



MACROECONOMIC DETERMINANTS OF GROSS DOMESTIC PRODUCT IN ASEAN: THE ROLE OF WTI OIL PRICES AND EXTERNAL DEBT RATIO

Abdul Latif^{1*}; Zulfa Zakiatul Hidayah²; Nani Hartati³, Widiastuti⁴, Erna Apriani⁵)

^{1,2,3,4,5}Faculty of Economic and Business, Universitas Pelita Bangsa, Bekasi, East Java, Indonesia
Jl. Inspeksi Kalimalang No.9, Cibatu, Cikarang Sel., Kabupaten Bekasi, Jawa Barat 17530

*Correspondent Author: abdullatif@pelitabangsa.ac.id

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ABSTRACT

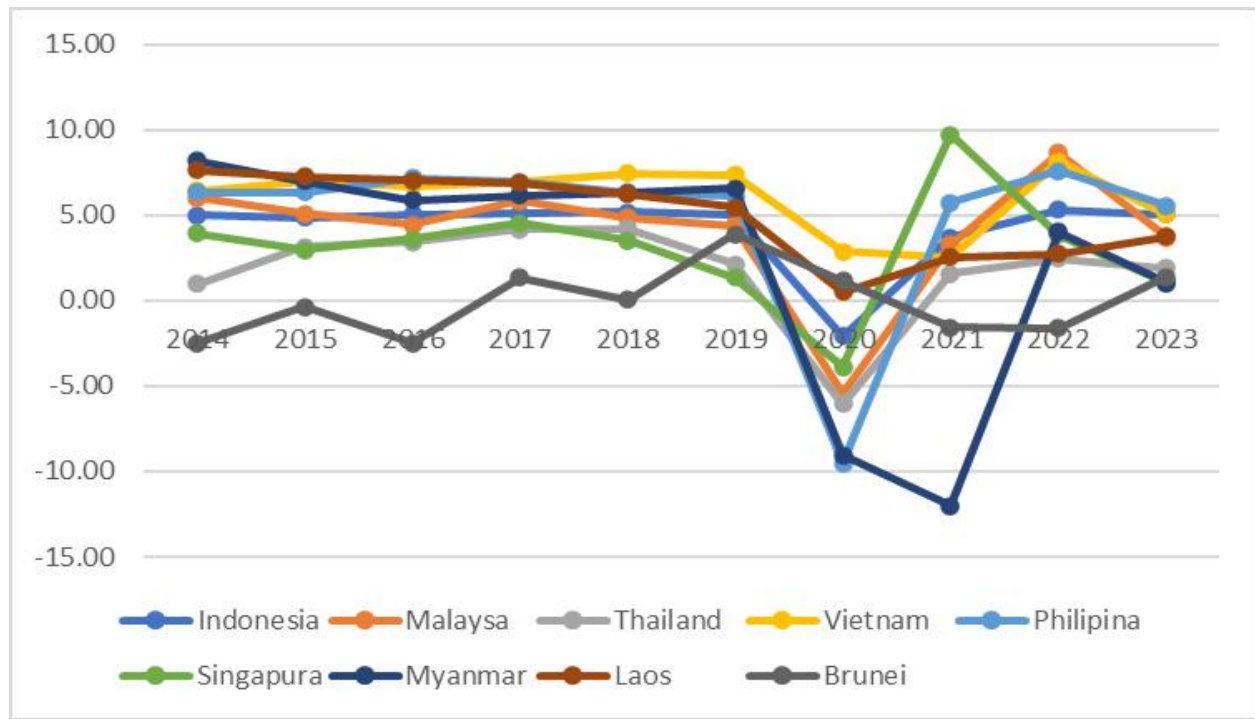
Purpose: This study examines the direct and indirect effects of WTI oil prices on GDP in ASEAN countries, by including the external debt ratio as a mediating variable. **Methodology:** Using path analysis, this study analyzes secondary data from 2000-2023 on WTI crude oil price, GDP, and external debt ratio. **Results:** The results found that the direct effect of debt ratio on world oil prices had no effect with a sig of 0.186, then the direct effect of debt ratio on GDP had no effect with a sig of 0.198, then the direct effect of WTI oil prices on GDP had no effect with a sig of 0.518, and the results of the mediation dimension of WTI oil prices did not mediate the relationship between debt ratio and GDP with a V-Value of 0.240. **Findings:** The findings of the study show that macroeconomic factors, especially world oil prices and a country's debt ratio, do not affect a country's economic growth. **Novelty:** Novelty in previous research makes novelty in the variable foreign debt ratio as a mediating dimension of the relationship between WTI oil prices and GDP which has not been examined in previous studies. **Originality:** This study discusses one of the macroeconomic factors that fluctuate in their influence on the movement of a country's economy, and has not been examined in previous studies. **Conclusion:** Policymakers should consider additional economic indicators when assessing the impact of external debt and oil price fluctuations on national growth. **Type of Paper:** Empirical research paper

INTRODUCTION

Economic growth is an important measurement tool for seeing a country's economic success (Hafizhy & Sukarniati, 2024). Economic growth is considered a macroeconomic problem that takes place in the long term. According to (Pahimah & Ichsan, 2024), economic growth is the increase in the level of production in an economy as measured by national income, including components such as government spending, foreign direct investment exports, labour, and inflation reflected in Gross Domestic Product (GDP). Every country will always strive to increase economic growth and set growth targets to achieve success over a long period. Economic growth is influenced by surrounding environmental conditions such as population (Rijal, 2022). With each country's capabilities and resources, not all countries can achieve the economic situation they want. The higher economic

growth reflects better development and economic activity in the country (Ngoc et al., 2024). ASEAN countries are the main research objectives in this case because Indonesia is part of ASEAN countries within a small, simple scope of all countries in ASIA.

Figure 1. GDP of ASEAN Countries 2014-2023



Source: Statistical data processed, 2025

A country's ability to produce goods and services requires sufficient funds to achieve development goals. Investment, which comes from domestic savings or state deposits, is a source of funds to achieve development goals (Kwablah, 2023). However, due to the limited availability of savings, developing countries, especially countries in the Southeast Asian Region, rely heavily on external sources of capital and funding, such as loans or foreign investment, both in the form of foreign direct investment and portfolio investment. With the influx of foreign direct investment, new resources and technologies are transferred from the country of origin to the recipient country, which directly increases the economic growth of the recipient country (Angelini et al., 2024). In addition to the transfer of resources and technology, the intervention of foreign companies in investing in the investee country can increase the revenue of the investee country through taxes. Foreign companies that invest in the recipient country are obliged to pay taxes to the recipient country, where this tax revenue can be used to finance the development of infrastructure, education, and public services, which ultimately improves the quality of life of the people and promotes economic growth (Zhou et al., 2025) [Huawei](#).

Alghamdi et al., (2024) revealed that foreign loans serve as a source of funding that can be utilized to encourage investment in order to support economic development. That can be used to increase investment and support economic growth. External debt is the total private and public external debt owned by a country (Naibaho et al., 2023). Foreign debt can positively impact the country's economic growth in the long term (Pellu, 2019). Petroleum is a commodity that has a significant global impact, as it is the main source of primary energy. Other hydrocarbon resources, such as natural gas and coal, also play an important role. (Heinlein et al., 2021). Simultaneously, crude oil prices have increased, which is most likely a hedging measure against equities and a result of disruptions in oil supply felt in the OPEC market. Oil prices, which directly and indirectly impact

various economic sectors, serve as a leading indicator in assessing economic performance (Sahban & Se, 2018).

Some studies show different results in analyzing FDI variables, trade openness, government spending, exchange rates, and inflation. The study's results (Sahban & Se, 2018) showed that government expenditure variables did not significantly impact economic growth in 8 ASEAN countries. Research (Chisanga et al., 2025) [Naibaho](#) shows that inflation and investment significantly affect economic growth. Research (Huawei, 2022) shows that the exchange rate does not affect economic growth. The gap in previous research makes novelty in the foreign debt ratio variable as a mediating dimension of the relationship between WTI oil prices and GDP.

Hypothesis Development

Relationship between external debt ratio and WTI oil price

The relationship between world oil prices and external debt shows varying results depending on the country, period, and industry sector (Kwablah, 2023). (Ngoc et al., 2024) found a negative relationship between the two and emphasized that this relationship varies depending on the sector and may not always be linear. In conclusion, the relationship between oil prices and external debt varies based on context.

H1: External debt ratio hurts WTI oil price

Relationship between WTI oil price and GDP

Zakiah & Purnomo, (2019) explains that world oil prices hurt the national economic growth rate. Income inequality may affect this relationship, and economic dynamics may differ across country contexts and periods (Nurfitriyani & Manjaleni, 2023). Fluctuating world oil prices certainly create uncertainty for a country's economy, so their movements can affect the prices of national-level consumption because the economy's rotation does not escape the transportation of fuel (Lee & Song, 2025) [Alghamdi](#).

H2: WTI oil price negatively affects GDP

Relationship of foreign debt to GDP ratio

The ratio of foreign debt to GDP (Gross Domestic Product) can indicate a country's economic condition; a high debt ratio can signal an economic disaster (Pahimah & Ichsan, 2024). A high debt ratio can cause the government to potentially default on its debts, and it can cause financial panic around the world (Lehmann & Zarges, 2025) [Hafizhy](#).

H3: External debt ratio negatively affects GDP

The foreign debt ratio mediates the relationship between WTI oil prices and GDP.

A country's debt ratio can inform stakeholders in investment decisions, thus reflecting the state of its economic growth (Sampe et al., 2023). The debt overhang theory explains that if a country accumulates more debt, it can reduce its ability to pay off its debts. World oil prices are relatively volatile and have a negative impact on economic growth, making foreign debt a caution that must be observed so that the impact is not too significant on a country's economic growth (Cisse et al., 2025) [Rijal](#).

H4: External debt mediates the relationship between WTI oil price and GDP.

From the series of hypotheses that have been made, the following research objectives can be arranged: 1). Analyze the direct effect of WTI oil price on the foreign debt ratio. 2). Analyzing the direct effect of WTI oil price on GDP. 3). Analyzing the direct effect of foreign debt ratio on GDP. 4). Analyzing the indirect effect of WTI oil price and GDP through mediating the foreign debt ratio.

METHOD

Metode Analisis

This type of research is associative causality research. Associative causality is a quantitative approach to finding the relationship between two or more variables (Arikunto, 2019). The GDP of ASEAN countries represents the population in the study, macroeconomic factors of world oil prices, and microeconomic factors of debt ratio as mediating variables. The sample used in the study is secondary data in annual data for twenty-four years because annual data is taken and to meet the sample criteria, the period is taken from 2000 to 2023, sample data sourced from the internet, papers, books, and other references that support this research (Gujarathi, 2022).

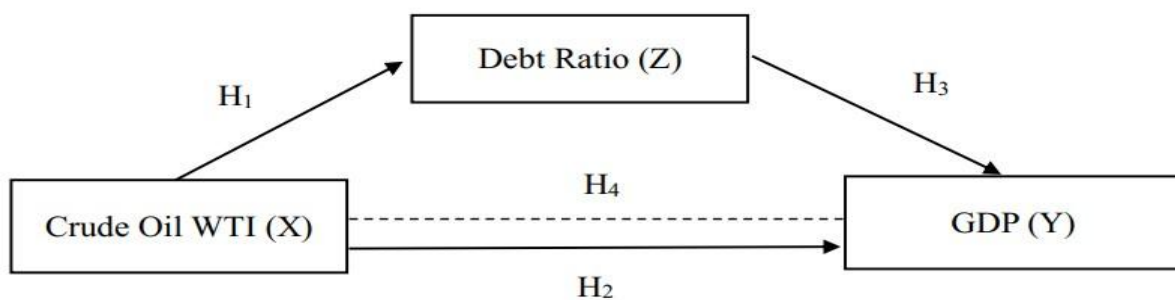
Table 1. Definition and Measurement

Variables	Definition	Scale
Gross Domestic Product (Y)	Economic growth is the increase in gross public goods in a country	Ratio
Foreign Debt Raso (Z)	Refers to credit facilities received by domestic residents from outside entities, where the repayment of the debt requires future repayment of principal and/or interest.	Ratio
World Oil Price WTI (X)	Is one of the most vital energies, this is because the processed crude oil is a source of energy.	Nominal

Source: Primary data processed, 2025

The path analysis method analyses data and tests various research variables. This technique was developed as a form of refinement of multiple linear regression, or path analysis is an application of regression analysis that estimates the causal relationship between variables (causal models) previously determined based on theory (Ghozali, 2018). From the description of the information above, path analysis can be built by examining the relationship of the world oil price variable (X) to the GDP of ASEAN countries (Y), as well as the indirect relationship of world oil prices (X) to GDP (Y) through the mediating variable debt ratio (Z):

Figure 2. Research Design



Source: Primary data processed, 2025

From the information in the figure above, based on the concept of path analysis in this study, the world oil price variable (X) has a direct relationship to the GDP variable (Y), as well as the world oil price (X) to the debt ratio (Z), as well as the direct relationship of the debt ratio to GDP. Then, there is the indirect relationship of world oil prices (X) to GDP (Y) through the mediation of the debt ratio (Z).

RESULTS AND DISCUSSION

RESULTS

Data Reliability Test

Table 2. Reliability Test Results

Reliability Statistics	
Cronbach's Alpha	N of Items
.675	3

Source: Primary data processed, 2025

From the information in table 2 above, the reliability test results show that the GDP variable, WTI oil price, and the national debt ratio have a Cronbach's Alpha value of 0.675 or 67.5% greater than the reliability standard of 0.600, thus the research variables are reliable.

Table 3. Results of Data Normality Test, Multicollinearity, Heteroscedasticity

Testing	Variables	Asymp. Sig.	Tolerance	VIF	Sig.
Normality		0.200			
Multikolinearity	Crude Oil WTI		0.978	1.023	
	Debt Ratio		0.987	1.033	
a. Dependent Variable: DGP					
Heteroskedasticity	Crude Oil WTI				0.494
	Debt Ratio				0.146
a. Dependent Variable: RES_ABS					

Source: Primary data processed, 2025

From the information on the results of the first model feasibility test data normality test in Table 3 above, the Asymp. Sig. in the data normality test of 0.200 is greater than the 5% alpha standard, namely $0.200 > 0.05$. These results indicate that the data in the study are normally distributed and deserve to be continued at the next stage.

The second model feasibility test is the multicollinearity of the research data, the tolerance value of the Crude Oil WTI and Debt ratio variables of 0.978 and 0.987 is greater than alpha 10%, namely 0.978 and $0.987 > 0.10$, and the VIF value of Crude Oil WTI and Debt ratio of 1.023 and 1.033 is less than 10, namely 1.023 and $1.033 < 10.00$, these results indicate that the research data is not indicated by multicollinearity and is worth continuing to the next stage.

The third model feasibility test is heteroscedasticity. The significance value of the WTI Crude Oil variable is 0.494, and the Debt ratio variable is 0.146. The significance value of each variable is greater than alpha 5% or 0.05. These results indicate that heteroscedasticity does not indicate the research data and that it is feasible to continue with regression testing and path analysis.

Regression Test Results

Equation 1

Equation 1 is the result of regression with path analysis, namely the direct influence between the WTI crude oil variable on the Debt ratio variable as the ratio of debt to GDP.

Table 4. Model Summary Results Equation 1

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.141 ^a	0.120	0.009	6.2262975

a. Predictors: (Constant), Crude Oil WTI

Source: Primary data processed, 2025

Table 4 above shows that the R-Square value is 0.120, or 12%. This information conveys that the WTI Crude Oil variable can influence the Debt ratio variable by 12%. This result is categorized as insufficient because it is below 50% so that variable opportunities can be a reference for research.

Table 5. Results of Regression Equation 1

Coefficients ^a						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-2.768	3.026		-0.915	0.363
	Crude Oil WTI	0.067	0.050	0.141	1.332	0.186

a. Dependent Variable: Debt Ratio

Source: Primary data processed, 2025

The information in Table 5 above is the result of regression equation 1 partially, with the resulting significant value of the WTI oil crude variable of 0.186 > 0.05. These results indicate that the WTI oil crude variable partially has no effect on the Debt ratio.

Equation 2

Equation 2 is the result of regression with path analysis, namely the direct effect between the WTI crude oil variable and the debt ratio variable as a mediating variable on GDP.

Table 6. Model Summary Results Equation 2

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.177 ^a	0.231	0.005	0.022311

a. Predictors: (Constant), Debt Ratio, Crude Oil WTI

Source: Primary data processed, 2025

Table 6 above shows that the R-Square has a value of 0.231, or 23.1%. This information conveys that the WTI Crude Oil variable and the Debt ratio can influence the GDP variable by 23.1%. This result is categorized as insufficient because it is below 50% so that other variable opportunities can be used as a reference for research.

Table 7. Regression Equation Results 2

		Coefficients ^a				
		Unstandardized Coefficients		Standardized Coefficients		
Model		B	Std. Error	Beta	t	Sig.
1	(Constant)	0.055	0.012		4.641	0.000
	Crude Oil WTI	0.000	0.000	-0.075	-0.649	0.518
	Debt Ratio	0.112	0.046	-0.149	-1.300	0.198

a. Dependent Variable: GDP

Source: Primary data processed, 2025

Information Table 7 above is the result of regression equation 2 partially, with the resulting significance value of the WTI crude oil variable of $0.518 > 0.05$. These results indicate that the WTI crude oil variable partially does not affect GDP. Then, the debt ratio, with a value of $0.198 > 0.05$, shows that the debt ratio has no effect on GDP.

Sobel Test Results

After the equation test is carried out, the test results are continued to the Sobel test. This test is conducted to determine the relationship and mediating effect of the WTI crude oil variable in mediating the relationship between debt ratio and GDP.

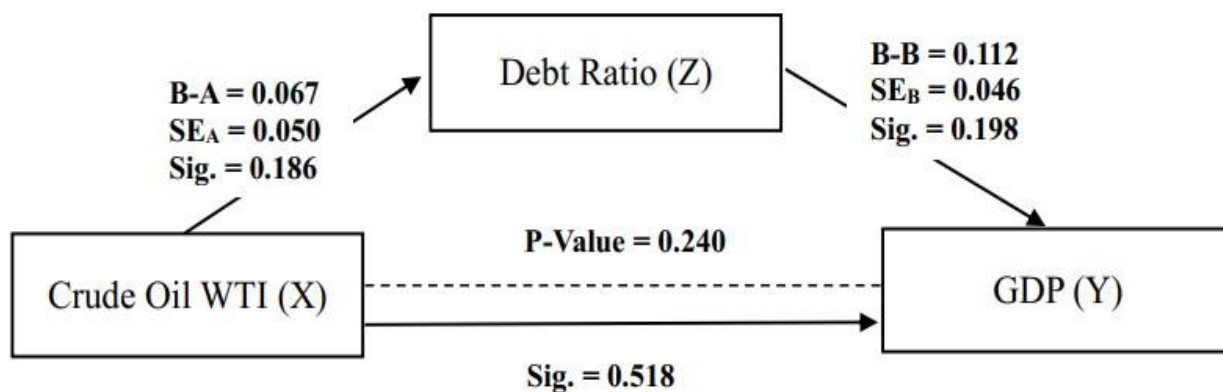
Table 8. Sobel Test Results

B - A (Crude Oil WTI)	0.067
SE _A	0.050
B - B (Debt Ratio)	0.112
SE _B	0.046
Sobel Test Statistic	1.173
Std. Error	0.006
P-value	0.240

Source: Primary data processed, 2025

From the information on the soil test results in Table 8 above, the path analysis with mediation can produce a P-value of 0.240 greater than alpha 5%, namely $0.240 > 0.05$. These results indicate that the debt ratio variable on GDP mediated by WTI crude oil indirectly does not provide a mediating relationship in the path analysis of research data.

Figure 3. Path Analysis Results



Source: Primary data processed, 2025

Figure 3 above concludes the results of the stages of testing with path analysis in the study. These results visualize the results in the testing process and the results obtained at each testing stage between the debt ratio variable, the GDP variable, and WTI crude oil as mediating variables in the study.

Table 9. Hypothesis Test Results

Variables	Description	Result
Debt ratio \longrightarrow Crude Oil WTI	Direct	No effect
Crude Oil WTI \longrightarrow GDP	Direct	No effect
Debt ratio \longrightarrow GDP	Direct	No effect
Debt ratio \longrightarrow Crude Oil WTI \longrightarrow GDP	Indirect	No effect

Source: Primary data processed, 2025

The information in Figure 2 and Table 9 above summarises the research hypothesis. For example, the results of the first hypothesis test show that the effect of debt ratio directly on WTI crude oil has no effect. The results of testing the second hypothesis of crude oil WTI directly GDP has no effect. The results of testing the third hypothesis are that the debt ratio directly does not affect GDP. The fourth hypothesis of WTI crude oil does not mediate the relationship between the debt ratio and GDP of countries in ASEAN.

DISCUSSION

The relationship between debt ratio and WTI oil price

The results found that the debt ratio does not affect the world price of WTI oil. The movement of WTI world oil prices is very volatile, but the debt ratio does not influence the price movement; the debt ratio in this study is the ratio of debt to state income or gross domestic product (GDP). The movement of WTI world oil prices is influenced by macroeconomic factors besides the debt ratio. The trend of WTI oil price movements in the observation period is quite significant with an increasing trend pattern, in contrast to the trend pattern of GDP of countries in ASEAN, which is classified as very fluctuating, so it is clear that the debt ratio of a country does not affect the trend of WTI oil prices. The findings of this study are in line with the findings (Sunday et al., 2025) [Hafizhy](#) that foreign debt is widely used in the context of infrastructure development for a relatively long time, so the size and size of a country's debt ratio does not affect macroeconomic variables. The findings of (Pahimah & Ichsan, 2024) explain that global economic factors and international politics influence the movement of world oil prices. Hence, the trend of changes in world oil prices only has a short-term impact, such as the rise and fall of fuel oil prices in a country, assuming the country uses the USD as an international trade currency. The results of this study differ from the findings of (Chisanga et al., 2025) that the foreign debt factor can be a factor in changing fluctuations in world crude oil prices, so countries with high debt ratios not accompanied by development growth tend to be a factor in changing world oil prices with erratic exchange rates.

Relationship between WTI oil price and GDP

The results found that WTI oil prices do not affect Gross Domestic Product (GDP). Several factors that can affect a country's GDP include net exports, government spending, investment, and household consumption, so the movement of world oil prices only affects foreign investment, as well as household consumption with a short-term impact so that it only affects the rise and fall of logistical staples from the increase in fuel. The rise and fall of WTI oil prices only has a temporary impact, especially on consumer goods. GDP is a large-scale economic growth in a country from various microeconomic factors, so the movement of WTI world oil prices does not have a significant effect. This study's results align with the findings of (Tian et al., 2025) [Angelini](#). Oil price movements hurt a country's GDP if the country's economic stability level is classified as unhealthy, impacting

negative economic growth. Economic growth, subsidies, and state revenues can be affected by fluctuations in world oil prices in the short term (Kwablah, 2023). The positive and negative of a country's GDP are not only influenced by the movement of WTI world oil prices, as found in the results of this study. The results of this study differ from the findings (Hafizhy & Sukarniati, 2024) that world oil prices affect a country's economic growth rate. Fluctuations in world oil prices can cause economic uncertainty in the prices of basic goods in a country.

Relationship between debt ratio and GDP

The results found that the debt ratio does not affect Gross Domestic Product (GDP). The debt ratio in this study does not affect economic growth; in the old theory, if a country has a high enough debt, it is classified as a country that ranges from debt default; the new theory proves that a country with a high amount of debt does not mean a big risk, because it can fund strategic projects that can increase the pace of the economy and economic growth. The high debt ratio does not affect Gross Domestic Product (GDP), as evidenced by the country of Singapore, whose average debt ratio is above the country's income but is a large developed country. These findings are in line with (Büyükkara et al., 2025) [Huawei](#) that the slowdown in economic growth is largely due to the foreign debt of heavily indebted countries; besides that, for developing countries, foreign debt is a big trap bringing these countries into a debt trap and making them debt-dependent (debt overhang). The findings (Sahban & Se, 2018) also explain that from 1990 to 2013, foreign debt hurt the economic growth of ASEAN countries. The results of this study differ from the findings of (Pahimah & Ichsan, 2024), who found that foreign debt has a significant effect on GDP. The amount of foreign debt impacts uncertain economic growth because there can be defaults on foreign debt interest payments, thus negatively affecting GDP. Good public debt management and optimal output will be more positive towards the development and equitable distribution of the economic sector.

The relationship between debt ratio and GDP through the mediation dimension of WTI oil price

The results found that the WTI oil price variable did not mediate the debt ratio and GDP relationship. Foreign debt in the short term does not affect economic growth, unlike foreign debt, which is long-term and has more impact on increasing a country's GDP. This study's findings align with (Pellu, 2019) that macroeconomic factors such as world oil prices that change at any time do not affect the relationship between debt ratio and economic growth. Furthermore, the findings of (KURNIAWAN, 2021) show that the relationship between world oil prices and economic growth has no impact if the period is in the short term; the external debt factor is not tied to world oil market prices. The movement of world oil prices is considered to have little effect on a country's economic growth because the movement of world oil prices is relatively fast and volatile, so it does not mediate the relationship between the debt ratio and economic growth. According to (Darmawan, 2022), foreign debt is interconnected with a country's economic growth, back to whether the use of debt is productive or not. When a country experiences a high level of foreign debt, it will always be a consideration for stakeholders and investors, as well as trust and safety in investment instruments. Fluctuations in a country's currency certainly affect world oil prices and economic growth, world oil transactions with dollars and other trade, so that currency fluctuations will affect commodity prices and domestic basic prices due to increases and vice versa world oil prices that affect domestic prices. Thus, the world oil price factor does not significantly influence a country's debt ratio and economic growth.

CONCLUSION

The research conducted is causality quantitative research that analyzes the factors that affect the gross domestic product (GDP) of ASEAN countries. These factors are macroeconomic factors of

WTI world oil prices and a country's debt ratio as a mediating dimension of the relationship between GDP and WTI world oil prices. The results of the study of macroeconomic variables contributed below 20% to DGP, then the results of the direct effect of the debt ratio on WTI oil prices had no effect, the second result of the direct effect of the WTI oil price variable on GDP had no effect, the third result of the direct effect of the debt ratio variable on GDP had no effect, the fourth result of the foreign debt ratio variable did not mediate the relationship between WTI oil prices and Gross Domestic Product (GDP). The implication of the research is practically that macroeconomic factors, especially the price of WTI oil and the debt ratio of a country, do not affect the rate of economic growth, especially the ratio of foreign debt, as long as it has a positive impact, for example, Singapore's debt ratio which reaches more than 100% the rate of economic growth remains positive. For policymakers to better socialize the development of a country's debt ratio on economic growth, and for investors, the factor of the ratio of sovereign debt and world oil prices can be set aside in investment decisions, especially in the long term, for the short term can consider commodities that are directly related to fluctuations.

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