Dynamics of Economic Factors Influencing Human Development in ASEAN-7

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Abstract

This study analyses the relationship between economic factors and human development in the seven ASEAN countries using the panel data regression approach and Moderated Regression Analysis (MRA). The factors investigated include international trade (TRD), per capita GDP growth (GrGDPPC), inflation (INF), and economic freedom (EFI). Panel data covers seven ASEAN countries during the 2012–2020 period. Based on the results of the panel data regression analysis, it was found that only the inflation variable did not have a significant effect on human development. Meanwhile, the results of the MRA analysis show that economic freedom acts as a quasi-moderation in the relationship between international trade and human development. Meanwhile, economic freedom is an independent variable influencing GDP per capita growth and inflation in human development. These findings provide a deeper understanding of the complexity of the interactions between economic factors shaping HDI achievement in ASEAN.

Keywords*: ASEAN, economic freedom, human development*
JEL*: O15, F43, E31, I32*

A. INTRODUCTION

Improving the quality of human development stands as a paramount goal for every nation globally, aligning with the primary objective of the Millennium Development Goals (MDGs), which emphasizes humans as the focal point of development endeavors (BAPPENAS, 2014). A pivotal instrument to gauge the success levels of these developmental efforts is the Human Development Index (HDI), which offers a holistic portrayal of human well-being and quality of life. Comprising health (measured by life expectancy), education (assessed through literacy rates and school enrolment), and income per capita, the HDI offers a comprehensive insight into a nation's social and economic advancement. Across Southeast Asia, ASEAN member nations have implemented substantial measures to enhance the quality of human development. These encompass diverse economic and social policies to ease community welfare and quality of life, spanning improved healthcare accessibility, enhanced educational standards, and promoting sustainable economic growth (Government Policy Document, Year). Economic factors wield a substantial influence on HDI. International trade, recognized as a catalyst for economic growth, contributes positively to HDI achievement by bolstering national income and job creation, supported by previous research (Frankel et al., 1996)(Seven & Coskun, 2016). Conversely, unchecked inflation poses a threat by eroding purchasing power and subsequently diminishing the quality of life (Blanchard & Quah, 1988). GDP per capita growth remains a critical indicator of economic progress, potentially facilitating increased HDI by enhancing access to health, education, and public facilities (Barro, 1991).

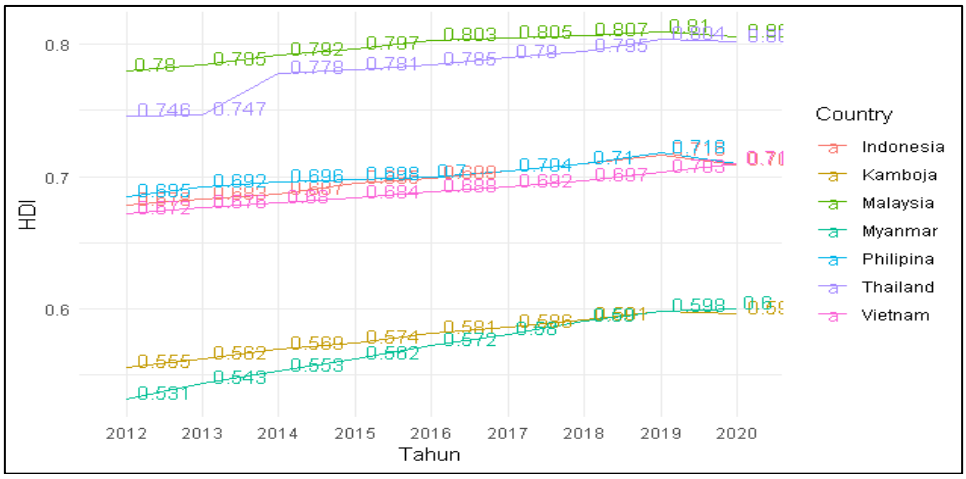

Figure 1. Human Development Index ASEAN Countries

Moreover, as a visual aid to comprehend the evolution of HDI across the ASEAN+7 nations from 2012 to 2020, this study includes a graph illustrating the trends in HDI development.

The graphical representation provides a comprehensive overview and comparative analysis of human development progress in these countries over the specified period. In understanding the intricate interplay between economic factors and the Human Development Index (HDI), attention must be directed towards moderating variables. One such variable, the Economic Freedom Index (EFI), has garnered attention for its comprehensive assessment of a nation's economic freedom, encompassing trade policy, business regulations, fiscal policy, and property rights. A high EFI signifies greater economic freedom, influencing various facets of economic growth and social welfare, thereby positively impacting HDI. Research has shown that elevated EFI levels can augment the positive correlation between international trade and HDI, fostering sustainable economic growth and enhancing living standards (Ramalho et al., 2010).

Moreover, EFI moderates the relationship between inflation and HDI by advocating lighter regulations and prudent fiscal policies, mitigating the adverse impact of inflation on living standards (Gwartney et al., 2022). However, it's vital to acknowledge that the role of EFI as a moderating variable is multifaceted and contingent on a nation's social, political, and economic context. The moderating impact of EFI on the relationship between GDP per capita growth and HDI warrants deeper examination (Glaeser et al., 2004).

This study explores the effects of trade, economic growth, inflation, and economic freedom on human development. Specifically, it seeks to answer two primary research questions: Firstly, to what extent do trade, economic growth, inflation, and economic freedom influence human development? Secondly, what moderating effect does economic freedom exert on trade relations, economic growth, and inflation concerning HDI? To delve deeper into these inquiries, this research employs an extensive analysis to provide a nuanced understanding of the intricate dynamics between economic factors and EFI in shaping HDI attainment.

B. LITERATURE REVIEW

Improving the Human Development Index (HDI) has become a significant focus for countries worldwide to improve the quality of life and people's welfare. The HDI measures health, education, and per capita income, an essential benchmark for measuring development progress. In Southeast Asia, ASEAN member countries have taken strategic steps to increase their HDI through various economic and social policies.

"Increased international trade, as an engine of economic growth, has been known to impact economic development and social welfare positively. Previous studies have underlined the positive contribution of trade to achieving HDI through increasing national income and creating jobs." (Dollar & Kraay, 2002). However, "uncontrolled inflation can hamper efforts to achieve a higher HDI. Low inflation maintains price stability and people's purchasing power." (Mohamed Emara, 2020) Furthermore, "GDP per capita growth also plays a significant role in achieving HDI. With increased per capita income, people have better access to education, health, and infrastructure services." (Barro, 1991)

One crucial factor moderating the relationship between economic factors and HDI is the "Economic Freedom Index (EFI). A high level of economic freedom can strengthen the positive impact of trade, controlled inflation, and per capita GDP growth on HDI." (Rode et al., 2018) In the context of this research, an in-depth understanding of the complex relationship between trade, inflation, GDP per capita growth, EFI, and HDI in ASEAN countries is essential. This study aims to fill knowledge gaps and provide deeper insight into these dynamics using a panel data regression model and a moderation regression approach. Thus, this research will provide a more comprehensive view of how economic factors and EFI contribute to achieving HDI in the ASEAN region.

C. RESEARCH METHODS

This study uses various variables in its analysis. In this study, human development, as measured through the Human Development Index (IPM) from the United Nations Development Program (UNDP), is used as the dependent variable. The independent variable includes trade, the total value of exports and imports of goods and services calculated as part of the Gross Domestic Product (GDP). In addition, it also involves per capita GDP growth and the inflation rate based on data obtained from the World Bank. To moderate, the variable used is economic freedom as measured by the Heritage Foundation's Economic Freedom Index (EFI).

The data used is panel data with the composition of time series data from 2012–2020 and cross-section data from 7 ASEAN countries, which consist of Indonesia, Cambodia, Malaysia, Myanmar, the Philippines, Thailand, and Vietnam. The analytical instrument used in this research is a multiple linear regression analysis approach to panel data and Moderated Regression Analysis (MRA). Multiple linear regression of panel data is utilised to analyze the direct effect of trade, GDP per capita growth, inflation, and economic freedom on HDI. In conducting multiple linear regression analysis of panel data, a model selection test was first carried out to determine the suitable model using the Chow, Hausman, and Lagrange Multiplier tests. Furthermore, the classical assumptions are tested after obtaining a suitable model. The last is to test the hypothesis with partial, simultaneous tests and the coefficient of determination. The following is the estimation model used for panel data regression:

$$HDI_{it} = \beta_0 + \beta_1 TRD_{it} + \beta_2 GrGDPPC_{it} + \beta_3 INF_{it} + \beta_4 EFI_{it}\ \varepsilon\ (\dots\dots 1)$$

Where HDI = Human Development, TRD = Trade, GrGDPPC = GDP Per Capita growth, INF = inflation rate, EFI = economic freedom, and ε = Error Term, the error level in estimating research. Three moderation regression models are used to analyze the moderating effect of financial freedom on the relationship between trade, GDP Per Capita growth, and inflation on HDI. The following is the estimated model used for moderation regression:

$$HDI_{it} = \beta_0 + \beta_1 TRD_{it} + \beta_2 EFI_{it} + \beta_3 TRE_{it} + \varepsilon\ (\dots\dots 2)$$

$$HDI_{it} = \beta_0 + \beta_1 GrGDPPC_{it} + \beta_2 EFI_{it} + \beta_3 GDE_{it} + \varepsilon\ (\dots\dots 3)$$

$$HDI_{it} = \beta_0 + \beta_1 INF_{it} + \beta_2 EFI_{it} + \beta_3 INE_{it} + \varepsilon \ (\dots\dots 4)$$

The TRE, GDE, and INE describe the interaction of the moderating variable (EFI) on trade relations, per capita GDP growth, and the inflation rate, respectively, on human development (HDI). If the value of β_2 is significant but, β_3 is not, then economic freedom has a pure moderating effect. However, if β_2 is substantial and β_3 is also significant, it means that economic freedom has a quasi-moderating effect, and if β_2 and β_3 are not significant, then economic freedom acts as an independent variable and does not have a moderating effect.

D. RESULTS AND DISCUSSION

Based on the Table 1, there seems to be significant variation in the Human Development Index (HDI) scores among ASEAN countries. Malaysia leads with the highest average HDI of 0.7983, indicating a better level of human development.

Table 1 Descriptive Analysis Result

Country	Average HDI Score	Average Trade	GDPPC Growth Average	Average Inflation	Average EFI Score
Indonesia	0.697888	42.0765	4.41130	3.32111	7.144
Cambodia	0.579111	125.757	6.01509	2.12576	7.203
Malaysia	0.798333	132.284	3.91664	1.13586	7.321
Myanmar	0.569888	47.9209	6.49426	4.57213	5.594
Philippines	0.701444	62.1550	4.81843	1.78637	7.32
Thailand	0.780888	121.742	2.42674	1.28125	6.724
Vietnam	0.689111	148.155	6.19859	3.19973	6.157

On the other hand, Myanmar has the lowest average HDI of 0.5699, suggesting more significant development challenges in achieving people's welfare.

An in-depth analysis of economic factors highlights several essential aspects. First, although Cambodia recorded impressive growth in per capita income with an average of 6.0151, its impact on the HDI does not appear to have reached a significant point (average HDI 0.5791). This may indicate that other factors such as education, health, and income distribution must be considered to ensure a better quality of human development.

The correlation between the Economic Freedom Index (EFI) and HDI is also interesting to observe. Countries with higher EFI scores tend to have higher HDI as well. Malaysia, which stands out with an average EFI score of 7,321, also has the highest average HDI. However, this interpretation needs to be reversed with caution. Although EFI can provide an environment supporting economic growth, social inequality and unequal educational infrastructure must also be considered to achieve a more inclusive HDI.

This analysis underscores the complexity of measuring human development in the ASEAN region. To increase the HDI, the focus should not only be limited to economic growth and economic freedom but also pay attention to the multifaceted interactions between economic and non-economic factors that play an essential role in improving the quality of life and people's welfare.

Verification Analysis Results

First, a model selection test is performed to conduct multiple linear regression analyses on panel data. Here are the results of the chow test:

Table 2. Chow Test Results

F test for individual effects
F= 398.34 df1 = 6, df2=52 p-value < 2.2e-16

Table 2 shows that the probability value of the Chow test results indicates a number smaller than 5%, equal to 2.2e-16. This suggests that the correct model based on the results of the Chow test is to use the fixed effect model. Next, the Hausman test was carried out to compare a fixed effect model with a random effect model. Here are the results of the Hausman test:

Table 3. Hausman Test Result

Hausman Test
Chisq= 1.0296 Df = 4 p-value = 0.9053

Based on Table 3 it shows the value of the p-value for Chi-square Hausman test results of 0.9053. So, this indicates that, based on the Hausman test, the most appropriate model is to use random effects. These results require the Lagrange Multiplier test to be carried out to retest the random effect model as the model selected from the Hausman test with the common model. The following are the results of the Lagrange multiplier test using the Breusch-Pagan method:

Table 4. Lagrange Multiplier Test Result

Lagrange Multiplier Test (Breusch – Pagan)		
Chisq= 197.43	Df =1	p-value < 2.2e-16

Based on Table 4, the probability values are spread 2.2e-16. So, based on the results of the Lagrange Multiplier test, the suitable model is the random effect model. So, from the results of the three tests, it was decided that the model chosen to be used in the panel data multiple linear regression analysis in this study was the random effects model.

This result follows the opinion expressed by (Nachrowi & Usman, 2007), which states that if the amount of time series data is smaller than the cross-section data, then using a random effect model is better than a fixed effect model. In Hoffmann's opinion (1987), the random effect model in panel data analysis has directly transformed the variables, so it is assumed that using the random effect model meets the assumptions of homoscedasticity and non-autocorrelation. So, there is no need to do heteroscedasticity and autocorrelation tests. On the other hand, the opinion expressed by Latan (2014) concerning the central limit theorem states that when the sample size used in the regression analysis is large, non-compliance with the assumption that the data is typically distributed will not significantly impact the regression estimation results.

According to (Gwartney, 2009), researchers generally follow the guideline that when each variable has a total of 30 data points, it is assumed that the data already has a distribution that is close to normal. Furthermore, Fox (2009) explains that "the central limit theorem guarantees that inferences based on least squares estimators roughly hold." In this study, the number of observational data points was 63, so this does not require a normality test to be carried out. Based on these opinions, the classical assumption test proposed in this study only performs multicollinearity tests. The following are the results of the multicollinearity test:

Table 5. Multicollinearity Test Results

	TRD	**GrGDPPC**	**INF**	**EFI**
TRD	1.0000			
GrGDPPC	0.0166	1.0000		
INF	-0.271	0.2825	1.000	
EFI	0.0986	-0.1610	-0.427	1.000

Table 5 shows the correlation value between the independent variables is below 0.9. Therefore, according to the opinion expressed (Wufron, 2020), if the correlation value between variables is below 0.9, it indicates no multicollinearity. So, after testing this classical assumption, it was decided that the regression estimate used was BLUE. The following is the estimation of the selected model:

Table 6. Random Effect Model Estimation

Variable	**Coeff**	**t-value**	**Pr(>|t|)**	
(Intercept)	0.252318	4.0664	4.775e-05	***
TRD	-0.000363	-2.8674	0.004138	**
GrGDPPC	-0.002203	-5.0687	4.006e-07	
INF	-0.000199	-0.2736	0.784394	
EFI	0.060587	7.4699	8.023e-14	***
Sig. codes: 0 * 0.001 ** 0.01 * 0.05 '.'**				
R-Squared			0.5973	
F-statistic			**p-value**	
21.50693			0.000000	

Based on the estimation results (Table.6), the probability value for f count is 0.000000,

which is smaller than the 5% significance level. So, from these results, it can be concluded that all the independent variables used in this study significantly influence human development. Meanwhile, suppose you look at the R-squared value of 0.5973. In that case, this shows that by 59.7%, human development in the 7 ASEAN countries is influenced by all the independent variables used in this study, and the rest is influenced by other variables not used in the study.

However, if we look at it partially, we get the result that Per Capita Income (GrGDPPC) has a significant negative impact on HDI per capita income (coefficient = -0.002203, t-value = -5.0687, p-value < 0.001). This means that an increase in per capita income can contribute to the rise in HDI because people will have better access to education and health services. International Trade (TRD) also significantly negatively impacts HDI, as seen from international trade variables (coefficient = -0.000363, t-value = -2.8674, p-value = 0.004138). This shows that although trade positively affects economic growth, its impact on HDI is insignificant.

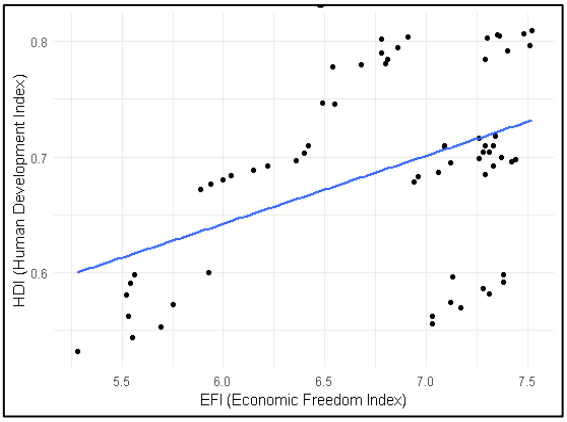

Figure 2 Scatter Plot : EFI vs. HDI

Inflation (INF) has no significant effects on HDI (coefficient = -0.000199, t-value = -0.2736, p-value = 0.784394). This indicates that inflation at a reasonable level does not have a significant effect on quality of life or welfare. There is a significant positive impact of economic freedom on HDI (coefficient = 0.060587, t-value = 7.4699, p-value < 0.001). This suggests that countries with high levels of financial freedom tend to have a higher HDI because economic freedom can increase economic growth and people's access to essential services.

These results underscore the importance of economic factors, especially economic freedom, in influencing HDI achievement in the ASEAN region. However, remember that the relationship between these variables and HDI is complex and affected by other factors that may not be included in this model. After being analyzed using panel data regression, an analysis was carried out using the MRA model approach to see the moderating effect of economic freedom on the relationship of each independent variable (trade, economic growth, and inflation) on human development in 7 ASEAN countries. The following are the results of the MRA model estimation:

Table 7. MRA of Trade Against HD

Variable	Coefficient	t-value	Pr(>|t|)	
(Intercept)	0.0702981	0.6619	0.508045	
TRD	0.0024959	2.8070	0.005001	**
EFI	0.0915478	5.8532	4.823e-09	***
TRE	-0.000371	-2.621	0.008757	**
Signif. codes: 0 '*' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 " 1**				
R-Squared			0.478587	
F-statistic			**p-value**	
18.05137			0.000000	

Based on the analysis using the MRA method to see the moderating effect of economic freedom in moderating trade relations on human development, the coefficient value of trade (TRD) and the coefficient value of the interaction variable (TRE) have a significant value. This means that economic freedom has a quasi-moderating effect. The meaning of this is that economic freedom, in this case, not only acts as an independent variable but also has a role in moderating the influence of trade on human development in the seven ASEAN countries.

Table 8. MRA of GDPPC Growth Against HDI

Variable	Coefficient	t-value	Pr(>|t|)	
(Intercept)	0.318317	4.151	3.299e-05	***
GrGDPPC	-0.009299	-1.202	0.2292	
EFI	0.056097	5.265	1.402e-07	***
GRE	0.0010634	0.960	0.3366	
Sig. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 " 1				
R-Squared			0.53551	
F-statistic		p-value		
22.67358		0.000000		

Based on the MRA analysis of the moderating effect of economic freedom in moderating the relationship between GDPs per capita growth and human development, it is concluded that economic freedom only acts as an independent variable. This can be seen from the analysis results table, which shows that only the coefficient of economic freedom (EFI) has a significant value, namely with a probability of 1.402 e-07.

In Table 9, the results of the MRA analysis for the effect of the inflation relationship on human development show that economic freedom also acts as an independent variable only and does not have a moderating effect in influencing the relationship between the effect of inflation and human development in 7 ASEAN countries. This can be seen from only the economic greatness coefficient (EFI) value, which has a significant value below 5%, namely 2,586e-09.

The discussion of the panel data shows the significant impact of various economic factors on the Human Development Index (HDI) in ASEAN countries. The estimation results provide deeper insight into how certain variables can collectively affect the achievement of the HDI.

In this study, the variable International Trade (TRD) has a coefficient of -0.000363, a t-value of -2.8674, and a p-value of 0.004138. This indicates a statistically significant impact of international trade on HDI. However, the negative implications demonstrate the complexity of linking trade-generated economic growth to improved quality of life. Although some studies support the contribution of trade to economic growth and human progress (Dollar & Kraay, 2002), these results may hint at aspects that need attention, such as the distribution of economic benefits.

Table 9. MRA of Inflation Against HDI

Variable	**Coeff**	**t-value**	**Pr(>|t|)**	
(Intercept)	0.261682	3.313	0.0009206	***
INF	0.008129	1.075	0.2823098	
EFI	0.063211	5.955	2.586e-09	***
INE	-0.0013796	-1.158	0.2467114	
Sig. codes: 0 '*' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 " 1**				
R-Squared			0.41346	
F-statistic		**p-value**		
13.86334		0.000000		

The variable Per Capita Income Growth (GrGDPPC) shows a significant negative impact on HDI with a coefficient of -0.002203, a t-value of -5.0687, and a p-value of 4.006e-07. Although, intuitively, growth in per capita income will positively affect HDI, these results indicate that this correlation is not necessarily linear. Previous research has also shown that growth in per capita income does not always result in a parallel increase in HDI (Goh & Wong, 2018).

Moreover, the variable Economic Freedom (EFI) has a significant positive coefficient of 0.060587, with a t-value of 7.4699 and a p-value of 8.023e-14. These results confirm the significant positive contribution of economic freedom to HDI. Higher levels of economic freedom tend to support inclusive economic growth and social welfare (Rode et al., 2018). However, the inflation variable (INF) does not significantly impact HDI, with a coefficient of -0.000199 and a t-value of -0.2736. This result may be consistent with the view that inflation at a reasonable level does not always directly erode people's quality of life.

Based on the results of the regression analysis using the Multiple Regression Modulation (MRA) approach reveals exciting findings regarding the role of economic freedom as a moderating variable in the relationship between international trade (TRD) and the Human Development Index

(HDI) in ASEAN countries. This result suggests that economic freedom acts as "quasi-moderation" in this context, influencing the relationship between international trade and HDI. At the same time, economic freedom still has a role as an independent variable in controlling GDP per capita growth and inflation in human development.

This shows that the effect of economic freedom is not only direct on HDI but can also affect how international trade impacts HDI. These results can be related to previous research by Klomp and de Haan (2013), which suggested that the relationship between international trade and economic growth is not always linear but can be influenced by contextual factors such as economic institutions and policies.

However, regarding per capita GDP growth and inflation, economic freedom has a direct influence as an independent variable. These results support the view expressed by Leal-Arcas (2013), which emphasizes the importance of economic freedom in promoting sustainable economic growth and controlling inflation.

However, keep in mind that the MRA results refer to a particular model and have their own assumptions. The political, social, and cultural context can also influence the interactions between these variables. Further studies, such as those conducted by Bojanic (2014), have emphasized that the moderation and interaction of complex variables can vary in different environments.

These findings provide a more nuanced view of how economic freedom directly impacts human development and interacts with other variables to shape the complexity of economic relations and human development in ASEAN countries.

E. CONCLUSION

The conclusion of this study illustrates the complexity of the interaction between economic factors and human development in ASEAN countries. The results of the panel data regression analysis show that economic freedom acts as a quasi-moderator in the effect of international trade on the Human Development Index (HDI). Meanwhile, economic freedom covariates influence per capita GDP growth and inflation. This finding underscores the importance of looking at economic variables as individual factors and considering how they interact in the context of human development.

Based on the results of this study, the governments of ASEAN countries can take strategic steps to enhance human development in this region. First, the government needs to understand that economic freedom has a more complex role than being an independent variable. Economic policies that support growth and inclusion must be complemented by efforts to protect individual rights and improve social welfare.

The second suggestion is promoting trade policies considering social aspects and income distribution. Although international trade can provide economic benefits, its impact on people's welfare needs further attention. Governments can adopt approaches that ensure that the economic gains from trade are more equitable and positively impact social aspects such as education and health.

As a suggestion for future research, a deeper analysis of non-economic factors moderating the relationship between economic variables and human development is recommended. Education, health, and income distribution play pivotal roles in comprehending the variable impacts on HDI in ASEAN countries. Additionally, further research could delve into the variances in cultural, political, and social contexts within the ASEAN region, which might significantly influence the interplay of these variables. Furthermore, future investigations could explore the club convergence of HDI in ASEAN and its determinants, employing

methodologies such as those utilized in the studies by Phillips and Sul (2007).

Overall, this research contributes to understanding the complex relationship between economic factors and human development in ASEAN countries. However, it should be remembered that other factors, such as education, health, and social policies, also play an essential role in shaping the quality of life and well-being of people in this region.

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