Journal of Economics, Finance and Accounting Studies (JEFAS)
ISSN: 2709-0809
DOI: 10.32996/jefas
Journal Homepage: www.al-kindipublisher.com/index.php/jefas

Analysis on the Impact of Economic Globalization on Human Development and Economic Growth in the ASEAN-4

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ARTICLE INFORMATION

Received: 10 October 2021
Accepted: 26 November 2021
Published: 31 December 2021
DOI: 10.32996/jefas.2021.3.2.24

KEYWORDS

Economic Globalization, Trade, Foreign Direct Investment, Foreign Portfolio Investment, Human Development Index, Gross Domestic Product, ASEAN-4

ABSTRACT

Economic globalization has made economies fruitful; however, a few studies argued that its impact on human development is not at par with economic growth's advancements. With this, the effect and difference of economic globalization in terms of Trade, Foreign Direct Investment (FDI), and Foreign Portfolio Investment (FPI) on Human Development Index (HDI) and Gross Domestic Product (GDP) per capita were examined among the ASEAN-4 nations, namely, Indonesia, Malaysia, Philippines, and Thailand conjointly from 1990 to 2019. Multiple regression was used to estimate the parameters and significance of the models. Results have proved that the predictors, collectively, have a positive and statistically significant effect on GDP and the HDI. However, the data showed that linear regression of GDP per capita at 51.21% has more variation than HDI at 35.95%, which could mainly be due to that human development is highly influenced by other factors such as demand political freedom and prioritization of human rights, while the preferred subset still has the three variables altogether. Yet there were sub predictors towards GDP per capita that showed a partial effect except for FDI and FDI+FPI. This might be caused by its unidirectionality and volatility in investing.

1. Introduction

Boosting one's economy can be broadened by globalization (Maduka et al., 2017) as this enables the integration of trade to economic advancement (Hamdi, 2013). Over time, such a system is the one that erodes national boundaries, integrates national economies, cultures, technologies, and governance that lead to complex and mutually dependent relationships (Gygli et al., 2019). This happens within a global market where interdependence is an essential element; although, globalization can be influenced by economic agents, natural resources, market components, and more.

The focal point of this paper is on the change within the economy of a country, including its economic integration and interdependence on a global, regional, and local scale through economic globalization. Its long-distance flow of goods, capital, and services with market exchanges can be the factors of its measurement (Ying et al., 2014). Copeland and Taylor (2013) advised the economies of the harm it can cause through more production and consumption, creating more waste and pollution.

Other than its positive impact on economic growth, human development in terms of education, health, and living standards are not at par with economic growth's advancements. Though Elistia and Syahzuni (2018), Daniela-Mihaela and Oana-Georgiana (2015), Shome et al. (2010) claimed that theoretically, human development (measured by the HDI) has a relationship with the GDP; however, empirical evidence presented that the positive impact of growth through globalization varies to the HDI (Hasan & Waheed, 2020); (Ulucak et al., 2020).

With these claims, the researchers examined the impact of economic globalization on human development and economic growth of four selected Association of Southeast Asian Nations (ASEAN) countries conjointly with Indonesia, Malaysia, Philippines, Thailand from 1990 to 2019. This study also investigated the estimates of the joint and partial effects in which the best subset predictors of each regression model were determined and differentiated the directional effects of the two models. Yet, limitations exist in this study since the researchers may have generalized in analyzing the limited data and studies to support the chosen variables.

The gap that globalization holds promising benefits to an economy in the aspect of economic growth and human development motivated the researchers to investigate them within the context of ASEAN nations since only a few studies were made related to it (Santosa, 2014). While its findings can enrich the academe, particularly in developing countries, it can support policymakers to accelerate trade, financial integration, human development through education, healthcare, and production policies; industries can also review their stand before penetrating the global supply chain.

This paper is structured with the background of the study in Section 1, followed by Section 2 with the literature review and hypothesis development, and Section 3 with the research method and model specification. Results and discussions are discussed in Section 4. Section 5 includes the conclusions and policy implications of the study.

2. Literature Review

2.1 Economic Globalization to Human Development

Trade has been widely used to facilitate, promote, and sustain the development process (Hamid and Amin, 2013). However, Jawaid and Waheed (2017) stated that trade alone is not enough measurement to verify human progress. Two-way causation between trade and human development was mentioned by the UNDP (2006), which presented a framework where trade can alter the structure of an economy and its growth rate. This was approved by Razmi and Yavari (2012), Kabadayi (2013), and Jawaid and Waheed (2017) on the relationship between trade and human development and concluded that trade positively affects HDI. A correlation between the two was investigated by Kumar (2017) in ASEAN countries, concluding that there is a long-run cointegrating relationship.

The more a country increases its trading intensity, the greater is the addition in income, the influx of technologies, human skills, boosting its production efficiency, and more availability of new goods. Hamid and Amin (2013) further revealed that trade positively correlates with HDI for all income categories but is insignificant to non-income HDI—life expectancy and educational attainment. This implies that public policies have been unable to integrate the benefits from trade into different dimensions of HDI. Simplice (2013) concluded that the life expectancy component of HDI weighs most in the positive impact of trade globalization on human development. Aigheyisi (2013) and Mazlan et al. (2019) contradicted the positive relationship of trade with HDI.

While in FDI, long-term economic benefits can be attained when capital is invested in other countries (Santosa et al., 2016) like how it gives way for deficient countries to increase their progress through spillover effects, aperture employment, technology advancement, and forwarding human capital in the host country (Srivastava and Talwar, 2020). Even so, FDI imparts opportunities to make a developing country become an industrialized nation (Hussain et al., 2010). Still, the competitiveness of a country can affect FDI like in the ASEAN setting, while other factors like economic cycles, the openness of trade, HDI, etc., do the same (Bhavan et al., 2011).

In line with the ASEAN Economic Community (AEC), low HDI ASEAN members see their deficiency as an obstacle to attracting investors (Thanh, 2016). Santosa (2014) and Santosa et al. (2016) even concluded that there is no significant impact by the FDI on human development in the ten ASEAN countries, especially for the Philippines. The ambiguity of the connection between the two was supported by Baghizarde (2012) and Mustafa et al. (2013). Tamer (2013), moreover, observed the associated development done by FDI where it is positive with the upper-middle- and high-income countries, while ambiguous in low-income nations.

Although this still depends on the country's state, a positive impact of FDI on HDI was supported by Kar (2013), Hussain et al. (2010) in Pakistan, Ahmad et al. (2019). In the ASEAN5, specifically, it was indicated that it had a good impact due to FDI on the social development of these nations, both collectively and individually, to different levels (Narayanan, 2014). While in India, human development is missing an increased height of FDI (Sahoo & Sethi, 2017). FDI recipient countries might need to consider internal changes to have an advantage over foreign capital inflows (Tamer, 2013). This focuses on government intervention through appropriate policies for a more tangible impact on development, especially human development.

Lastly, through the instruments of equity and debt securities, FPI transacts in a cross-border (IMF, 2009), making this type of investment significant in the world economy and a principal source of funds to support the investment of a country (Baghebo & Apere, 2014). Since FPI can be bought and sold, this made it flexible on investing money, allowing engagements in international

diversification as well. Investors are more capable of looking for the financial rate of return or growth in value over time as well as broadening investment risk through numerous markets (Ezeanyeji & Maureen, 2019).

International capital flows can enhance the domestic investment of the host country by adding it to its savings that can be transformed into investment by strong local financial markets then conveying into higher levels of productivity (Agbloyor et al., 2014). Thus, this international investment acts as a stimulus to economic growth and development, especially in developing countries, as a need for domestic resources. Investors promote transparency and positive spillover in economic factors, leading to a better allocation of capital resources in the domestic market and a healthier economy.

Moreover, results from a few studies on the impact of FPI on economic development, particularly measured by HDI, have a positive impact. Most of these studies have been presented on the continent of Africa. Monogbe et al. (2020) proved the significance of promoting FPI to HDI that also accounts for FDI as a multiple regression model, but FDI resulted in a negative effect. Nwafor (2020) also concluded the positive and significant effect of FPI on human capital development and has helped improve the standard of living of a country. However, Maku and Ajike (2015) argued that FPI is only significant to human welfare in terms of access to water and sanitation but negatively access to health services and life expectancy at birth in a disaggregated level of human development.

2.2. Economic Globalization to Economic Growth

Trade is often regarded as a principal determinant of economic growth (Busse & Koeniger, 2012). It led to increased efficiency, productivity, technology, and growth both in developed and developing countries (Feenstra, 2015). As numerous pieces of empirical evidence suggest that trade leads to an increase in economic growth; even Van den Berg and Lewer (2015), Vogiatzoglou and Nguyen (2016), Hussain and Haque (2016) concluded that trade positively contributes to the long-term economic upturn. Through the integration and cross-border trade, the economic efficiency of a country develops through efficient resource allocation, production efficiency, fostering technological processes, and expanding market opportunities.

Trade openness also provides numerous opportunities for attracting foreign capital, which is vital for sustainable growth. Busse and Koeniger (2012) also said that lowering trade barriers is most likely to encourage international trade by reducing costs, which in turn can enhance economic growth rates. Tan and Tang (2016) examined the effect of trade on GDP in the ASEAN countries and concluded that in Malaysia, the Philippines, and Thailand, trade growth has directly influenced the growth in GDP.

Further, Belloumi and Alshehry (2020) claimed that trade openness does not affect economic growth in the short run. However, both variables of the ratio of exports plus imports to GDP and ratio of exports to GDP do not enhance economic growth in the long-term; but the variable of the ratio of imports to GDP enhances economic growth in the long term. Hussin and Saidin (2012) also investigated the impact on economic growth in the ASEAN countries. They concluded that trade openness does not correlate to growth for Malaysia, Thailand, and the Philippines. The researchers suggested that governments should create more policies that encourage openness in these countries.

While the exploration of FDI's impact on GDP has been carried out with varied and conflicting results, correspondingly, Sengupta and Puri (2020) claimed an association between FDI and GDP, and in every event, the former can enhance the economic growth of the countries in their study. Sahoo and Sethi (2017) and Murari (2017) under India and South Asian countries, respectively, have empirically investigated the relationship between financial development and economic growth where they highlighted the importance of national development policies; Agrawal and Khan (2011) agreed in the context of China and India. This was proved further by Aga (2014) and Vogiatzoglou (2016) that most studies attempting to link GDP with FDI have a positive relationship.

Moreover, Sengupta and Puri (2020) tabulated previous studies that linked the two variables in the case of India with positive findings: Kumar (2014); Anitha (2012); Nosheen (2013); Bhattacharyya, J. and Bhattacharya, M. (2012); and Agrawal and Khan (2011). Whereas, in the South Asian Association for Regional Cooperation (SAARC), FDI from outside is more essential than in intra-regional investments in most countries, exempting Nepal (Alam & Zubayer, 2010).

In contrast, Rahaman and Chakraborty (2015) may have shown similar findings between the two. However, FDI was an insignificant factor in the study from 1987 to 2011. This is further supported by (Sultana et al. 2019), with FDI having no positive impact on GDP. Likewise, Tiwari and Mutasca (2011) concluded that export-led growth is better in enhancing Asian developing countries compared with FDI-led growth. While Sengupta and Puri (2020), Khan et al. (2014), with the use of regression analysis, managed to see FDI as a significant factor, but the Granger causality test showed no bidirectional relationship from either GDP to FDI or FDI to GDP, making them unidirectional. Further, in Nepal, the GDP growth rate did not depend on FDI, and the latter did not support the GDP (Kundan & Gu, 2010; Yan & Majagaiya, 2011). A better concentration of government and public policies should be implemented to better magnetize FDI inflows and outflows as a benefactor to economic growth (Sultana et al., 2019).

Identically, as a capital inflow, FPI can boost the domestic resources of a developing country. Igan et al. (2020) stated that countries with well-functioning banks and better-institutionalized quality are stronger with inflows-growth nexus. Suidarma et al. (2020), Okafor et al. (2015), Ahmad et al. (2016) concluded that FPI provides greater speed and contribution to the economic growth as proxied by GDP in some countries in Asia and Sub-Saharan Africa. Tintin (2012) also proves that FPI contributes to the human development of developed and developing countries, but the size of the effect is smaller than the size of the FDI.

However, according to Ahmad et al. (2016), the opinion of the economists is mixed about the effect of FPI on economic growth, whereas it helps diversify the sources of external finance and decrease capital cost as they conclude that it does not directly promote economic growth, unlike FDI. This further proves from the study of Rachdi and Saidi (2011), where, statistically, it has a negative relationship with economic growth in developing countries. Financial openness could lead to a disrupted development that increases the risk of financial fragility, fiscal imbalances, and inflation since FPI is more volatile and short-term in money than FDI (Ahmed, 2013).

2.3 Theoretical Framework

Trade and financial integration of countries is often seen as an important factor for increasing economic growth and development where trade, FDI, and FPI are the explanatory variables. The researchers used the endogenous growth theory as support for the study. The theory was developed by Romer (1986, 1990) which argued that economic growth is the result of internal forces rather than external forces. This theory suggests that a country will lead to economic growth based on the improvements in technology, knowledge, human capital, and capital investments that could increase productivity through international trade and foreign capital inflows.

2.4 Statement of Hypothesis

H1: Trade, FDI, and FPI have a joint effect on ASEAN-4's (Indonesia, Malaysia, Philippines, and Thailand) HDI
H2: Trade, FDI, and FPI have a joint effect on ASEAN-4's (Indonesia, Malaysia, Philippines, and Thailand) GDP
H3: A subset of Trade, FDI, and FPI has a partial effect on ASEAN-4's (Indonesia, Malaysia, Philippines, and Thailand) HDI
H4: A subset of Trade, FDI, and FPI has a partial effect on ASEAN-4's (Indonesia, Malaysia, Philippines, and Thailand) GDP

2.5 Synthesis

From the established discussion of variables above, trade can benefit from market expansion, technological transfer, job opportunities, and information sharing as it opens new opportunities for economic growth and human development. For deficient countries, FDI gives way to increase their progress through spillover effects, aperture employment, technology advancement, and forwarding human capital in the host country, while FPI is an important indicator that can supplement the stability of the financial system and prevent run-on banks from the economy. Most of the empirical evidence of the explanatory variables of trade, FDI, and FPI to HDI and GDP have contradicting conclusive results; hence, this study was conducted to verify and examine its conjoint and partial effects in the context of Indonesia, Malaysia, Philippines, and Thailand.

3. Research Method

This study examined the impact of the joint economic globalization variables, which are trade, foreign direct investment, and foreign portfolio investment, on human development and economic growth. The conjoint ASEAN-4 countries are the focal point of the study; having acquired the needed data from (i) United Nations Development Program (UNDP) for Human Development Index, as a measurement for human development and (ii) World Bank database for Gross Domestic Product per capita (constant 2010 US $) as a measurement for economic growth. While the explanatory variables, Trade (% GDP), FDI, net (% GDP), and FPI, net (% GDP) as a measurement for economic globalization from 1990 to 2019.

In line with the previous related studies from Hasan and Waheed (2020), Maku and Ajike (2015), Hussin and Saidin (2012), Okafor et al. (2015), and linear regression assumption, the models in estimating the impact of economic globalization variables on economic development and economic growth is derived from the function below:

$$\boldsymbol{HDI_{it} = f\,(TRADE_{it}, FCI_{it})} \qquad (1)$$

$$\boldsymbol{GDP_{it} = f\,(TRADE_{it}, FCI_{it})} \qquad (2)$$

Converting it to an econometric model by disaggregating the foreign capital inflow and adding the constant term and error term:

$$\boldsymbol{HDI_{it} = \beta_0 + \beta_1 TRADE_{it} + \beta_2 FDI_{it} + \beta_3 FPI_{it} + u} \qquad (3)$$

$$\boldsymbol{GDP_{it} = \beta_0 + \beta_1 TRADE_{it} + \beta_2 FDI_{it} + \beta_3 FPI_{it} + u} \qquad (4)$$

HDI	=	Human Development Index
GDP	=	Gross Domestic Product per Capita
TRADE	=	Total Trade
FDI	=	Foreign Direct Investment, net
FPI	=	Foreign Portfolio Investment, net
i	=	Countries
t	=	Time
u	=	Error Term

The researchers employed the Ordinary Least Square (OLS) regression to estimate the parameters in the linear regression model and the significance of the p-value. For the pre-estimation method, a test for multicollinearity was conducted to ensure that the regressors were not dependent on each other. This can be done by checking for pairwise Pearson's correlation of the three variables of interest. For the post-regression diagnostic checking, the researchers confirmed the normality by using the Anderson-Darling Test. Next is the test for non-constancy of variances of the error terms or Heteroskedasticity, which can be detected using the Breusch-Pagan test. If non-normality and heteroskedasticity are observed, a variable transformation must be undertaken on the response variable, and a new model will be fitted, as necessary. Lastly, the Durbin-Watson test is conducted to detect any autocorrelation among the variables, which accounts for the data's nature through time series.

4. Results and Discussion

4.1 Results

A set of 30 yearly observations per country (1990-2019) in the ASEAN-4 was collected from the World Bank database having a total of 120 observations for the study. To compute the minimum sample size needed, the researchers used Cohen's effect size f^2 and its relation to the noncentral F distribution. The following formula is used for the computation of Cohen's effect size:

$$f^2 = \frac{R^2}{1 - R^2} = \frac{SSreg}{SSres}$$

To compute for the power of multiple regression, the noncentral F distribution $F(df_{reg}, df_{res}, \lambda)$ was applied, where the parameter has the following formula:

$$\lambda = f^2 n$$

Thus, computing for the sample size $n = \frac{\lambda}{f^2}$. For ease of computation, the researchers used an excel add-in Real Statistics Data Analysis tool that computes for the desired sample size given the effect size, power, number of predictors, level of significance, and some default values. Cohen's $f^2 = 0.15$ was set for a moderate effect size, with 0.90 power, 3 predictors, and 0.05 level of significance. From the outcome of the input and output dialogue in Table 1, 99 observations are needed to achieve an actual power of 0.901719 with an effect size of 0.15 and a 0.05 level of significance if 3 predictors are used in our multiple linear regression model. Thus, the researchers used 25 observations per country (1995-2019), with a total of 100 observations for the entire data.

Table 1. Test of Sample Size for Multiple Regression

Input		**Output**	
Effect Size	0.15	Non-centrality	14.85
Power	0.90	Critical value	2.70040906297
# of Predictors	3	Sample Size	99
Alpha	0.05	Actual Power	0.901719511133
Sum Count	1000		
Effect Type	Cohen's F Square		

4.1.1 Summary Statistics

The following descriptive statistics are computed using the Excel Real Statistics Data Analysis tool:

Table 2. Summary Statistics of All Variables

	HDI	GDP (USD)	Trade	FDI	FPI
Mean	0.69004	4634.952	105.8914	-0.92771	-0.40424
Standard Error	0.005876	280.6303	5.008656	0.182775	0.230596
Median	0.6925	3626.792	95.619	-0.9915	-0.409
Standard Deviation	0.058761	2806.303	50.08656	1.827751	2.30596
Sample Variance	0.003453	7875334	2508.663	3.340675	5.31745
Kurtosis	-0.66193	0.305689	-0.54571	0.454411	4.801153
Skewness	0.087895	1.073374	0.643517	-0.18581	0.513314
Range	0.25	10921.27	183.104	9.711	17.105
Maximum	0.81	12486.67	220.407	3.391	10.381
Minimum	0.56	1565.41	37.303	-6.32	-6.724
AAD	0.048339	2284.1415	42.08033	1.410256	1.66918
MAD	0.041	1502.407	36.1675	1.078	1.329
IQR	0.08725	3991.1129	72.52375	2.09175	2.66575

The table above shows different descriptive statistics that are computed from the sample. The mean and a median of 0.69 for HDI with a standard deviation of 0.06, which means that 50% or less of the observations lie below 0.69. GDP per capita (Constant USD) recorded a mean of 4634.952 with a standard deviation of 2806.303 and a median of 3626.792, which means that the data for GDP per capita is widely varied. For the predictors, Trade, HDI, and FPI recorded means of 105.89, -0.93, and -0.40, respectively, with the following respective standard deviations: 50.09, 1.82, and 2.31. All the predictors exhibit large variability in their data.

4.1.2 Multicollinearity Test

To test whether the regressors or predictors have interdependence, a test for multicollinearity was applied by calculating the correlation coefficient using Pearson's correlation for pairs of variables.

Trade - FDI Correlation

Table 3. Trade and FDI Correlation

Correlation Coefficients		**Pearson's coeff (t-test)**			
Pearson	-0.07034	Alpha	0.05	std err	0.100765
Spearman	-0.01555	Tails	2	t	-0.69804
Kendall	0.000606	corr	-0.07034	p-value	0.486805

Using the MS Excel data analysis, the results shown in Table 3 that the computed Pearson's correlation coefficient is -0.07 with a p-value of 0.486805. Since the computed p-value is larger than the level of significance, the researchers fail to reject the null hypothesis that the true correlation is zero. There is no sufficient evidence to say that there is a linear relationship between Trade and FDI.

Trade - FPI Correlation

Table 4. Trade and FPI Correlation

Correlation Coefficients		**Pearson's coeff (t-test)**			
Pearson	0.182864	Alpha	0.05	std err	0.099312
Spearman	0.269117	Tails	2	t	1.841304
Kendall	0.195595	corr	0.182864	p-value	0.0686025

In Table 4, the computed p-value of 0.068602 exceeds the 0.05 level of significance; the researchers fail to reject the null hypothesis that the true correlation coefficient is zero. Therefore, there is no sufficient evidence to conclude that there is a linear relationship between Trade and FPI.

FDI - FPI Correlation

Table 5. FDI and FPI Correlation

Correlation Coefficients		**Pearson's coeff (t-test)**			
Pearson	0.114673	Alpha	0.05	std err	0.100349
Spearman	0.08812	Tails	2	t	1.142743
Kendall	0.062039	corr	0.114673	p-value	0.255929

The results show in Table 5 that the estimated Pearson's correlation coefficient of 0.114673 with a calculated p-value of 0.255929. Since the p-value exceeds the 0.05 level of significance, the researchers fail to reject the null hypothesis of zero correlation. Therefore, there is no sufficient evidence to conclude that there is a linear relationship between FDI and FPI.

In summary, since there is no pairwise linear relationship observed between the predictors, there is no multicollinearity in the data. Thus, the three variables can be used as predictors of the response variable HDI and GDP per Capita.

4.1.3 Ordinary Least Squares (OLS) Regression and Diagnostic Checking for HDI model

RStudio was used in modelling the Ordinary Least Squares or linear regression for the data.

Linear Regression of HDI

$H_o: \beta_j = 0, for\ all\ j \quad There\ is\ no\ joint\ effects\ of\ Trade, FDI, and\ FPI\ on\ the\ HDI$
$H_A: \beta_j \neq 0, for\ at\ least\ one\ \ j \quad There\ is\ joint\ effects\ of\ Trade, FDI, and\ FPI\ on\ the\ HDI$
$\alpha = 0.05$

Table 6. OLS Regression Estimates

Variable	Estimate	Standard Error	t-value	p-value
Intercept	0.6339	0.01145	55.364	<2e-16
Trade	0.0006206	0.00009641	6.438	4.78e-09
FDI	0.009201	0.002615	3.519	0.000664
FPI	0.002688	0.002103	1.278	0.204224

Table 7. OLS Regression Fit Statistics

Statistic	Value	Statistic	Value
R-squared	0.3789	F-Statistic	19.52
Adjusted R-squared	0.3595	p-value (Chi-Square)	5.812e-10
Residual SE	0.04703	Akaike Info Criterion	-321.6987

The results in Tables 6 and 7 show the estimated value for the coefficients of the 4 parameters: Intercept, Trade, FDI, and FPI, with a calculated p-value of 5.812e-10 for the F-test. At 0.05 level of significance, the researchers reject the null hypothesis of no joint effects. There is sufficient evidence to conclude that Trade, FDI, and FPI are good predictors of HDI. However, only 35% of the variability in HDI is explained by Trade, FDI and FPI. Looking at the estimates, a unit increase in Trade (% GDP) increases HDI by 0.0006206 if all other things are equal. On the other hand, a unit increase in FDI (% GDP) also increases HDI by 0.009201, and lastly, a unit increase in FPI (% GDP) increases HDI by 0.002688. FDI has the largest effect on the response variable. The following model is fitted for this set:

$$HDI = 0.6339 + 0.0006206 * Trade + 0.009201 * FDI + 0.002688 * FPI$$

To test if the model is a good fit, diagnostic checking was conducted:

Table 8. Diagnostic Summary 1

Statistic	Value	P-value
Anderson-Darling (A)	0.2719	0.6644
Breusch-Pagan (BP) [Original]	11.325	0.01009
Breusch-Pagan (BP) [Log]	11.763	0.008242

Test for Normality

The Anderson-Darling test was employed to further confirm its normality with the following hypothesis:

H_o: $\varepsilon's\ are\ normally\ distributed$
H_A: $\varepsilon's\ sare\ not\ normally\ distributed$
$\alpha = 0.05$

Using the results in Table 8, at a 5% level of significance, the researchers do not reject the null hypothesis of normality since the p-value computed for the Anderson-Darling statistic is 0.6644, which is larger than 0.05. There is no sufficient evidence to say that the residuals for the model are not normally distributed.

Test for Heteroskedasticity

The test for heteroskedasticity was applied to know if there is no constancy in the variance for the error terms and if data transformation is necessary. Breusch-Pagan test was used with the following hypothesis:

H_o: $The\ variances\ are\ constant$
H_A: $The\ variances\ are\ NOT\ constant$
$\alpha = 0.05$

Using the results in Table 8, the researchers reject the null hypothesis that the variances are constant. Since there is heteroskedasticity in the model, there is a need to transform the response variable HDI. The log transformation was used with the following model and test for Heteroskedasticity:

$$\log(HDI) = 0.6339 + 0.0006206 * Trade + 0.009201 * FDI + 0.002688 * FPI$$

Based on the results in Table 8, the log transformation did not solve the problem of Heteroscedasticity. Since the problem of non-constancy invariance cannot be solved by the transformation of the response, the Generalized Least Squares (GLS) model was employed. The following estimates are computed:

Table 9. GLS Regression Estimates

Variable	Estimate	Standard Error	t-value	p-value
Intercept	0.6339	0.01145	55.364	<2e-16
Trade	0.0006206	0.00009641	6.438	4.78e-09
FDI	0.009201	0.002615	3.519	0.000664
FPI	0.002688	0.002103	1.278	0.204224

The results in Table 9 show the same estimates that were computed in the OLS model. The following model was obtained, which relaxes its assumption on Heteroskedasticity:

$$\log(HDI)^* = 0.6339428 + 0.0006206 * Trade^* + 0.0092007 * FDI^* + 0.0026879 * FPI^*$$

Test for Autocorrelation

Table 10. Diagnostic Summary for Autocorrelation

Statistic	Value	P-value
Durbin-Watson (DW) [Original]	0.36246	1.195e-17
Durbin-Watson (DW) [Transformed]	2.06087	0.6437

Durbin-Watson was employed in testing the following hypothesis:
H_o: $The\ true\ autocorrelation\ is\ zero$

H_A: *The true autocorrelation is greater than zero*
$\alpha = 0.05$

The results in Table 10 show a calculated p-value of 1.195e-17, which is also less than 0.05 level of significance. The researchers reject the null hypothesis that autocorrelation is zero. This indicated a need for model respecification by the inclusion of additional predictors in the model. Another option is to apply a Cochrane-Orcutt transformation procedure that adjusts the model for the first-order autocorrelation. To test if data has a first-order autocorrelation, the partial autocorrelation function (PACF) plot was employed. Illustrated in Figure 1 indicates that the time series data for HDI taper after a lag of 1, thus following an AR(1) order process, which sets as the precedent to conduct the Cochrane-Orcutt transformation process.

Figure 1. PACF Plot of HDI Model

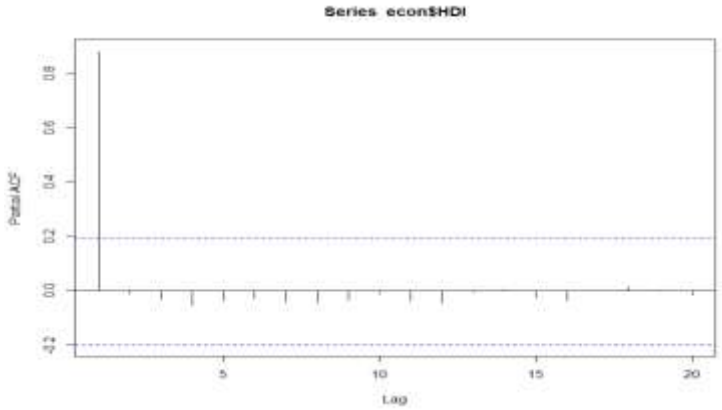


Table 11. Cochrane-Orcutt Transformation Estimates

Variable	Estimate	Standard Error	t-value	p-value
Intercept	0.707272	0.026606	26.583	<2e-16
Trade	0.000040	0.000129	0.309	0.7577
FDI	0.002211	0.001916	1.154	0.2514
FPI	0.001045	0.000861	1.215	0.2276

The following model was obtained:

$$HDI = 0.707272 + 0.000040 * Trade + 0.002211 * FDI + 0.001045 * FPI$$

The transformed data now has a p-value of 0.6437 for the Durbin-Watson statistic, effectively not rejecting the null hypothesis of zero autocorrelation. The model above shows a reduced effect of the predictors on HDI, with a 0.0004 increase in HDI per unit increase in Trade, 0.002211 per unit increase in FDI, and 0.001045 per unit increase in FPI.

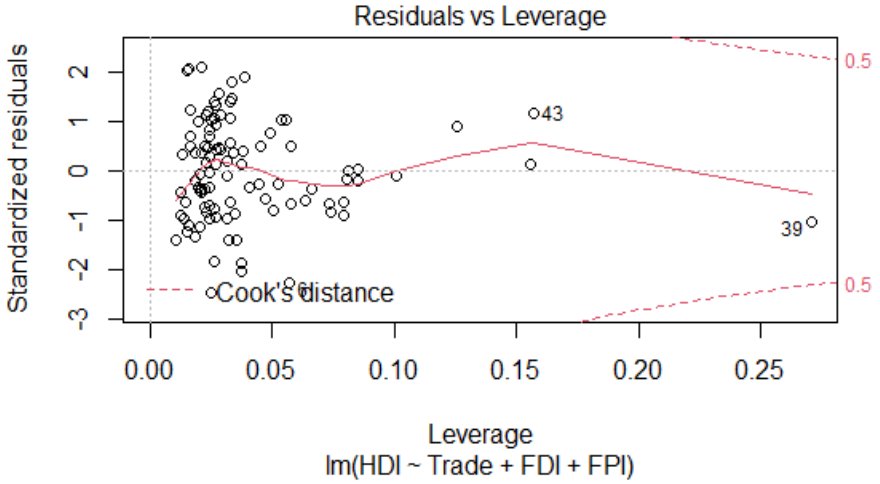
Test for Outliers and Influential Observations

To see if there are outlying and influential observations, the researchers compute for the Studentized residuals. Values that exceed 2 are considered as outliers. The following observations are found to have studentized residuals who exceed the limit:

Table 12. Observations with Large Studentized Residuals

Observation	Studentized Residual	Observation	Studentized Residual
4	-2.5517	47	2.0621
5	-2.0881	48	2.1049
6	-2.3239	50	2.1477

Figure 2. Cook's Distance Plot of HDI Model



The results above tell that observations 4, 5, 6, 47, 48, and 50 have absolute values of Studentized residuals greater than 2. These observations are possible outliers or influential, and thus, the researchers have to confirm by computing Cook's Distance. Values exceeding 1 are considered influential observations. Figure 2 shows that no observation points exceeded the 0.5 Cook's Distance limit. Thus, no observations were found to have exceeded the limit.

4.1.4 Variable Selection

Since the researchers were able to conclude that at least one of the predictors has a significant effect on HDI, they now look for the best subset of predictors that can effectively predict the response variable. The following results are obtained by conducting a stepwise procedure considering all possible subsets. The researchers investigated the value of R-squared and Adjusted R-squared to know the model's predictive power; the Mallow's Cp to assess the best subset; the Akaike Information Criterion (AIC) and Bayesian Information Criterion (BIC) to estimate the information lost by the model. The researchers want a model with high predictive power and low Mallow's Cp, AIC, and BIC to determine the best subset of predictors. The following computed values are obtained:

Table 13. Variable Selection Summary

Predictors	R-squared	Adj. R-squared	p-value	Mallow's CP	AIC	BIC
Trade	0.27895	0.27160	1.63e-08	15.4487	-310.7771	-302.9616
FDI	0.06815	0.05864	0.00870	48.0316	-285.1303	-277.3148
FPI	0.05524	0.04560	0.01858	50.0281	-283.7537	-275.9381-
Trade + FDI	0.36833	0.35531	2.11e-10	3.6341	-322.0109	-311.5902
Trade + FPI	0.29879	0.28433	3.34e-08	14.3834	-311.5660	-301.1454
FDI + FPI	0.11078	0.09244	0.00336	43.4432	-287.8124	-277.3917
All	0.37891	0.35949	5.81e-10	4.0000	-321.6987	-308.6729

Results from Table 13 shows that a subset with the lowest AIC and BIC is Trade and FDI, which can be considered as a contender against the saturated model. However, the saturated model has a larger R-squared value which indicates a higher predictive power, and a Mallow's CP is equal to the number of parameters. While the Trade + FDI model has lower AIC and BIC, it is not far from the values computed for the saturated model. Thus, the saturated model was used as the final model in predicting HDI, with the following adjusted equation for the autocorrelation:

$$\log(HDI)^* = 0.707272 + 0.000040 * Trade^* + 0.002211 * FDI^* + 0.001045 * FPI^*$$

Among the subset of predictors, the researchers reject the null hypothesis of having no partial effect on HDI. The subset predictors shown above proved to have a significant or partial effect at a 5 % significance level.

4.1.5 Ordinary Least Squares (OLS) Regression and Diagnostic Checking for GDP per capita model

Linear Regression of GDP per Capita

Table 14. OLS Regression Estimates

Variable	Estimate	Standard Error	t-value	p-value
Intercept	935.385	477.292	1.960	0.0529
Trade	38.308	4.019	9.533	1.5e-15
FDI	341.311	108.983	3.132	0.0023
FPI	99.657	87.646	1.137	0.2854

Table 15. OLS Regression Fit Statistics

Statistic	Value	Statistic	Value
R-squared	0.5269	F-Statistic	35.63
Adjusted R-squared	0.5121	p-value (Chi-Square)	1.448e-15
Residual SE	1960	Akaike Info Criterion	3509.41

$H_o: \beta_j = 0, for\ all\ j \quad There\ is\ no\ joint\ effects\ of\ Trade, FDI, and\ FPI\ on\ the\ GDP\ per\ capita$
$H_A: \beta_j \neq 0, for\ at\ least\ one\ \ j \quad There\ is\ joint\ effects\ of\ Trade, FDI, and\ FPI\ on\ the\ GDP\ per\ capita$

$\alpha = 0.05$

The results in Tables 14 and 15 show a calculated p-value of 1.448e-15. Since the p-value is less than the 0.05 level of significance, the researchers reject the null hypothesis of no joint effects of the three predictors to the GDP per capita. At a 5% level of significance, there is sufficient evidence that one of the predictors affects GDP per capita. It must also be noted that the computed adjusted R^2 for the model is 0.5121, which means that 51.21% of the variability in GDP per capita is explained by the three predictors.

Furthermore, holding all other things equal, the computed estimates indicated that a unit increase in Trade (% GDP) increases the GDP per capita by 38.308. A unit increase in FDI (% GDP) also increases GDP per capita by 341.311, and a unit increase in FPI (% GDP) increases GDP per capita by 99.657. FDI is also seen to have the largest effect on the response. The following model is fitted:

$$GDP\ per\ capita\ =\ 935.385\ +\ 38.308 * Trade\ + 341.11 * FDI\ + 99.657 * FPI$$

Test for Normality

The Anderson-Darling test was employed to further confirm its normality with the following hypothesis:

H_o: $The\ variances\ are\ constant$
H_A: $The\ variances\ are\ NOT\ constant$
$\alpha = 0.05$

Table 16. Diagnostic Summary 1 for Normality

Anderson Darling Statistic	Value	P-value
Original	3.4025	1.43e-08
Log Transformation	0.91285	0.0194
Square Root Transformation	1.6713	0.0002565
Inverse Transformation	1.9596	4.98e-05

At a 5% level of significance, the researchers reject the null hypothesis of normality for the original data. There is sufficient evidence to say that the residuals for the model are not normally distributed. To remedy this, there is a need to transform the new data for normality, fit the new model, and redo the test. Furthermore, at a 5% level of significance, the null hypothesis of normality was rejected for all transformed versions of the data. However, it must be noted that the log transformation can be accepted at a lower significance level. With this, the following estimates were obtained for the log-transformed data:

Table 17. OLS Regression Estimates for Log-Transformed Data

Variable	Estimate	Standard Error	t-value	p-value
Intercept	7.4693	0.0984	75.834	<2e-16
Trade	0.0081	0.0008	9.738	5.45e-16
FDI	0.0470	0.0224	2.090	0.0393
FPI	0.0186	0.0181	1.026	0.3072

Table 18. OLS Regression Fit Statistics (log)

Statistic	Value	Statistic	Value
R-squared	0.5264	F-Statistic	35.31
Adjusted R-squared	0.5097	p-value (Chi-Square)	1.821e-15
Residual SE	0.4045	Akaike Info Criterion	108.6973

The log transformation will have the following estimated model below, with a p-value of 1.821e-15, effectively rejecting the null hypothesis of no effect:

$$\log(GDP\ per\ capita) = 7.4693426 + 0.0080752 * Trade + 0.0469958 * FDI + 0.018556 * FPI$$

Holding all other things constant, a unit increase in Trade has a multiplicative effect of exp(0.0080752) = 1.00810789 on the GDP per capita or a 0.81% increase in GDP per capita. On the other hand, a unit increase in FDI has a multiplicative effect of exp (0.0469958) = 1.048117 or a 5.81% increase in GDP per capita. Lastly, a unit increase in FPI has a multiplicative effect of exp (0.0185660) = 1.018739 or a 1.87% increase in the response.

Table 19. Diagnostic Summary 2

Statistic	Value	P-value
Breusch-Pagan	2.6374	0.451
Durbin-Watson	0.30747	1.058e-18
Durbin-Watson [Transformed]	1.9	0.5209

Test for Heteroskedasticity

Test for heteroskedasticity was used to know if there is non-constancy in the variance for the error terms on the transformed model. Breusch-Pagan test was used with the following hypothesis:

H_o: $The\ variances\ are\ constant$
H_A: $The\ variances\ are\ NOT\ constant$
$\alpha = 0.05$

Based on Table 19, with a p-value of 0.451 > 0.05 level of significance, the researchers do not reject the null hypothesis that the variances are constant. Therefore, at a 5% level of significance, the error terms have constant variance or are homoskedastic. No further transformation is required.

Test for Autocorrelation

Durbin-Watson was employed to test the following hypothesis:

H_o: $The\ true\ autocorrelation\ is\ zero$
H_A: $The\ true\ autocorrelation\ is\ greater\ than\ zero$
$\alpha = 0.05$

Using the results in Table 19, the test above shows a calculated p-value of 1.05e-18, which is also less than 0.05 level of significance. The researchers reject the null hypothesis that autocorrelation is zero. This indicates a need for model respecification by including additional predictors in the model. Another option is to apply a Cochrane-Orcutt transformation procedure that adjusts the model for the first-order autocorrelation. To test if data has a first-order autocorrelation, a partial autocorrelation function (PACF) plot

was employed. Figure 3 indicates that the time series data for GDP per capita taper after a lag of 1, thus following an AR(1) order process, which sets as our precedent to conduct the Cochrane-Orcutt transformation process.

Figure 3. PACF Plot of GDP per Capita Model

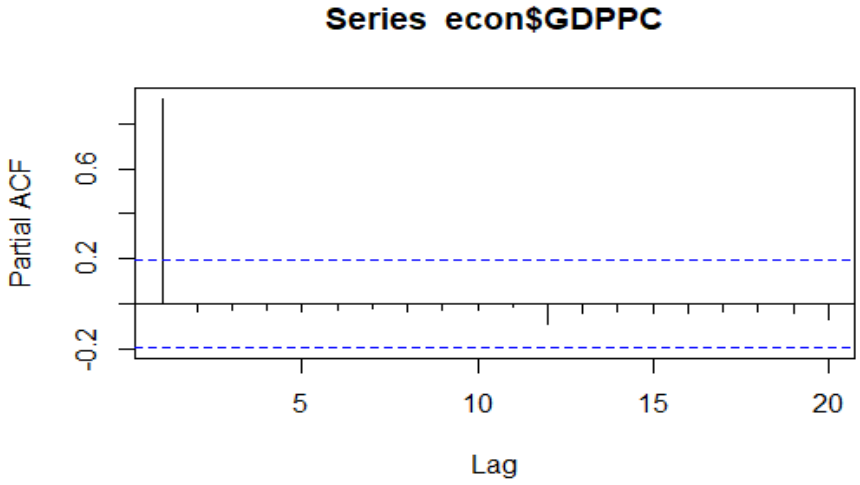


Table 20. Cochrane-Orcutt Transformation Estimates

Variable	Estimate	Standard Error	t-value	p-value
Intercept	7.9263754	0.2376520	33.353	<2e-16
Trade	0.0041388	0.0011114	3.724	0.0003327
FDI	0.0151358	0.0164352	0.921	0.3594139
FPI	0.0085653	0.0073738	1.162	0.2483136

The following model is formulated from the obtained estimates above:

$$\log(GDP\ per\ capita)^* = 7.9264 + 0.00414 * Trade^* + 0.01514 * FDI^* + 0.00857 * FPI^*$$

The transformed data now has a p-value of 0.5209 for the Durbin-Watson statistic, effectively not rejecting the null hypothesis of zero autocorrelation. The model above shows a reduced effect of the predictors on GDP per Capita, with a 0.00414 increase in GDP per capita* per unit increase in Trade*, 0.01514 per unit increase in FDI*, and 0.00857 per unit increase in FPI*

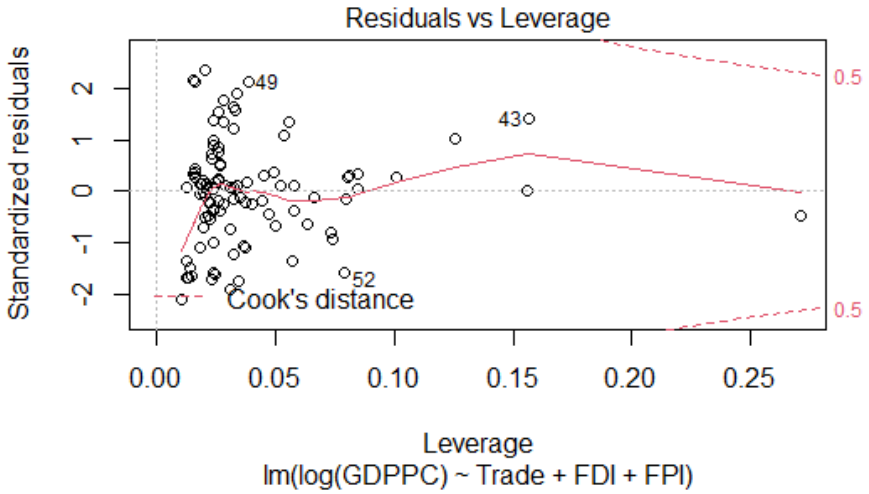
Test for Outliers and Influential Observations

To see if there are outlying and influential observations, the Studentized residuals were computed. Values that exceed 2 are considered as outliers. The following are the computed studentized residual for each observation.

Table 21. Observations with Large Studentized Residuals

Observation	Studentized Residual	Observation	Studentized Residual
47	2.1993	49	2.1848
48	2.1906	50	2.4399

Figure 4. Cook's Distance Plot of GDP per capita Model



The results above tell us that observations 47, 48, 49, and 50 have absolute values of Studentized residuals greater than 2. These observations are possible outliers or influential, and thus, Cook's Distance was used to confirm. Values exceeding 1 are considered influential observations. Figure 4 shows that there are no observation points that exceeded the 0.5 Cook's distance limit. Thus, no observations were found to have exceeded the limit.

4.1.6 Variable Selection

Since the researchers were able to conclude that at least one of the predictors has a significant effect on GDP per Capita, they now look for the best subset of predictors that can effectively predict the response variable. The following results are obtained by conducting a stepwise procedure considering all possible subsets.

Table 22. Variable Selection Summary

Predictors	R-squared	Adj. R-squared	p-value	Mallow's CP	AIC	BIC
Trade	0.49446	0.48930	3.45e-16	6.0809	110.839	118.6546
FDI	0.01165	0.00156	0.28510	103.5712	177.8796	185.6951
FPI	0.04804	0.03832	0.02846	96.223	174.1285	181.9440
Trade + FDI	0.51935	0.50944	3.70e-16	3.0537	107.7889	118.2096
Trade + FPI	0.50295	0.49270	1.87e-15	6.3665	111.1453	121.566
FDI + FPI	0.05499	0.03550	0.06483	96.8209	175.3960	185.8167
All	0.52457	0.50972	1.82e-15	4.0000	108.6973	121.7231

Results from Table 22 show that a subset with the lowest AIC and BIC is Trade and FDI, which can be considered a contender against the saturated model, the same as the HDI model. However, the saturated model has a larger R-squared value which indicates a higher predictive power, and a Mallow's CP is equal to the number of parameters. The AIC and BIC value of the complete model also does not deviate far from the lowest values. Thus, the saturated model was used as the final model in predicting GDP per capita, with the following adjusted equation for the autocorrelation:

$$\log(GDP\ per\ capita)^* = 7.9264 + 0.00414 * Trade^* + 0.01514 * FDI^* + 0.00857 * FPI^*$$

Moreover, the researchers reject the null hypothesis at a 5% significance level from the subset of predictors. This shows that at least one of the subset predictors resulted in a partial effect on GDP per capita.

4.2. Discussions

4.2.1 HDI Model

Based on the estimation results, the joint effects of economic globalization (trade, FDI, and FPI) are significant and have a positive effect on HDI, thus contributing to the development of the ASEAN-4. In addition, all sub predictors have a partial effect on HDI. This is because trade openness between countries has a greater addition in income, innovation and better opportunities for people to boost productivity. Likewise, in financial openness, in terms of foreign capital inflows, FDI has the largest effect on HDI based on the model. This can be proved that it has economic benefits which give way to developing countries a capital, technology advancement, and enterprise development. This also generates employment that can lead to an increase in income and create more purchasing power for people.

While FPI engages international diversification, it can increase the accumulation of investments in a country, which achieves sustainable development for developing countries, such as helping alleviate firms' financial constraints. All of these joint economic globalization variables have a contribution that spurs each dimension of the human development index as one. These results confirm from the study of Jawaid and Waheed (2017), Hamid and Amin (2013), Narayanan (2014), Srivastava and Talwar (2020), Monogbe et al. (2020), and Nwafor (2020) from each of the predictors. Although all of the economic globalization variables have an increasing effect that also accounts for the other, their variability as a joint effect is only 35%. This may be because human development is highly influenced by other factors like how human development demands political freedom and prioritization of human rights as well and not just by the variables mentioned above Daniela-Mihaela and Oana-Georgiana (2015).

4.2.2 GDP per capita Model

Similar to the result of the HDI model, the economic globalization variables (trade, FDI, and FPI) as joint are significant and have a positive impact on GDP per capita, thus also having a positive contribution to the economic output considering the population size of the ASEAN-4. In addition, there are sub predictors that showed a partial effect on GDP per capita except for FDI and FDI+FPI subsets since an export-led growth can be better than investment-led growth, wherein they can be unidirectional towards GDP. This might be a cause of its volatility in investing that can cause fiscal imbalances and risk of financial fragility to the economic growth. This calls for improvement in policies in inflows and outflows as a benefactor to economic growth. Yet through the integration of cross-border transactions, trade and FDI expanded its market opportunities as it can increase its production of goods and services and reduce unemployment which led to an increase in economic growth.

FPI helps diversify the economy, especially in developing countries, because of its inflow of investments from foreign countries. The results confirm the study from various authors, Van den Berg and Lewer (2015), Vogiatzoglou and Nguyen (2016), Tan and Tang (2016), Hussain and Haque (2016), Tiwari and Mutasca (2011), Sengupta and Puri (2020), Suidarma et al. (2020), Okafor et al. (2015) and, Ahmad et al. (2016) from each of the predictors. Its adjusted r-square is 51% which means that 51% variation of the GDP per capita in the ASEAN- 4 can be explained by the joint variables of trade, FDI, and FPI. This variation is higher than the impact on human development.

4.2.3 Model Comparison

From the results of the OLS Regression and adjustments conducted due to diagnostic checking, the researchers have seen that the linear combination of the three predictors, namely Trade, FDI, and FPI, is needed in predicting the responses HDI and GDP per capita. Furthermore, coefficients computed have indicated the same directional effect of the three independent variables to the dependent, all of which increases the latter as they increase, indicating a positive linear effect. Since both models dealt with time-series data, both also needed to be applied with the necessary transformation to account for the possible effect of the time variable in the data. Thus, the final models fitted for both responses do not necessarily use the original data characteristic but are still effective in prediction.

Therefore, the impact brought by the economic globalization variables of trade, FDI, and FPI has a positive contribution to HDI and GDP per capita. This is confirmed by the study of Tintin (2012). It proves that two of its explanatory variables have an impact on economic growth and human development but also has different variation as a category for developing countries. The HDI model has less variability, which is mainly due to differences in development levels per country and is highly influenced by other factors. The researchers may have not statistically proved that GDP could affect HDI and vice versa. However, the results may reflect a relationship between the two dependent variables. On the other hand, it is observed that the magnitude for the estimates in the parameters differs greatly, which is due to the difference in the magnitude of the responses. Larger estimates are computed for the GDP per capita response because it deals with larger observation values. Furthermore, the GDP per capita observations only became eligible for variable transformation due to lowering the significance level. Thus, it cannot fully compare both transformed models on the same standards.

5. Conclusion and Policy Implications

5.1 Conclusion

The researchers examined the impact of economic globalization on human development and economic growth of four selected Association of Southeast Asian Nations (ASEAN) countries conjointly with Indonesia, Malaysia, Philippines, Thailand from 1990 to 2019. It also investigated the estimates of the joint and partial effects in which the best subset predictors of each regression model were determined and differentiated the directional effects of the two models based on the results of the estimates. The effects of the variables were parallel to the hypothesis given by the researchers. For instance, the joint effects of trade, FDI, and FPI are significant and have a positive directional effect on human development and economic growth, which are good contributors to the response variable. This has proved that trade and foreign capital inflows have economic benefits, providing better opportunities for people that can lead to an increase of income and boost productivity in the ASEAN-4. However, the linear regression of the GDP per capita model has more variation than HDI from the predictors, which could mainly be since human development is highly influenced by other factors such as demand political freedom and prioritization of human rights. It can also be seen that it has different levels of development for each country. There were sub predictors towards GDP per capita that showed a partial effect except for FDI and FDI and FPI. This might be caused by its unidirectionality and volatility in investing. Furthermore, the saturated model adjusted for autocorrelation was used as the final model in predicting HDI and GDP per capita as a contender for Trade and FDI sub predictors.

5.2 Policy Implications

As the research findings appeared to have a positive and statistically significant impact on economic growth and human development of the ASEAN-4, policymakers can be guided on how to tap on both national and international levels. With a directional effect of three parameters that were proven toward the HDI, standards of education, health disparities, and the overall life expectancy must be considered. Even so, results have shown that the HDI had a lower variance compared to the GDP per capita.

The researchers suggest a re-evaluation of current policies to be more coherent in terms of international relations where investors have a continuous and significant contribution as they penetrate these nations—not compromising human development while having international trade relations and foreign capital inflows. With that, benefits from these parameters must be integrated into the different dimensions of HDI like social, political, economic, etc. This would ensure a more vibrant economy in the long run once such policies are updated and leaning onto welfare. Thus, researchers strongly suggest that countries like the ASEAN-4 must prioritize sustainable plans like the 2030 Agenda for Sustainable Development Goals, where countries can reassess their policies on the education and universal healthcare system to consider universalization of its equipment and operation.

Policymakers are also prompted to have their policies and regulations flexible and attractive to foreign investors. This includes easing tedious requirement processes through enhancement of technological methods, resource allocations, and feasible market opportunities. These speak of internal changes in both financial and operational strategies at the national level. With a long-term goal of strengthening the nations' foundation for intervening factors as they participate in foreign investments with other globalized countries. Considering the long-run effects of globalization, the government and private companies look out for the adverse effects of it since an increase in production and consumption may enlarge waste and pollution if overlooked.

Funding: This research received no external funding.
Conflicts of Interest: The authors declare no conflict of interest.

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