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The Effect of Export-Import Ratio, Human Development Index (HDI), and Labor on Income Inequality in Five Asean Countries with GDP as a Moderating Variable

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Abstract

The economic growth of ASEAN countries faces the ongoing challenge of income inequality despite increasing regional economic integration. International trade through export-import activities plays a role in promoting growth but does not necessarily ensure equitable income distribution. On the other hand, human capital quality and labor absorption are crucial factors in fostering inclusive development. This study aims to examine the effect of the Export-Import Ratio, Human Development Index (IPM), and Labor on Income Inequality in five ASEAN countries, and whether Gross Domestic Product (GDP) moderates these relationships over the period of 2011–2022. This research uses a descriptive quantitative method, utilizing secondary data in a panel data analysis approach. The study applies Panel Data Regression and Moderated Regression Analysis (MRA) with the help of Eviews 12 software. The findings of this research indicate that: (1) the export-import ratio has a positive and significant effect on income inequality in the five ASEAN countries; (2) the Human Development Index (IPM) has a negative but insignificant effect on income inequality; (3) labor force has a negative but insignificant effect on income inequality; (4) the export-import ratio, IPM, and labor force collectively have a significant effect on income inequality; (5) GDP does not moderate the relationship between the export-import ratio and income inequality; (6) GDP moderates the relationship between IPM and income inequality by weakening the effect; and (7) GDP moderates the relationship between labor force and income inequality by weakening the effect.

Keywords: Income Inequality; Export-Import Ratio; Human Development Index; Labor; Gross Domestic Product

1. Introduction

Economic growth in ASEAN countries continues to face the persistent challenge of income inequality, even amid increasing regional integration. As Todaro emphasizes, development must not only target growth but also equitable distribution and poverty reduction. [1] However, achieving high GDP growth does not always guarantee reduced disparities in income (Deininger & Olinto, 2000). [2]

ASEAN, founded in 1967 to foster economic and social cooperation, remains a region of emerging economies with high potential but ongoing structural inequality. [3] Despite economic progress and openness to trade, many ASEAN countries continue to report income distribution gaps. These disparities can be quantitatively observed through the Gini ratio, a commonly used measure of income inequality.

Table 1. Income Distribution Inequality based on Gini Ratio Data

Country	Years		
	2020	2021	2022
Indonesia	0,353	0,355	0,355
Malaysia	0,407	0,407	0,404
Thailand	0,350	0,349	0,349
Philipina	0.381	0,407	0,381
Vietnam	0,368	0,368	0,361

Source: Data Processing Results, 2025

The table illustrates that Malaysia and the Philippines exhibit relatively high inequality, while Thailand and Vietnam show more consistent and lower Gini ratios. This variation highlights the need to explore underlying economic factors affecting inequality, particularly trade openness, human development, and labor force participation. Trade openness, often represented by the export-import ratio, has a debated impact on inequality. While Balassa and Edwards argue that increased exports support

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inclusive growth, [4][5] Mahesh and Halmos show that the effect may differ depending on whether a country is export- or import-intensive [6][7].

In addition, human development indicators summarized by the Human Development Index (HDI) reflect access to health, education, and income. A lower HDI is associated with lower productivity and higher poverty. [8][9] Labor absorption further influences income distribution. However, studies offer mixed findings: some found labor insignificant to inequality. [10] whereas others reported a positive and significant effect [11].

Given the inconsistency in past studies, this research aims to examine the influence of the export-import ratio, HDI, and labor on income inequality in five ASEAN countries Indonesia, Malaysia, Thailand, the Philippines, and Vietnam from 2011 to 2022. Additionally, the study explores whether GDP acts as a moderating variable in these relationships. Findings from this study are expected to inform regional policymaking to reduce inequality and promote inclusive growth.

2. Literature Review

2.1. Income inequality

Income inequality refers to the condition of unequal income distribution among different groups within a country. This inequality reflects the extent to which the benefits of economic development are shared fairly across all levels of society. In the context of economic growth, such disparities pose a serious challenge, as they can widen the gap between the rich and the poor. Todaro states that income inequality is a significant variation in the income levels reported by the general population, which can exacerbate social disparities if not addressed equitably [12].

2.2. Export import ratio

The export-import ratio is a key indicator in international trade analysis, reflecting the balance between a country's exports and imports over a given period. A higher export-to-import ratio indicates a trade surplus, while the opposite suggests a deficit. This ratio not only illustrates a country’s openness to global markets but also signifies its economic dependence on international trade. As Mankiw points out, the export-import ratio serves as a tool to assess a country's openness to trade, which can influence economic growth and public welfare. [13] In this study, the export-import ratio is used to explore its relationship with income inequality in ASEAN countries.

2.3. Human Development Index (HDI)

The Human Development Index (HDI) is a composite measure that captures a country's development level by integrating health, education, and income indicators. Introduced by the United Nations Development Programme (UNDP) in 1990, HDI serves as a broader alternative to GDP by assessing the quality of life and human well-being. It combines life expectancy, years of schooling, and gross national income per capita to reflect social progress. According to Amartya Sen, development should be centered on expanding people's capabilities to live the lives they value, rather than focusing solely on economic growth [14]. In this study, HDI is used to evaluate how improvements in human capital may influence income inequality in ASEAN countries.

2.4. Labour Force

The labor force refers to the portion of the working-age population that is either employed or actively seeking employment, typically aged 15 years and above. It includes individuals engaged in producing goods or services, whether for personal or societal needs. This category encompasses both the employed and the unemployed who are available for work. According to Arrozi and Sutrisna, the labor force consists of all individuals aged 15 or older who are potentially capable of producing goods and services [15]. In this study, labor force participation is examined in relation to income inequality, particularly to understand whether increased labor supply contributes to more equitable income distribution in ASEAN countries.

2.5. Labour Force

Gross Domestic Product (GDP) reflects the total value of goods and services produced within a country and is widely used to assess economic performance and growth. It can be measured in current or constant prices to capture nominal or real changes. In this study, GDP is used as a moderating variable to examine how economic growth may influence income inequality in five ASEAN countries.

3. Research Method

This study employs a quantitative descriptive approach, which utilizes numerical secondary data to empirically test hypotheses and identify causal relationships among variables. The study covers the period from 2011 to 2022, using panel data combining time-series and cross-sectional data. Secondary data were obtained from international databases, including the World Bank and UNDP. The cross-section dimension comprises five ASEAN countries, while the time-series dimension spans twelve years. The

analysis was conducted using the Panel Data Regression method and Moderated Regression Analysis (MRA). The regression model was processed with the help of EViews 12 software.

1. Panel Data Regression

$$GINIit = \alpha + \beta 1XMit + \beta 2IPMit + \beta 3TNit + eit$$

2. Moderated Regression Analysis (MRA)

$$GINIit = \alpha + \beta 1XMit + \beta 2\ IPM\ it + \beta 3TNit + \beta 5\ XMit*PDBit + \beta 6\ IPMit*\ PDBit + \beta 7\ LFit*\ PDBit + eit$$

Description :

GINI	= Gini Index (%)
XM	= Export Import Ratio (USD)
IPM	= Human Development Index (%)
TN	= Labour Force
PDB	= Gross Domestic Bruto
XM*PDB	= Interaction between Export-Import Ratio and GDP
HDI*GDP	= Interaction between Human Development Index and GD
LF*GDP	= Interaction between Labor Force and GDP
α	= Constant
i	= Cross section
t	= Time series
β1- β7	= Regression Coefficient
εit	= Error

4. Results and Discussion

4.1. Panel Regression Tests to determine the best model

In this study, a panel data model test was conducted to determine the appropriate choice among the common effect, fixed effect, and random effect models. To select the most suitable model for panel data analysis, several tests can be performed, such as the Chow test, the Hausman test, and the Lagrange Multiplier test.

Table 2 Chow Test Results

Effect Test	Statistic	d.f.	Prob.
Cross-section F	18,842281	(4,52)	0,0000
Cross-section Chi-sequare	53,750737	4	0,0000

Source: Data Processing Results, 2025

The table shows that the probability value for the cross-section fixed is less than 0.05, specifically 0.0000. Thus, based on the Chow test, the fixed effect model is selected as the appropriate model (H0 is rejected).

Table. 3 Hausman Test Result

Effect Test	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section Random	53,750737	4	0,0000

Source: Data Processing Results, 2025

Based on Table 3 the probability value for the cross-section random is less than 0.05, which is 0.0112. Therefore, it can be concluded that the chosen model is the fixed effect model (H0 is rejected).

4.2. Fixed Effect Model (FEM) Panel Data Regression

The results of the panel data regression analysis in this study aim to determine the one-way relationship or the influence of the Export-Import Ratio, Human Development Index, and Labor Force on income inequality. The following is the output from the use of the Fixed Effect Model:

Table 4. Fixed Effect Model (FEM) Panel Data Regression

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0,177753	0,120613	1,473741	0,1466
XM	0,073681	0,030653	2,403713	0,0198
IPM	-0,035325	0,096259	-0,366984	0,7151
TN	0,002411	0,001319	1,828571	0,0732

Source : Data Processing Results, 2025

From the regression equation, it can be interpreted as follows :

1. The constant value of 0.177753 (positive) indicates that when all independent variables (Export-Import Ratio, Human Development Index, and Labor Force) are equal to zero, the estimated value of the dependent variable (income inequality) is 0.177753.
2. The coefficient value β_1 for the Export-Import Ratio is 0.073681. This indicates that a one-unit increase in the Export-Import Ratio will increase Income Inequality by 0.073681, assuming all other variables remain constant.
3. The coefficient value β_2 for the Human Development Index is -0.035325. This means that a one-unit increase in the Human Development Index will reduce Income Inequality by 0.035325, assuming all other variables remain constant.
4. The coefficient value β_3 for the Labor Force is 0.00241. This indicates that a one-unit increase in the Labor Force will increase Income Inequality by 0.00241, assuming all other variables remain constant.

4.3. Hypothesis Test

a. Determination Coefficient Test

The coefficient of determination is a testing technique used to measure the extent to which a model is able to explain the variation in the dependent variable, as indicated by the value of the Adjusted R-Squared.

Table 5. Results of the Coefficient of Determination Test

R-squared	0,800772
Adjusted R-squared	0,773953

Source : Data processing Results, 2025

Based on Table 5 the coefficient of determination (R^2) is 0.773953. This result indicates that income inequality (Gini Index) can be explained by the Export-Import Ratio, Human Development Index, and Labor Force by 77.40%. The remaining 22.60% is explained by other variables not included in this model.

b. Partial Test

The partial test, or t-test, is conducted to determine the effect of each independent variable on the dependent variable. If the probability value (p-value) of the t-test is less than 0.05, the independent variable is considered to have a significant effect on the dependent variable.

Table 6 Partial Test

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0,177753	0,120613	1,473741	0,1466
XM	0,073681	0,030653	2,403713	0,0198
IPM	-0,035325	0,096259	-0,366984	0,7151
TN	0,002411	0,001319	1,828571	0,0732

Source : Data processing Results, 2025

$$GINI = 0.177753 + 0.073681\ XM - 0.035325\ IPM + 0.002411\ TN + e$$

Based on Table 6. the results of the t-test can be summarized as follows:

1. The t-test for the Export-Import Ratio variable (X1) shows a p-value of 0.0198 < 0.05, with a positive coefficient of 0.073681. This indicates that the Export-Import Ratio has a positive and significant effect on income inequality in the five ASEAN countries. Therefore, it can be concluded that the research hypothesis H1 is rejected.
2. The t-test for the Human Development Index (HDI) variable yields a p-value of 0.7151 > 0.05, with a negative coefficient of -0.035325. This indicates that the Human Development Index has a negative but not significant effect on income inequality. Thus, it can be concluded that the research hypothesis H2 is accepted.
3. The t-test for the Labor Force variable shows a p-value of 0.0732 > 0.05, with a positive coefficient of 0.002411. This implies that the Labor Force has a positive but not significant effect on income inequality. Hence, it can be concluded that the research hypothesis H3 is rejected.

c. Simultaneous Test

The F-test is used as a technique to examine whether there is a simultaneous effect of all independent variables on the dependent variable. The assessment indicator is that if the probability value (Prob > F) is less than the significance level of 0.05, then the independent variables are considered to have a simultaneous effect on the dependent variable, and vice versa.

Table. 7 Simultaneous Test

F-statistic	29,85824
Prob(F-statistic)	0,000000

Source: Data Processing Results, 2025

Based on Table 7. the Prob > F value is 0.000000. This value is less than 0.05, indicating that all independent variables in this study simultaneously have a significant effect on the dependent variable, namely income inequality.

4.4. Individual Effect

Table 8 Individual Effect

No	Crossid	Effect
1	Indonesia	0.008087
2	Malaysia	0.011822
3	Thailand	-0.022766
4	Viet Nam	-0.059149
5	Filipina	0.067643

Source: Data Processing Results, 2025

Based on the table showing the effects across five ASEAN countries, the following interpretations can be made:

1. The effect value in Indonesia is 0.008087. If the independent variables are held constant, the coefficient value (c) for Indonesia is 0.008087. This represents the value of the dependent variable (income inequality) when it is not influenced by any other variables. In other words, income inequality in Indonesia is expected to increase by 0.008087 if the independent variables Export-Import Ratio, Human Development Index, and Labor Force are equal to zero.
2. The effect value in Malaysia is 0.011822. Assuming the independent variables remain constant, the coefficient (c) for Malaysia is 0.011822. This is the value of the dependent variable (income inequality) when it is not affected by other variables. This indicates that income inequality in Malaysia would increase by 0.011822 if the Export-Import Ratio, Human Development Index, and Labor Force were all zero.
3. The effect value in Thailand is -0.022766. When the independent variables are assumed to be constant, the coefficient (c) for Thailand is -0.022766. This reflects the value of the dependent variable (income inequality) in the absence of influence from other variables. Thus, income inequality in Thailand would decrease by 0.022766 if the Export-Import Ratio, Human Development Index, and Labor Force were zero.
4. The effect value in Vietnam is -0.059149. If the independent variables are considered constant, the coefficient (c) for Vietnam is -0.059149. This indicates the value of the dependent variable (income inequality) when unaffected by other variables. Therefore, income inequality in Vietnam would decline by 0.059149 if the Export-Import Ratio, Human Development Index, and Labor Force were zero.
5. The effect value in the Philippines is 0.067643. Assuming the independent variables are held constant, the coefficient (c) for the Philippines is 0.067643. This value represents the level of income inequality in the absence of other influencing variables. Accordingly, income inequality in the Philippines would increase by 0.067643 if the Export-Import Ratio, Human Development Index, and Labor Force were equal to zero.

4.5. Moderated Regression Analysis

The moderation classification test in this study refers to the framework proposed by Dharma et al. (2020), with the following steps: The moderation classification test in this study refers to the framework proposed by Dharma et al. (2020), with the following steps:

Table 9. Results of Moderation Test

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-8,299040	3,776428	-2,197590	0,0329
XM	1,678725	1,522591	1,102545	0,2758
IPM	10,93544	5,134072	2,129974	0,0384
TN	0,001406	0,001110	1,266669	0,2115
PDB	0,320882	0,142545	2,251101	0,0291
XM*PDB	-0,059942	0,056478	-1,061345	0,2940
IPM*PDB	-0,412405	0,194631	-1,118908	0,0394
TN*PDB	-2,72E-07	9,18E-08	-2,968570	0,0047

Source: Data Processing Results, 2025

Based on the regression equation, the interpretation is as follows:

1. The constant value is -8.299040. This indicates that income inequality is valued at 8.299040 when both the independent variables and the moderating variable are assumed to be zero.
2. The regression coefficient for the Export-Import Ratio variable is positive, at 1.678725. This means that for every one-unit increase in the Export-Import Ratio, income inequality increases by 1.678725. When GDP is included as a moderating variable, it results in a decrease of -0.059942 in income inequality.
3. The coefficient for the Human Development Index variable is positive, at 10.93544. This implies that a one-unit increase in HDI leads to an increase of 10.93544 in income inequality. When GDP is added as a moderating variable, it contributes to a decrease of -0.412405 in income inequality.
4. The coefficient for the Labor Force variable is positive, at 0.001406. This indicates that for every one-unit increase in Labor Force, income inequality increases by 0.001406. When GDP is added as a moderating variable, it results in a decrease of -2.72E-07 in income inequality.
5. The regression coefficient for the GDP variable is 0.320882, meaning that a one-unit increase in GDP leads to an increase of 0.320882 in income inequality.

4.6. Moderation Classification Test

In this study, a panel data model test was conducted to determine the appropriate choice among the common effect, fixed effect, and random effect models. To select the most suitable model for panel data analysis, several tests can be performed, such as the Chow test, the Hausman test, and the Lagrange Multiplier test.

4.6.1. Stage I Regression Test

In the first stage of the moderated regression test, two testing steps were conducted. The first step examined the effect of the Export-Import Ratio (XM) and GDP on income inequality (GINI). The second step tested the effect of XM, GDP, and the interaction term XM*GDP on GINI.

- Step I

Table 10. Results of Stage 1 Moderated Regression Test

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1,611707	0,336898	4,783957	0,0000
XM	0,049767	0,027657	1,799431	0,0776
PDB	-0,047818	0,012373	-3,864676	0,0003

Source: Data Processing Results, 2025

- Step II

Table 11. Results of Stage 2 Moderated Regression Test

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0,854283	1,791513	-0,476850	0,6355
XM	2,366775	1,654016	1,430926	0,1584
PDB	0,043715	0,066474	0,657626	0,5137
XM*PDB	-0,085953	0,061350	-1,401030	0,1671

Source: Data Processing Results, 2025

In Table above, Step I shows that the probability value of the moderating variable (GDP) is significant, as it is less than 0.05 (0.0003 < 0.05). However, in Step II, the resulting probability value is not significant, as it is greater than 0.05 (0.1671 > 0.05). Therefore, GDP can be classified as a predictor moderator, as it is only significant in the first step of the test.

4.6.2. Stage II Regression Test

In the second stage of the moderated regression test, two testing steps were conducted. The first step examined the effect of the Human Development Index (HDI) and Gross Domestic Product (GDP) on income inequality (GINI). The second step tested the effect of the Human Development Index (HDI), Gross Domestic Product (GDP), and the interaction variable HDI*GDP on GINI (Y).

- Step I

Table 12. Results of Stage 1 Moderated Regression Test

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1,840463	0,333035	5,526331	0,0000
IPM	0,120074	0,090770	1,322837	0,1916
PDB	-0,057806	0,013090	-4,416009	0,0000

Source: Data Processing Results, 2025

- Step II

Table. 13 Results of Stage 2 Moderated Regression Test

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-5,823904	4,064621	-1,432828	0,1579
IPM	10,46658	5,470159	1,913396	0,0612
PDB	0,232593	0,154044	1,509910	0,1371
IPM *PDB	-0,392085	0,207266	-1,891694	0,0641

Source: Data Processing Results, 2025

Based on the table above, Step I shows that the probability value of the moderating variable (GDP) is significant, as it is less than 0.05 (0.0000 < 0.05). However, in Step II, the resulting probability value is not significant, as it is greater than 0.05 (0.0641 > 0.05). Therefore, GDP is classified as a predictor moderator, as it is only significant in the first step of the test.

4.6.3. Stage III Regression Test

In the third stage of the moderated regression test, two testing steps were conducted. The first step examined the effect of Labor Force (TN) and Gross Domestic Product (GDP) on income inequality (GINI). The second step tested the effect of Labor Force (TN), Gross Domestic Product (GDP), and the interaction variable TN*GDP on GINI.

- Step I

Table 13. Results of Stage 1 Moderated Regression Test

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1,634585	0,384360	4,252747	0,0001
TN	0,000917	0,001272	0,720947	0,4741
PDB	-0,049029	0,013108	-3,740263	0,0005

Source: Data Processing Results, 2025

- Step II

Table 14. Results of Stage 1 Moderated Regression Test

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1,722691	0,358765	4,801719	0,0000
TN	0,000831	0,001188	0,699166	0,4876
PDB	-0,052114	0,012285	-4,242013	0,0001
TN *PDB	-2,54E-07	9,62E-08	-2,642184	0,0109

Source: Data Processing Results, 2025

Based on the table above, Step I shows that the probability value of the moderating variable (GDP) is significant, as it is less than 0.05 (0.0005 < 0.05). In Step II, the resulting probability value is also significant, as it is less than 0.05 (0.0109 < 0.05). Therefore, GDP is classified as a quasi-moderator, since it is significant in both the first and second steps of the test.

4.7. Discussion

1. The Export-Import Ratio has a positive and significant effect on income inequality in five ASEAN countries, with a regression coefficient of 0.073681 and a p-value of 0.0198. This suggests that an increase in trade activity tends to widen the income gap. The benefits of international trade are often concentrated among large enterprises and globally connected sectors, while low-income and informal groups receive fewer gains. This finding aligns with studie by Sidiq et al. [16] which highlight how export and import growth can deepen inequality if not supported by inclusive redistribution mechanisms. Similar trends are found across the region, including in Malaysia, Thailand, and Vietnam, where trade openness correlates with higher inequality, particularly in urban areas. While in some contexts, like labor-intensive sectors in Eastern Indonesia, exports may reduce disparities, overall the evidence supports the Kuznets Hypothesis. It posits that in the early stages of economic growth, income inequality tends to rise as modern sectors expand faster than the distribution of their benefits. Thus, without equitable trade policies, increased export-import activity risks amplifying existing disparities.
2. The Human Development Index (HDI) has a negative but statistically insignificant effect on income inequality in five ASEAN countries, with a coefficient of -0.035325 and a p-value of 0.7151. This suggests that while HDI improvements theoretically reduce inequality, such gains have not translated into more equitable income distribution. Several studies across ASEAN countries confirm this pattern, indicating that structural factors like regional disparities and limited access to quality employment continue to drive inequality. These findings support the Size Distribution Theory, which highlights the importance of equitable distribution of development outcomes, beyond improvements in average well-being. Moreover, the limited impact of HDI on reducing inequality may stem from the urban-centric nature of development. Although education and health indicators have improved, these advancements often benefit middle to upper economic groups, while lower-income populations, particularly in rural or informal sectors, remain excluded. As observed in Malaysia, Vietnam, and Thailand, rising HDI does not necessarily correlate with shrinking income gaps unless accompanied by inclusive and regionally balanced development policies.
3. The Labor Force variable shows a positive but statistically insignificant effect on income inequality across five ASEAN countries, with a regression coefficient of 0.002411 and a p-value of 0.0732. This result indicates that while an increase in the labor force is theoretically associated with rising inequality, the relationship is not statistically robust. The positive coefficient suggests that labor force growth when not accompanied by quality and inclusive employment opportunities may worsen inequality, especially when workers are absorbed into low-productivity, informal sectors. This condition is prevalent in ASEAN, where informal employment dominates labor markets, particularly in Vietnam (68.5%), Indonesia (59.1%), and Thailand (51%). Empirical findings from Malaysia, Thailand, Vietnam, and the Philippines support this result. Despite growing labor participation, inequality persists due to structural mismatches between labor supply and job quality. For instance, informal labor growth in Thailand and oversupply of educated workers in Vietnam failed to significantly reduce inequality. These findings align with the Size Distribution Theory by Todaro and Smith (2006), which emphasizes that equitable income distribution not just higher labor participation is essential in reducing inequality. Hence, while the labor force may have a theoretical link to income disparity, its lack of statistical significance suggests it is not a primary driver of inequality variation in ASEAN during the observed period.
4. The simultaneous F-test shows a significance value of 0.000000, which is less than the threshold of 0.05. This indicates that the Export-Import Ratio, Human Development Index (HDI), and Labor Force collectively have a statistically significant effect on income inequality in the five ASEAN countries, thus confirming Hypothesis 4. These findings suggest that income disparity in the ASEAN region is not driven by a single factor but results from the interaction of multiple structural economic elements, including international trade performance, the quality of human development, and labor market conditions. Although HDI and Labor Force did not show significant effects individually, their combined influence alongside the Export-Import Ratio reveals a substantial impact on inequality. This supports a multidimensional approach to inequality analysis, which posits that income disparities are shaped by interconnected economic and social variables. Consequently, tackling inequality requires integrated policies that address trade, human capital development, and labor market reform simultaneously.
5. The moderating regression analysis reveals that the interaction term between Export-Import Ratio and GDP (XM*GDP) has a coefficient of -0.059942 with a p-value of 0.2940, exceeding the 0.05 significance level. This indicates that GDP does not significantly moderate the relationship between the Export-Import Ratio and income inequality across the five ASEAN countries studied, thus leading to the rejection of Hypothesis 5. Substantively, this suggests that economic growth as measured by GDP does not necessarily alter the effect of trade intensity on inequality. Even in the presence of rising GDP, the benefits of international trade are not equitably distributed among social groups. Supporting evidence from ASEAN countries shows that while trade may promote GDP growth, it does not automatically reduce inequality. In Indonesia and Malaysia, for instance, GDP growth often coincides with persistent or widening disparities. The Structuralist Theory of Trade

and Inequality further explains this outcome: developing countries tend to export low-value goods while importing high-value products, resulting in uneven gains from trade. As most economic benefits concentrate in formal sectors and urban regions, informal workers and rural populations remain excluded. These findings imply that GDP alone is insufficient as a moderating force more inclusive, redistributive policies are essential to ensure that trade-led growth translates into broader social equity.

6. he moderated regression analysis shows that the interaction term between Human Development Index (HDI) and Gross Domestic Product (GDP) has a coefficient of -0.412405 with a significance level of 0.0394. Since the p-value is below 0.05, this indicates a statistically significant moderating effect. GDP weakens the relationship between HDI and income inequality, suggesting that high economic growth does not necessarily enhance the positive impact of HDI on reducing inequality. In other words, even if human development improves, it may not significantly reduce inequality when the accompanying economic growth is not equitably distributed. This finding is consistent with evidence from ASEAN countries, where GDP growth often coincides with persistent inequality. Studies in Indonesia, Malaysia, Thailand, Vietnam, and the Philippines reveal that while HDI improvements reflect better education and health outcomes, they are insufficient in offsetting structural income disparities if economic benefits remain concentrated in specific groups. These results underscore the need for inclusive growth policies that align economic expansion with fair income distribution, ensuring that human development translates into real gains for all segments of society.
7. The results of the moderated regression analysis indicate that the interaction between Labor Force (TN) and Gross Domestic Product (GDP) has a negative coefficient of -2.72E-07 with a significance level of 0.0047, below the 0.05 threshold. This finding suggests that GDP significantly moderates the relationship between labor and income inequality by weakening it. In other words, the higher a country's GDP, the smaller the impact of labor force expansion on increasing income inequality. This reflects GDP's role in absorbing labor into higher-productivity sectors, mitigating the inequality risks associated with an expanding labor force, particularly in informal employment. These findings align with Kuznets' hypothesis, which posits that income inequality tends to rise in the early stages of economic growth but eventually decreases as development matures. Supporting evidence from ASEAN countries, including Indonesia, Malaysia, Vietnam, and the Philippines, suggests that inclusive GDP growth can buffer the adverse distributional impacts of labor growth. Thus, GDP acts as a stabilizing force, ensuring labor market expansion contributes to more equitable income distribution. This highlights the need for inclusive economic strategies to effectively manage labor supply and reduce structural inequality.

5. Conclusions

Based on the research findings regarding the influence of the Export-Import Ratio, Human Development Index (HDI), and Labor Force on income inequality in five ASEAN countries with Gross Domestic Product (GDP) as a moderating variable, several key conclusions can be drawn. The Export-Import Ratio has a positive and significant effect on income inequality, indicating that international trade tends to widen inequality as its benefits are not evenly distributed. Meanwhile, the Human Development Index (HDI) does not have a significant effect on income inequality, suggesting that improvements in quality of life alone are insufficient to reduce inequality without equitable distribution of development outcomes. Similarly, the Labor Force does not significantly affect income inequality, as a large workforce without sufficient quality or equal access to employment opportunities may exacerbate inequality. When considered simultaneously, the Export-Import Ratio, HDI, and Labor Force collectively have a significant effect on income inequality, demonstrating that inequality arises from the complex interaction of multiple social and economic factors. Furthermore, Gross Domestic Product (GDP) does not moderate the relationship between the Export-Import Ratio and income inequality, indicating that economic growth has not yet been able to mitigate the negative effects of trade on inequality. However, GDP significantly moderates the relationship between HDI and income inequality in a negative direction, implying that non-inclusive economic growth can weaken the positive impact of human development on reducing inequality.

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