from http://dx.doi.org/10.1017/S0022381611001113
21. Gujarati, D.N. (2003). Basic Econometrics. Translation: Sumarno Zain. Jakarta, Erlangga
22. Hamzah, M.Z., Risqiani, R., & Sofilda, E. (2012). Human Development Quality and Its Problems in Indonesia. *OIDA International Journal of Sustainable Development 05:07.* Retrieved from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2192206
23. Hayman, D.T.S. (2018). Measles Vaccination in An Increasingly Immunized and Developed World. *Human Vaccines & Immunotherapeutics.* Retrieved from https://doi.org/10.1080%2F21645515.2018.1517074
24. Hsiao, C. (1995). Panel Analysis for Metric Data. In: Arminger, G., Clogg, C.C., Sobel, M.E. (eds) Handbook of Statistical Modeling for the Social and Behavioral Sciences. Boston, Springer
25. Khan, H. (2015). Good Governance and Human Development in Developing Countries, with Special Reference to South Asia. *Public Administration, Governance and Globalization 15.* Retrieved from https://www.springerprofessional.de/en/good-governance-and-human-development-in-developing-countries-wi/2372606
26. Klafke, R.V., Picinin, C.T., Raiher, A.P., & Pilatti, L.A. (2018). Brazilian industrialisation: The influence of technological levels on the gross domestic product and Human Development Index. *International Journal of Business Innovation and Research, 16(2).* Retrieved from http://dx.doi.org/10.1504/IJBIR.2018.10009709
27. Li, Z., Zheng, X., & Sarwar, S. (2022). Spatial Measurements and Influencing Factors of Comprehensive Human Development in China. *Sustainability, 14, 5065.* Retrieved from https://doi.org/10.3390/su14095065
28. Liao, L., Du, M., Wang, B. & Yu, Y. (2019). The Impact of Educational Investment on Sustainable Economic Growth in Guangdong, China: A Cointegration and Causality Analysis. *Sustainability, 11, 766.* https://doi.org/10.3390/su11030766
29. Lu, C.H. (2020). Child labor and compulsory education: the effects of government education policy on economic growth and welfare. *Economic Theory. 69:637–666.* Retrieved from https://doi.org/10.1007/s00199-019-01176-w

30. Maiorano, D. & Manor, J. (2017). Poverty reduction, inequalities and human development in the BRICS: policies and outcomes. *Commonwealth & Comparative Politics, 55:3, 278-302.* Retrieved from https://core.ac.uk/download/pdf/82925437.pdf
31. Masruri (2022). Pengaruh Kinerja Industri Manufaktur Terhadap Penyerapan Tenaga Kerja dan Indeks Pembangunan Manusia di Provinsi Banten. *Jurnal Ekonomi, Volume 24 Nomor 1.* Retrieved from https://doi.org/10.37721/je.v24i1.985
32. Mezni, M. & Djebali, N. (2022). External Debt and Human Development Index: MENA Region Case. *Research Square.* Retrieved from https://doi.org/10.21203/rs.3.rs-1650276/v1
33. Moodys (2019). Sovereign Ratings Methodology. Retrieved from https://www.moodys.com/researchandratings/research-type/methodologies-frameworks/-/003006/003006/-/-1/0/-/0/-/-/-/-/-/-/-/-/global/pdf/-/rra
34. Nachrowi, N.D & Usman, H. (2006). Pendekatan Populer dan Praktis Ekonometrika untuk Analisis Ekonomi dan Keuangan, Jakarta: LPFE Universitas Indonesia.
35. Nicholson, W. (2008). Microeconomic Theory Basic Principles and Extensions. South-Western Cengage Learning
36. Pradhan, R.P., & Sanyal, G.S. (2011). Good governance and human development: Evidence from Indian States. *Journal of Social and Development Science Vol. 1, No. 1, pp. 1-8, Feb 2011.* Retrieved from https://doi.org/10.22610/jsds.v1i1.622
37. Ranis, G., Stewart, F., & Ramirez, A. (2000). Economic Growth and Human Development. *World Development Vol. 28, No. 2, pp. 197-219.* Retrieved from http://www.econ.yale.edu/~granis/papers/cp0546.pdf
38. Ravianto, J. (1989). Kualitas dan Produktivitas. Jakarta, Lembaga Sarana Informasi Usaha dan Proktivitas
39. Rontos, K., Vavouras, I., Ciommi, M.T., Salvati, L. *(2019).* Two faces of the same coin? A comparative, global approach to corruption and socio-economic development. *Quality & Quantity (2019) 53:1875–1894.* Retrieved from https://doi.org/10.1007/s11135-019-00846-0
40. Rosen, H.S. (2005). Public Finance. McGraw-Hill
41. Sachs, J.D., & Warner, A. (1995). Economic reform and the process of global integration. *Brookings papers on economic activity, 1995(1), 1-118.* Retrieved from https://www.brookings.edu/wp-content/uploads/1995/01/1995a_bpea_sachs_warner_aslund_fischer.pdf
42. Samuelson, P.A., & Nordhaus, W.D. (2001). Ilmu Makroekonomi. Jakarta, PT. Media Edukasi
43. Schutter, O.D., Swinnen, J., & Wouters, J. (2012). Foreign Direct Investment and Human Development: The Law and Economics of International Investment Agreements. London, Routledge
44. Simanjuntak, P.J. (1983). Produktivitas Kerja: Pengertian dan Ruang lingkupnya. Prisma
45. Sofilda, E., Hermiyanti, P., & Hamzah, M.Z. (2015). Determinant Variable Analysis of Human Development Index in Indonesia (Case for High and Low Index at Period 2004 – 2013). *OIDA International Journal of Sustainable Development 08:09.* Retrieved from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2695465
46. Srivastava, S., & Talwar, S. (2020). Decrypting the Dependency Relationship Between the Triad of Foreign Direct Investment, Economic Growth and Human Development. *The Journal of Developing Areas Volume 54 No. 2.* Retrieved from https://doi.org/10.1353/jda.2020.0012
47. Sudirman, W. (2011). Kebijakan fiskal moneter: teori dan empirikal. Jakarta, Kencana
48. Taryono, dan Purnomo, A.H. (2012) Ekonomi Pembangunan Perikanan dalam: Pengantar Teori Ekonomi Pembangunan. Jakarta, Universitas Terbuka, pp. 1-51

49. Todaro, M.P., & Smith, S.C. (2015). Economic Development, 12th ed. Pearson
50. United Nations Development Programme (2020). Human Development Report
51. Viddy, A., Rafiqoh, & Asniwati, B. (2019). The Determinants of Human Development Index and Economic Growth in Indonesia. *International Journal of Scientific & Technology Research Volume 8, Issue 12.* Retrieved from https://www.ijstr.org/final-print/dec2019/The-Determinants-Of-Human-Development-Index-And-Economic-Growth-In-Indonesia.pdf
52. Widarjono, A. (2007). Ekonometrika Teori dan Aplikasi. Yogyakarta, Ekonisia FE UII
53. Zaghdoudi, K. (2018). Is the relationship between external debt and human development non-linear? A PSTR approach for developing countries. *Economic Bulletin, 38(4), 2194-2216.* Retrieved from https://ideas.repec.org/a/ebl/ecbull/eb-18-00571.html