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The Impact of Global Oil Prices on the Vietnamese Stock Market: An Empirical Analysis

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ABSTRACT

This study investigates the influence of global oil price fluctuations on the Vietnamese stock market, using quarterly data from 2013 to 2024. Employing a Vector Autoregression (VAR) model and Granger causality tests, we analyze the dynamic relationships between the Vietnamese stock market (represented by the market capitalization to GDP ratio), global oil prices (Brent crude), inflation (CPI), money supply (M2), and economic growth (GDP). The results indicate that global oil prices have a limited short-term impact on the Vietnamese stock market, while long-term effects are statistically insignificant. This suggests that the Vietnamese stock market is primarily driven by domestic factors.

1. INTRODUCTION

Vietnam's economic landscape is significantly shaped by its reliance on imported raw materials, with crude oil and petroleum products constituting a substantial 37% of the nation's total raw material import costs. Consequently, global oil price volatility can exert considerable pressure on Vietnam's domestic economy. Rising oil prices drive up the costs of imported goods and raw materials, potentially fueling domestic inflation and exacerbating trade deficits due to increased petroleum imports. This impact is particularly pronounced for businesses, where gasoline and oil serve as essential direct and indirect inputs for a wide range of production and operational activities, creating a ripple effect across the entire economy.

The significant proportion of oil-related expenses within the total production costs of various industries. Illustrative examples include the fisheries sector (76.73%), transportation (63.36%), and coal mining (45.18%). The transportation sector further amplifies this effect, as escalating fuel costs lead to increased service fees and freight charges, driving up the expenses borne by businesses and, ultimately, consumers. It is estimated that road transportation costs increase by 4-5% due to higher fuel prices, resulting in a corresponding rise in the price of both raw materials and finished goods.

The current surge in global oil prices has largely been attributed to the constrained supply resulting from geopolitical tensions, particularly the conflict between Russia and Ukraine. The situation further intensified with the introduction of sanctions by the United States and Western nations against Russia from late February 2022. In addition, supply concerns have been heightened as OPEC and its allies, including Russia, announced plans in April 2025 to cut oil production in 2025, as OPEC forecasts oil demand to grow by 1.4 million barrels per day (bpd) in both 2025 and 2026.

Vietnam possesses proven oil reserves estimated at 4.4 billion barrels, ranking second in East Asia and 28th globally. The light, sweet crude oil produced in Vietnam is a strategic export commodity, consistently representing a large share of its export revenue. Paradoxically, Vietnam is both an exporter and importer of oil, making it imperative to understand how crude oil prices will impact its economy. Thus, global oil prices have a vital significance for Vietnam's economy and stock market.

Acknowledging the profound influence of oil prices, numerous studies have examined their impact on stock market returns, often through analysis of industry-specific effects and inflation dynamics. Given these considerations, studying the impact of oil prices on various sectors is crucial to understanding both supply- and demand-side effects on its local stock market. To that end, the impact on the Vietnamese stock market has become a matter of keen interest.

2. LITERATURE REVIEW

Early studies, such as Huang et al. (1996), employed Vector Autoregression (VAR) models to examine the impact of energy shocks on financial markets. Their findings suggested that changes in oil prices do affect stock prices, primarily through their influence on corporate profitability and discount rates. Increased oil prices can raise input costs for oil-consuming firms, reducing their profits. Additionally, higher oil prices may lead to increased inflation and expected interest rates, which negatively affect corporate valuations. Conversely, oil-producing companies tend to benefit from rising oil prices, leading to an increase in their stock market value.

Bjornland (2009) investigated the relationship between oil price shocks and stock market booms in an oil-exporting country, using a structural VAR model. The results indicated that the response to oil price fluctuations varies depending on whether the shock is linear or non-linear.

Certi et al. (2014) examined the differential impact of oil price volatility on stock markets in oil-exporting and oil-importing countries. They used a time-frequency approach to distinguish between short-term and long-term dependencies. Their results indicated that the interdependence between oil prices and stock markets is stronger in oil-exporting countries than in oil-importing countries.

Hu et al. (2018) employed a structural VAR and nonlinear ARDL model to analyze the asymmetric effects of oil prices on the Chinese stock market. They found that oil price shocks have both short-run and long-run impacts on the Chinese stock market, except for supply-side shocks. Regarding the asymmetric effects, there was no evidence of asymmetric impacts in the case of supply shocks.

Basher & Sadorsky (2006) examined the relationship between oil prices and emerging stock markets using a multifactor international asset pricing model. Their results indicated that oil price risk is a significant factor in determining the stock prices of investors and institutions in emerging markets.

The impact of oil prices on the Vietnamese stock market has also been explored in several studies. Narayan and Narayan (2010) used Johansen cointegration tests to examine the impact of oil prices on the Vietnamese stock market. They found that stock prices, oil prices, and the nominal exchange rate are cointegrated, and the Vietnamese stock market benefits from increasing oil prices in the long run but is not affected in the short run.

Huynh et al. (2017) used a linear ARDL model and found that increasing global oil prices negatively impact the Vietnamese stock market in the long run but have a positive impact in the short run.

Tran Huy Hoang (2017) investigated the impact of global oil prices on the Vietnamese stock market and macroeconomic variables using a VAR model. The results indicated that oil prices are negatively correlated with stock market indices, and both supply and demand shocks have a negative impact on the overall development of the market.

Pham Thi Tuyet Trinh and Vo Le Linh Dan (2018) examined the asymmetric effects of oil price fluctuations on the Vietnamese stock market using a nonlinear ARDL model. Their results indicated that oil price fluctuations have a countercyclical impact on the Vietnamese stock market in the long run. Oil price increases negatively affect the stock market, and oil price decreases positively affect it.

Pham Thi Bich Nguyet and Le Phan Ai Nhan (2018) investigated the asymmetric effects of global oil price fluctuations on the Vietnamese economy using a mixed-data sampling (MIDAS) approach. Their results indicated that global oil price fluctuations have asymmetric effects on domestic oil prices and inflation but do not statistically affect output growth.

Nguyen Viet Phong (2022) examined the asymmetric effects of changes in oil prices on the Vietnamese stock market. The study used a nonlinear ARDL model to assess the symmetric effects between changes in oil prices and stock prices. The results indicated that the volatility of oil prices has a significant long-term impact on Vietnamese stock prices, and the stock market reacts asymmetrically to positive and negative oil price shocks.

3. DATA AND METHODOLOGY

Data Sources and Collection

This study utilizes quarterly time-series data spanning from Q1 2013 to Q4 2024. Data was collected from various sources, ensuring data reliability and consistency through cross-checking where possible. The following variables were used in the analysis:

Vietnamese Stock Market Performance (Market): Measured as the ratio of market capitalization to GDP. Market capitalization data, representing the total market value of all listed companies, was obtained from the State Securities Commission of Vietnam (SSC) for both the Ho Chi Minh Stock Exchange (HOSE) and the Hanoi Stock Exchange (HNX). End-of-quarter values (March, June, September, and December) were used. Real GDP data was sourced from the General Statistics Office of Vietnam (GSO) to calculate the market capitalization to GDP ratio.

Global Oil Prices (Brent): Measured by the Brent crude oil price, sourced from the Federal Reserve Economic Data (FRED) database maintained by the Federal Reserve Bank. Quarterly averages were calculated from the available data.

Inflation (CPI): Measured by the Consumer Price Index (CPI) obtained from the General Statistics Office of Vietnam (GSO).

Money Supply (M2): Measured by the M2 money supply, representing the total value of currency in circulation and demand deposits. Data was collected from the State Bank of Vietnam (SBV) on a monthly basis and then aggregated to quarterly averages.
Economic Growth (GDP): Measured as the real GDP growth rate, obtained from the General Statistics Office of Vietnam (GSO).
All data was downloaded and stored as Excel files, organized by year from January 2013 to December 2022.
Market = (Market Capitalization) / (Real GDP)
Brent Crude Oil Price (Brent): Quarterly data was obtained directly from the FRED database.

Methodology

This study employs a Vector Autoregression (VAR) model to analyze the dynamic relationships between global oil prices and the Vietnamese stock market, controlling for other macroeconomic variables.

Hypotheses

H1: Global oil prices have a significant short-run impact on the Vietnamese stock market, considering Brent crude oil prices, CPI, GDP, and M2.
H2: Global oil prices have a significant long-run impact on the Vietnamese stock market, considering Brent crude oil prices, CPI, GDP, and M2.

4. RESULTS

Overview of world oil prices and stock market

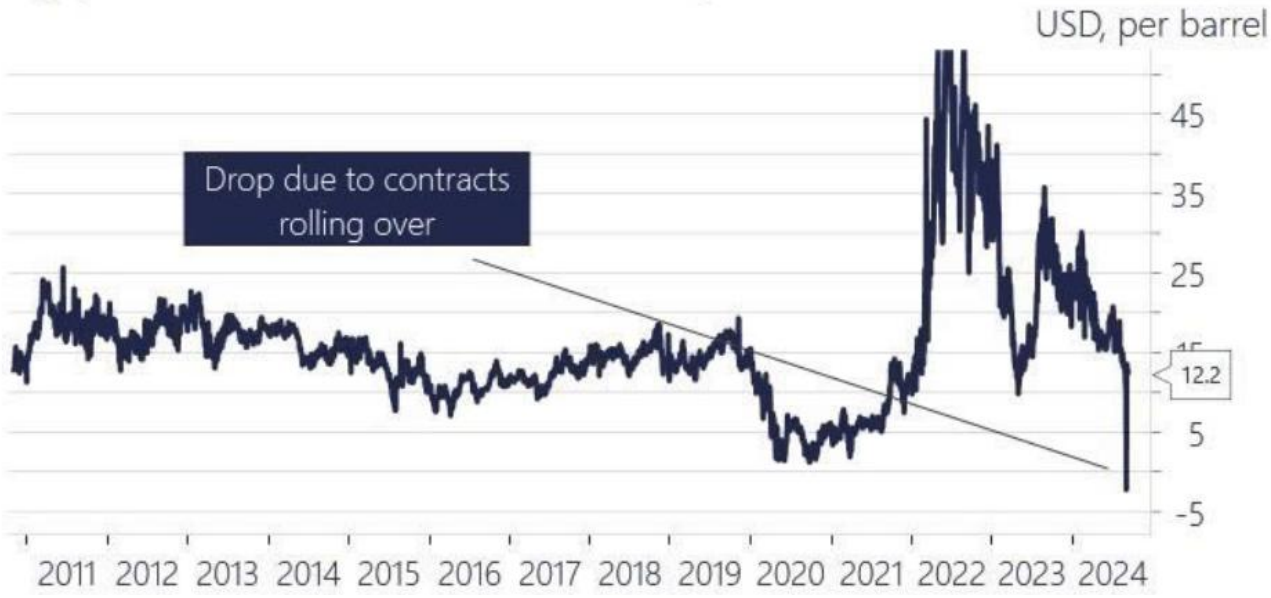

Figure 1: Brent crude oil price in the period 2011 – 2024
(Source: Steno Research, Bloomberg & Macrobond)

During 2011-2014, Brent crude oil prices were relatively stable at around 100-115 USD/barrel, reflecting a stable oil market during this period. However, during 2014-2015, prices began to decline sharply, from over 100 USD/barrel to around 50 USD/barrel, mainly due to increased US shale oil supply and unstable geopolitical factors in the Middle East. During 2016-2018, oil prices tended to recover from a low of around 30 USD/barrel to over 70-80 USD/barrel, reflecting the market's recovery from a major shock. During 2018-2019, prices fluctuated around 60-70 USD/barrel, reflecting the balance between supply and demand and global economic factors. From late 2019 to early 2020, prices began to fall sharply due to the impact of the COVID-19 pandemic, when the oil market fell into a global crisis. By April 2020, oil prices even fell to negative levels at times due to the extension of US shale oil contracts and depleted oil storage tanks, with the lowest level at around -37 USD/barrel.
After a prolonged recession, oil prices began to recover strongly in 2021 from late 2020, as global energy demand gradually increased again and the COVID-19 vaccination campaign was widely deployed. In early 2022, the Russia-Ukraine war pushed oil prices up 60%-70%, to over 112 USD/barrel and peaked at nearly 125 USD/barrel, due to factors such as supply concerns due to oil and gas disputes, plus the global economic recovery. From 2023 to 2024, oil prices are expected to decline again, mainly due to increased oil supply and reduced or stagnant demand. By the end of 2024, Brent crude oil prices are expected to be around 50-55 USD/barrel, and are expected to continue to decline or stabilize at lower levels due to market factors and excess supply. According to the December STEO, EIA reports that Brent spot prices will average 80.49 USD/barrel in 2024 and hover around 73.58 USD/barrel in 2025.

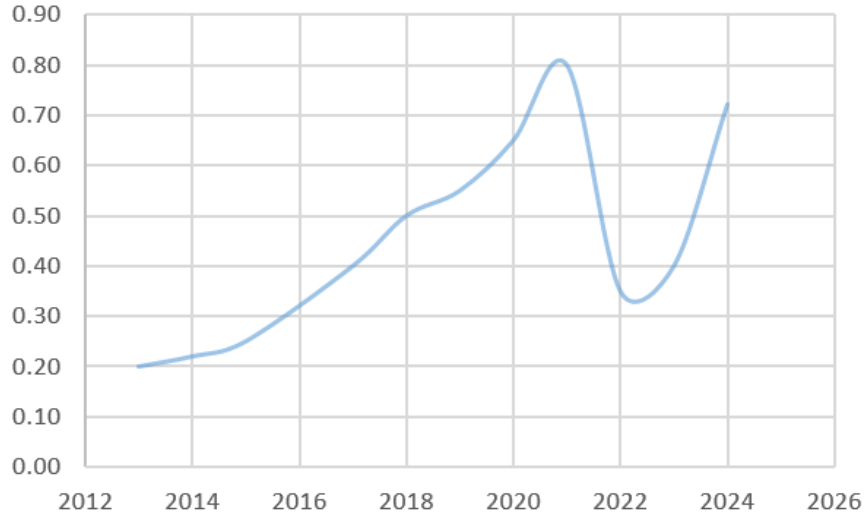

Figure 2: Overview of market capitalization value to GDP of Vietnam in the period 2013 - 2024
(Source: General Statistics Office of Vietnam, World Bank)

From 2013 to 2024, the Vietnamese stock market witnessed significant growth alongside considerable volatility, influenced by both domestic and global economic events. Market capitalization, as a percentage of GDP, increased steadily from approximately 20% in 2013 to 30% by 2016, indicating stable market development. The period from 2017 to 2019 saw accelerated growth, with market capitalization reaching around 40% of GDP in 2017, fueled by a 43% VNIndex surge and a rise in investor accounts. This upward trend continued into 2018, reaching 50% of GDP, reflecting the economy's positive momentum. However, headwinds emerged from 2018-2019 due to the US-China trade war, tighter monetary policies, and Brexit uncertainties, impacting liquidity and foreign investment. In 2020, the COVID-19 pandemic significantly impacted the economy and stock market. Despite the challenges, effective government support measures helped maintain market capitalization at approximately 65% of GDP. 2021 marked a peak, with the VNIndex exceeding 1,500 points and market capitalization hitting a record high of about 80% of GDP, driven by heated trading activity. However, 2022 saw a sharp correction, with market capitalization falling to around 35% of GDP. This downturn was attributed to tighter monetary policies globally, rising inflation, and significant geopolitical instability, most notably the Russia-Ukraine conflict. The conflict's disruption of global supply chains and its impact on crude oil prices led to increased inflation fears and risk aversion among investors, negatively impacting emerging markets like Vietnam. 2023 saw a partial recovery, with the market capitalization/GDP ratio reaching approximately 40%.

The latest data for the first six months of 2025 shows a strong Vietnamese economy, projected to grow by 7.3% in H1, with potential to reach 7.5-7.6% after updated figures. This growth momentum may benefit the stock market, potentially increasing the market capitalization/GDP ratio in 2025. Nonetheless, the stock market remains inherently risky and volatile. Ongoing global uncertainties, especially those affecting energy prices, could continue to influence market sentiment.

Unit root tests

Augmented Dickey-Fuller (ADF) tests, with a constant and trend, were performed to determine the order of integration for each variable. The results, presented in Table 1, indicated the following:

Table 1 - Unit root test of variables

Variable	ADF Testing	Critical value			Result	Integrated level
		1%	5%	10%		
Market	0.367833	-2.625606	-1.949609	-1.611593	Non-stop chain	
D(Market)	-5.128294***	-2.627238	-1.949856	-1.611469	Non-stop chain	I(1)
lnBrent	-0.941114	-2.625606	-1.949606	-1.611593	Non-stop chain	
D(lnBrent)	-4.572042***	-2.627238	-1.949856	- 1.611469	Stop chain	I(1)
CPI	-3.542127***	-2.625606	-1.949609	-1.611593	Stop chain	I(0)
GDP	-4.877502***	-3.610453	-2.938987	-2.607932	Stop chain	I(0)
lnM2	-1.193914	-2.636901	-1.951332	-1.610747	Non-stop chain	
D(lnM2)	0.222754	-2.636901	-1.951332	-1.610747	Non-stop chain	
D(lnM2,2)	-9.649120***	-2.632688	-1.950687	-1.611059	Stop chain	I(2)

Note: ***, ** correspond to 1% and 5% significance levels, respectively.
Source: Author calculate in Eview

The Market Capitalization to GDP ratio (Market) had an ADF test statistic of 0.367833. Since this was greater than the 1%, 5%, and 10% critical values (2.625606, 1.949609, and 1.611593, respectively), the level of Market was determined to be non-stationary. After first differencing, the ADF test statistic for D(Market) was -5.128294, which was less than the 1% critical value (-2.627238). The level was tested to be significant at the 1% value. Therefore, Market was integrated of order one, or I(1).

The natural logarithm of Brent crude oil prices (lnBrent) had an ADF test statistic of -0.941114. Again, this test statistic was greater than the 1%, 5%, and 10% critical values, and a test for being stationary was insignificant.

After first differencing, the ADF test statistic for D(lnBrent) was -4.572042, which was less than the 1% critical value (-2.627238). The level was tested to be significant at the 1% value. Therefore, lnBrent was integrated of order one, or I(1).

The Consumer Price Index (CPI) exhibited a stationary test. The ADF test statistic was -3.542127, which was less than the 1% critical value (-2.625606) Therefore, CPI was integrated of order zero, or I(0) and stationary at the 1% significance.

The economic growth test, Real GDP, exhibited a stationary test. The ADF test statistic was -4.877502, which was less than the 1% critical value (-3.610453) Therefore, Real GDP was integrated of order zero, or I(0) and stationary at the 1% significance.

Lastly, the natural logarithm of the Money Supply (lnM2) had an ADF test statistic of -9.649120 after second differencing. This was determined to be significant at the 1% mark and therefore had integration order of 2.

VAR model and granger causality

A VAR model was specified. Lag length selection criteria (Likelihood Ratio test, Final Prediction Error, Akaike Information Criterion, Schwarz Criterion, and Hannan-Quinn Information Criterion) strongly suggested a lag length of 1. This lag length was then implemented for the VAR model estimation.

Table 2 - Granger causality test results

Hypothesis H0	Obs	F-Statistic	Prob.
D(lnBrent)) no impact D(Market)	38	13.7477	0.0007
D(Market) no impact D(lnBrent))		0.06075	0.8068
CPI no impact D(Market)	38	3.56906	0.0672
D(Market) no impact CPI		1.40568	0.2438
GDP no impact D(Market)	38	8.14875	0.0072
D(Market) no impact D(GDP)		4.14875	0.0480
D(lnM2(2)) no impact D(Market)	36	3.68383	0.0636
D(Market) no impact D(lnM2(2))		4.07267	0.0518

Source: Author calculate in Eview

The Granger causality tests, in the table 2, revealed several key relationships. Global oil prices (lnBrent) were found to have a statistically significant impact on the Market Capitalization to GDP ratio (Market) (F-Statistic = 13.7477, p = 0.000). Conversely, no statistically significant causal relationship was found from Market to lnBrent (F-Statistic = 0.06075, p = 0.806). Similarly, GDP was found to have a statistically significant impact on the Market Capitalization to GDP ratio (Market) (F-Statistic = 8.14875, p = 0.007), but inflation did not significantly impact the Market, with a F-Statistic of 3.56906 and a p-value of 0.067.

Impulse response and variance decomposition

The impulse response functions (IRFs; results not provided due to space constraints) showed that an oil price shock results in a minor 5 quarter effect before decreasing.

The variance decomposition analysis, presented in Table 3, revealed that over the long term, the largest proportion of the variance in the Market Capitalization to GDP ratio (Market) is explained by itself. To further illustrate:

Table 3 - Variance decomposition results

Period	S.E.	D(MARKET)	D(LNBRENT)	GDP___	CPI____	D(LNM2(2))
1	0.08642	100.00000	0.00000	0.00000	0.00000	0.00000
2	0.09625	80.69379	0.00021	11.93429	4.69454	2.67717
3	0.09838	77.70571	0.17419	11.99932	4.74247	5.37832
4	0.09873	77.45003	0.29640	12.18814	4.70897	5.35646
5	0.09889	77.20514	0.29704	12.27413	4.70528	5.51842
6	0.09892	77.18463	0.30283	12.27098	4.70176	5.53980
7	0.09894	77.15864	0.30368	12.28907	4.70223	5.54639
8	0.09895	77.15247	0.30395	12.28845	4.70206	5.55306
9	0.09895	77.15127	0.30423	12.28960	4.70199	5.55291

10	0.09895	77.15028	0.30423	12.28989	4.70200	5.55360
11	0.09895	77.15021	0.30425	12.28989	4.70198	5.55367
12	0.09895	77.15011	0.30426	12.28995	4.70198	5.55370
13	0.09895	77.15010	0.30426	12.28995	4.70198	5.55372
14	0.09895	77.15009	0.30426	12.28995	4.70198	5.55372
15	0.09895	77.15009	0.30426	12.28995	4.70198	5.55372
16	0.09895	77.15009	0.30426	12.28995	4.70198	5.55372
17	0.09895	77.15009	0.30426	12.28995	4.70198	5.55372
18	0.09895	77.15009	0.30426	12.28995	4.70198	5.55372
19	0.09895	77.15009	0.30426	12.28995	4.70198	5.55372
20	0.09895	77.15009	0.30426	12.28995	4.70198	5.55372
Cholesky Ordering: D(MARKET) D(LNBRENT) GDP___ CPI____ D(LNM2(2))						

Source: Author calculate in Eview

At quarter 1, 100% of the forecast error variance is explained by the Market.
At quarter 10, it dips to 77.15%
Economic growth (GDP) accounts for approximately 12.29% of the forecast error variance in the Market Capitalization to GDP ratio by the 20th quarter.

5. DISCUSSION

The results of this study shed light on the dynamic relationship between global oil prices and the Vietnamese stock market. While the Augmented Dickey-Fuller (ADF) tests confirmed that the variables were integrated, ensuring a proper modeling approach with a VAR, the Granger causality tests pointed to a limited impact from oil prices on the Vietnamese stock market. This finding aligns with previous studies suggesting that external influences on the Vietnamese market are generally muted. The study also found that GDP has more interactions with the stock market than oil prices.

The variance decomposition further supports the limited influence of oil prices, with global oil price shocks accounting for a very small fraction of the variance in the Market Capitalization to GDP ratio, particularly in the long run. Instead, our analysis demonstrates that the largest proportion of variance in the Vietnamese stock market in the long run is accounted for with itself, as investors continue to pour money into the stock market.

These findings are consistent with existing theory that government and private sector investment, and also trade, all correlate to high stock market growth. Given the increasing effect from GDP to the stock market, this might be a factor that should be focused on for increasing the Vietnamese stock market, as this variable has more interaction than oil prices.

While the analysis accounts for GDP, CPI, and InM2, there remains room for future research. This study has shed light on the connection between oil prices and GDP, but could also focus more on other aspects of the macroeconomic environment.

6. CONCLUSION

This study investigated the impact of global oil prices on the Vietnamese stock market, utilizing a VAR model and Granger causality analysis with quarterly data from Q1 2013 to Q4 2024. The analysis, considering the ratio of market capitalization to GDP, global oil prices, money supply, CPI, and economic growth, supports the hypothesis (H1) that global oil prices have a significant, albeit weak, short-run impact on the Vietnamese stock market, accounting for approximately 0.3% of the market's variance. The results did not support hypothesis H2, suggesting that global oil prices do not significantly impact the Vietnamese stock market in the long run.

These findings differ from prior research that primarily used the VN-Index as a proxy for the Vietnamese stock market, which often found short-run impacts but did not compare the economic effects as this research does. By using market capitalization to GDP, this study found that global oil prices have a minimal influence on the Vietnamese stock market in the short-run. This result underscores the greater importance of the Vietnamese market on its macroeconomic environment.

7. RECOMMENDATIONS

Based on these findings, the following recommendations are offered to investors, listed companies, and regulatory authorities:

For Investors: Investors should be wary of using global oil prices as a primary factor in making investment decisions within the Vietnamese stock market. The impact is limited and can vary based on broader economic conditions. Instead, investors should base decisions on investment goals, time horizon, and risk/reward profile.

For Listed Companies: Given the greater influence of inflation and economic growth on the stock market, listed companies should focus on managing costs and adapting business strategies to account for inflation and economic fluctuation. Companies should

refrain from issuing additional shares to manage the drop in stock value. Moreover, it is essential for listed companies to comply with regulatory reporting requirements to protect investor interests.

For Regulatory Authorities: Given the macroeconomic environment and the current state of Vietnamese fuel production, regulatory authorities should maintain stable inflation, implement supportive monetary policies, and promote economic growth, it is recommended that an oil source is readily available for production if future constraints come into effect.

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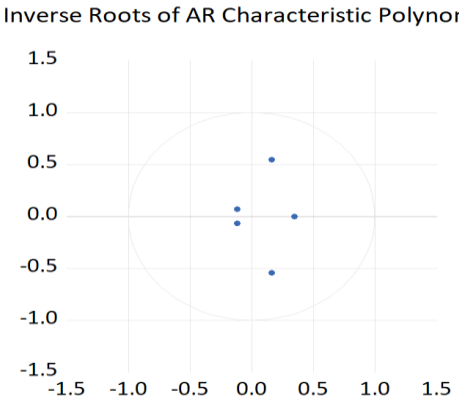
APPENDIX

A1 - Optimal model delay

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-620.9952	NA	6.76e+09	36.82325	37.04771*	36.89980*
1	-592.3434	47.19125*	5.55e+09*	36.60844*	37.95522	37.06773
2	-579.3966	17.51633	1.25e+10	37.31744	39.78656	38.15948
3	-566.5945	13.55512	3.39e+10	38.03497	41.62641	39.25975

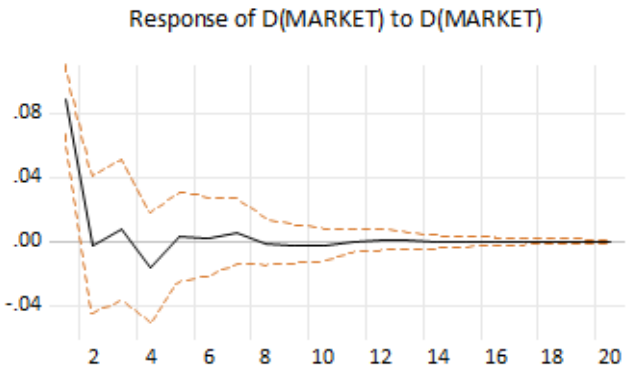
A2 - Stability of the model with lag 1



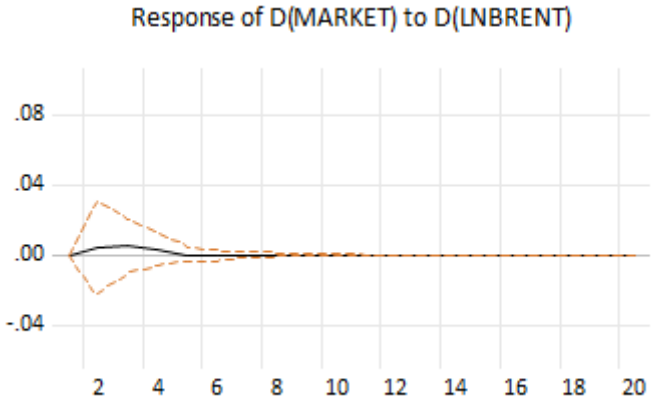
A3 - Residual autocorrelation test

Lag	LRE* stat	df	Prob.	Rao F-stat	df	Prob.
1	15.16192	25.00000	0.937500	0.576535	(25, 79.5)	0.9393

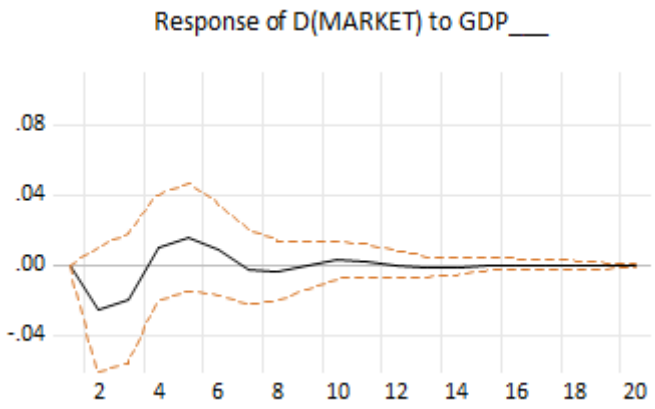
A3 - The impulse response function of the market capitalization-to-GDP ratio to its own shock



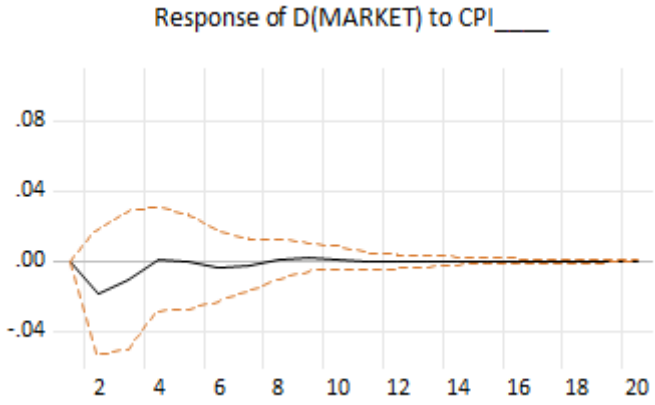
A4 - Vietnam stock market reaction to world oil price shock



A5 - Vietnam's stock market reacts to economic growth shock



A6 - Vietnam stock market reaction to consumer price index shock



A7 - Vietnam's stock market response to M2 money supply shock