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Determinant of Human Development Index in ASEAN Countries

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Abstract

Human development index is one indicator of development progress on aspects of human quality in a country. This study aims to determine the factors that affect the human development index in nations in ASEAN member countries. The analysis technique used is regression by using panel data regression with fixed effect model. The results of processing with fixed effect model show that population and per capita income growth rate affects the human development index in ASEAN member countries, while the variable rate of inflation and unemployment rate does not have an impact on the human development index. This study implies the importance of government to control the population and acceleration of economic growth.

Keywords: human development index, ASEAN's countries, panel regressions

Abstrak

Indeks pembangunan manusia merupakan salah satu indikator kemajuan pembangunan pada aspek kualitas manusia di suatu negara. Penelitian ini bertujuan untuk menentukan faktor-faktor yang memengaruhi indeks pembangunan manusia pada negara-negara di negara anggota ASEAN. Teknik analisis yang dipergunakan ialah regresi dengan menggunakan regresi data panel dengan model efek tetap. Hasil pengolahan dengan model efek tetap menunjukkan bahwa jumlah penduduk dan tingkat pertumbuhan pendapatan per kapita memiliki pengaruh terhadap tinggi rendahnya indeks pembangunan manusia pada negara anggota ASEAN. Sedangkan variabel tingkat inflasi dan tingkat pengangguran tidak memengaruhi indeks pembangunan manusia. Penelitian ini berimplikasi pentingnya pemerintah melakukan pengendalian jumlah penduduk dan akselerasi pertumbuhan ekonominya.

Kata Kunci: indeks pembangunan manusia, negara ASEAN, regresi panel

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Introduction

The discussion on development is not just about income per capita growth only. Development is a multi-dimensional thing that covers various aspect of the community, such as the economy, social, politics, law, and security. Economic development as a process of real income increase per capita accompanied by changes and improvements to the institutional system -growth with changes-. Therefore, in measuring economic development, it is not enough to talk only per capita GDP growth. Instead, it will also discuss the problem of social structure change, institutional system, change of attitude and behavior of society which also becomes an essential element in economic development. Sarkar et al. (2012) said that human development is one of the core considerations of a country's level of development. Human development is evidently about enlarging people's choices by shared natural resources (Eren et al., 2014).

United Nations Development Programme (UNDP) had introduced human development index (HDI) in 1990. The HDI was created to emphasize that people and their capabilities should be the ultimate criteria for assessing the development of a country, not economic growth alone. The HDI can also be used to question national policy choices, asking how two countries with the same level of Gross National Income (GNI) per capita can end up with different human development outcomes.

The outcome differences can stimulate the discussion about government program priorities. At that first time (1990), the human development index was formed from four indicators. These four indicators reflect the long and healthy life, knowledge, and a decent standard of living. The HDI is the geometric mean of normalizing indices for each of the three dimensions. The three dimensions are health dimension, education dimension, and standard of living dimension. The health dimension assessed by life expectancy at birth. The education dimension is measured by mean of years of schooling for adults aged 25 years and more, and, expected years of schooling for children of school entering the age. The standard of living dimension measured by gross national income per capita. The HDI uses the logarithm of income, to reflect the diminishing importance of income with increasing GNI.

Theoretically, one factor that can accelerate the HDI is the increase in per capita income. Hasan (2013); Eren et al. (2014) show that GDP per capita affect the level of development. This improvement will increase the purchasing power of people and at the end will improve the quality of education and health. However, the high growth sector in the region does not necessarily reflect equitable prosperity for all people of the region. Moreover, the rapid rate of economic growth by itself will not follow by the increase or improve the distribution of profits for the entire population. The increasing performance of human development indicators can accelerate the transformation of the country from developing the country into a developed country.

The Association of Southeast Asian Nations (ASEAN) is a regional intergovernmental organization comprising ten southeast Asian states. ASEAN promotes Pan-Asianism and intergovernmental cooperation and facilitates economic, political, security, military,

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educational, and socio-cultural integration amongst its members and ASIAN nations. Table 1 shows the HDI differences among ten member countries. Singapore and Brunei Darussalam had included in the category of the very high human development index. Malaysia and Thailand include in high human development index. Indonesia, Vietnam, Philippines, Cambodia, Laos, and Myanmar include in medium human development index. These HDI differences show that there is a difference in government policies priorities among the ASEAN countries.

Table 1. Human Development Index in ASEAN Countries

No	Countries	2008	2009	2010	2011	2012	2013	2014	2015
1	Singapura	0.887	0.889	0.911	0.917	0.920	0.922	0.924	0.925
2	Brunei	0.841	0.845	0.846	0.852	0.860	0.863	0.864	0.865
3	Malaysia	0.756	0.764	0.774	0.776	0.779	0.783	0.787	0.789
4	Thailand	0.706	0.711	0.720	0.729	0.733	0.737	0.738	0.740
5	Indonesia	0.645	0.656	0.662	0.669	0.677	0.682	0.686	0.689
6	Myanmar	0.504	0.515	0.526	0.533	0.540	0.547	0.552	0.556
7	Filipina	0.661	0.662	0.669	0.666	0.671	0.676	0.679	0.682
8	Kamboja	0.520	0.519	0.533	0.540	0.546	0.553	0.558	0.563
9	Vietnam	0.641	0.647	0.655	0.662	0.668	0.675	0.678	0.683
10	Laos	0.525	0.535	0.542	0.554	0.563	0.573	0.582	0.586

Sources: UNDP

The aim of this study is to examine the factors that affecting the human development index in ASEAN countries, which consist of 10 countries. For this aim, panel regression with fixed effect was used. This research find that population and per capita income growth rate have an effect on the human development index in ASEAN member countries. While the variable rate of inflation and unemployment rate does not affect the human development index. This research would suggest several policy recommendation that can applied for the ASEAN countries that still in medium human development index.

Method

The data that used in this research is ten ASEAN members countries from the period of 2000 until 2015. The data that used in this research retrieved from World Bank and UNDP. To examine the determinant factor that affects the human development index in ASEAN countries will use the panel regression technique. Panel regression technique used if the data is a combination of time series data with object series data (cross-section). Panel regression technique used in this research is panel regression technique with fixed effect model. The mathematical equation that used in this research as follow:

$$HDI_{it} = \alpha + \beta_1 Ln\_Pop_{it} + \beta_2 Inf_{it} + \beta_3 Unemp_{it} + \beta_4 Ln\_GDP_{it} + \epsilon_{it} \quad (1)$$

Where:

HDI is human development of country i at period t

Ln_pop is population of country i at period t

Inf is inflation rate of country i at period t

Unemp is unemployment rate of country i at period t

Ln_GDP is income per capita growth of country i at period t

To estimate the parameter of the model using panel data regression. Several techniques can be used, such as First, ordinary least square. Second, fixed effect model. Third, random effect model. On this research is using panel regression with fixed effect model, because we assume that the intercept is not constant. There are several steps in this research, such as: first, run the estimation using fixed-effect model. Second, do the Chow-test to choose between pooled ordinary least square or fixed effect model. Third, do the Hausman-test to select between fixed effect model and random effect model.

Result and Discussion

Empirical Result

The first step in this research we estimate using fixed-effect model. After that using the Chow-test we can see that we reject the null hypothesis which stated that intercept is constant in i and t, so the best model is fixed effect model. We can see the Chow-test result in Table 3. The next step we estimate the equation with random effect model. After that using the using the Hausman-test, we can see that we reject the null hypothesis which stated the random effect model is consistent, so the best model that chose on this research is fixed effect model. We can see the Hausman-test result in Table 4.

Table 2. shows the empirical result by using fixed-effect model. The result shows that population and income per capita had an impact on the human development index in ASEAN. The significant value of constants in Table 2. indicates that if all independent variables do not exist, the value of the human development index will be negative. This result is entirely rational, because if all independent variables do not exist, then it indicates the absence of economic development in the country. The population had the adverse effect, and it means that the higher people it will reduce the quality of human development in the selected countries. This result explains why Singapore and Brunei Darussalam are in the most top category because those two countries have a population lower than other ASEAN countries. These findings indicate the importance of population control program.

The other variables that also affected human development index are income per capita growth; the result shows the positive relationship. This result implies that the higher economic growth of the country, it would make the higher of human development quality. Increased growth in per capita income shows an improving economy. States with higher per capita income growth rates will have the higher the human development index.

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Table 2. The Empirical Result of Fixed Effect Model

Dependent Variable: HDI				
Sample: 2000 2015				
Periods included: 16				
Cross-sections included: 10				
Total panel (balanced) observations: 160				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-6.7231	0.390203	-17.22979	0.0000
LN_POP	-0.4373	0.022881	-19.11325	0.0000
INF	-0.0004	0.000201	-1.854246	0.0657
UNEMP	0.0015	0.001605	0.957664	0.3398
GDP_per capita growth	0.1108	0.020522	5.399084	0.0000
Effects Specification				
Cross-section fixed (dummy variables)				
R-squared	0.9875	Mean dependent var		0.662944
Adjusted R-squared	0.9864	S.D. dependent var		0.131434
S.E. of regression	0.0154	Akaike info criterion		-5.431694
Sum squared resid	0.0344	Schwarz criterion		-5.162616
Log likelihood	448.5355	Hannan-Quinn criter.		-5.32243
F-statistic	885.2372	Durbin-Watson stat		0.244838
Prob(F-statistic)	0.0000			

The other variables such as inflation rate and unemployment rate don't have an effect on human development index in ASEAN countries. This result implies that the inflation rate doesn't have a direct relationship with the human development index, although the inflation will reduce the purchasing power of the people. The same result also explains the relationship between the unemployment rate and human development index. Although the unemployment rate doesn't have an impact on human development index, the government must also have a priority to reduce the unemployment rate. Simultaneously, all the independent variables affect the human development index. The determinant coefficient in this research shows 0.9864; it means that the variables can explain the model approximately 98.64% and the remainder explains by other variables outside the model.

Table 4 shows the Haussman test results, which aim to compare the fixed effect model with the random effect model. Hausman test results show a significant result. The result indicates that more stable if this research use fixed effect model rather than random effect model. Therefore, this research will use fixed effect model as a model to estimate the determinants of factors influencing human development index in ten ASEAN member countries. The observation conducted for 16 years in ten ASEAN countries, so the total observation was 160 observations.

Table 3. The Result of Chow Test

Redundant Fixed Effects Tests				
Test cross-section fixed effects				
Effects Test		Statistic	d.f.	Prob.
Cross-section F		672.6246	-9146.0000	0.0000
Cross-section Chi-square		599.7819	9.0000	0.0000
Cross-section fixed effects test equation:				
Dependent Variable: HDI				
Method: Panel Least Squares				
Sample: 2000 2015				
Periods included: 16				
Cross-sections included: 10				
Total panel (balanced) observations: 160				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.0793	0.0798	13.5268	0.0000
LN_POP	-0.0214	0.0052	-4.0781	0.0001
INF	-0.0036	0.0012	-3.1309	0.0021
UNEMP	0.0083	0.0032	2.6104	0.0099
GDP_per capita growth	-0.0148	0.0027	-5.4305	0.0000
R-squared	0.4680	Mean dependent var		0.6629
Adjusted R-squared	0.4543	S.D. dependent var		0.1314
S.E. of regression	0.0971	Akaike info criterion		-1.7956
Sum squared resid	1.4612	Schwarz criterion		-1.6995
Log likelihood	148.6445	Hannan-Quinn criter.		-1.7565
F-statistic	34.0925	Durbin-Watson stat		0.3240
Prob(F-statistic)	0.0000			

Based on the results in the previous section shows that the factors affecting the human development index in ASEAN member countries are population and income per capita, while the inflation rate and unemployment rate does not affect. Hasan (2013) found the positive correlation between HDI and GDP, which is the relationship tends to weaken at higher income levels. Solfilda et al. (2015) see that areas which have HDI below the average national HDI show that the average variable spending per capita, population, unemployment rate, budget allocation for education and health had a significant effect on the HDI. Besides that, the areas which have HDI above the average national level show that GDP, average spending per capita, the dependency ratio, unemployment rate, and the education budget had an impact on the HDI.

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Table 4. The Result of Hausman Test

Correlated Random Effects - Hausman Test				
Test cross-section random effects				
Test Summary		Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random		257.9291	4.0000	0.0000
Cross-section random effects test comparisons:				
Variable	Fixed	Random	Var(Diff.)	Prob.
LN_POP	0.4373	0.1531	0.0003	0.0000
INF	-0.0004	-0.0006	0.0000	0.0000
UNEMP	0.0015	-0.0114	0.0000	0.0000
GDP_per capita growth	-0.0008	-0.0016	0.0000	0.0000
Cross-section random effects test equation:				
Dependent Variable: HDI				
Sample: 2000 2015				
Periods included: 16				
Cross-sections included: 10				
Total panel (balanced) observations: 160				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-6.7231	0.3902	-17.2298	0.0000
LN_POP	0.4373	0.0229	19.1133	0.0000
INF	-0.0004	0.0002	-1.8542	0.0657
UNEMP	0.0015	0.0016	0.9577	0.3398
GDP_per capita growth	-0.0008	0.0005	-1.6132	0.1089
Effects Specification				
Cross-section fixed (dummy variables)				
R-squared	0.9875	Mean dependent var		0.6629
Adjusted R-squared	0.9864	S.D. dependent var		0.1314
S.E. of regression	0.0154	Akaike info criterion		-5.4317
Sum squared resid	0.0344	Schwarz criterion		-5.1626
Log likelihood	448.5355	Hannan-Quinn criter.		-5.3224
F-statistic	885.2372	Durbin-Watson stat		0.2448
Prob(F-statistic)	0.0000			

Discussion

Shah (2016) conclude that the determinant factors of human development index like GDP per capita, literacy rate, life expectancy at birth, Gini index, fertility rate, and Co2 emission are significant in empirical analysis. In region analysis, they observed that Europe, Central Asia, Latin America, and the Carribean have a higher human development index rather than in South Asia and Sub-Saharan Africa. Çaglayan-Akay and Van (2017) that in the short-term the variables of rural population, health expenditure, GDP, internet users, life expectancy at birth, the share of expected years of schooling had affected the human development index. In the long term, the variables that had a positive effect on human development index are health expenditure, GDP, internet users, the share of expected years

of schooling. Kpolovie et al. (2017) show that Africa has HDI means significantly lower than for each of the other continents in the world. Fruin et al. (2013) indicate that there is a relatively massive variation in the rate of income growth into human development.

Ananta (2013) points out that per capita regional gross domestic product per capita, government spending on education function, government expenditure on health functions affect human development index in Lampung Province. Yuliani and Saragih (2014) show that unemployment, economic growth, and the government spends affect the human development index in Central Java Province. Bhakti et al (2014) found that factors affecting the human development index in Indonesia are a gross regional domestic product (PDRB) and provincial budget for health, dependency ratio and household consumption for food. On the other side, the provincial budget for education does not affect the human development index. Economic growth, income distribution, population control, poverty alleviation, and improved health and education services are essential to improve the human development index.

Bintang et al. (2015) show that the factors that influence the development index in OIC countries are the education budget, the per capita income level, and the Gini index. The other side, the health budget, and total population do not affect the human development index in OIC countries. Dianaputra and Aswitari (2017) found that government financing in the education and health sectors affected the human quality index. Furthermore, government financing in the education and health sectors has an indirect effect on economic growth through the human development index.

Setiawan and Hakim (2013) find GDP and income taxes in both the short and long-term to the HDI. Also, the result also found that the economic crisis in 2008 affects the HDI. The 1997 crisis and government decentralization do not affect HDI. Singariya (2014) suggest to enlargement of women empowerment, and household facilities are essential to enhance the value of HDI. Countries having high HDI values may concentrate on all four determinants (life expectancy at birth, expected years of schooling, labor participation rate, and GDP per capita) and design their policies. Bangun (2016) also shows that women's economic participation is still far below men. The government also should take a priority program to this discrimination.

Engineer et al. (2008) conclude that planning strategies to maximize the HDI tend towards minimizing consumption and maximizing expenditures on education and health. A problematic feature of the optimal plans is that the income component in the HDI does not play its intended role of securing resources for a decent standard of living. Singariya (2014) shows that infant mortality rate, the incidence of poverty and marriage below age eighteen an of important role in reducing the value of HDI. The primary focus on those countries is the education dimensions to reach the standards of top nations (Eren et al., 2014). Baseri and Kia (2008) suggest that it is crucial to improving the expenditure of physical and human investments to improve the quality of human life in a region.

Binder and Georgios (2011) conclude that the differences in countries persistent characteristics may even affect the sign of the long-run development effects of a given macroeconomic policy. The government should do the fiscal stimuli to accelerate the human development. The quality of institutional will affect the effectiveness of fiscal stimuli. The human development index is closely related to improving the quality of human life in the education sector and the health sector. The government should allocate specifically to increase

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budget allocation in both sectors. Physical investment and investment in human capital is essential in building quality human resources. Qualified human resources will be a significant capital base in accelerating economic growth in a country.

Indonesia has been working hard to do this. The 20% budget allocation policy of the National Budgetary for the education sector is one of the affirmative policies undertaken to improve the quality of human resources. The various programs currently underway by the Indonesian government, both in the education sector and in the health sector, are among the efforts undertaken to improve the quality of human life.

Conclusion

The result of processing with fixed effect model shows that partially population and per capita of income growth rate influence the high of human development index in ASEAN member countries. Also, the F test scores indicate that simultaneously all independent variables (population, inflation rate, unemployment rate, and per capita income growth rate) affect the human development index.

Several policy recommendations can apply to policymakers regarding the human development index. First, the need for population control, as the more significant the population the government should increase its budget to enhance the education and health sectors. Second, the need for policies to accelerate the economy to grow faster. High economic growth will improve the quality of human life in ASEAN member countries. Third, the development of education sector infrastructure and health sector is critical. Therefore, the government should pay more attention and more allocation to both sectors.

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