THE CRUDE OIL PRICE–STOCK RETURN CONNECTEDNESSAND THE IMPACT OF THE RUSSIAN-UKRAINE WAR ONSTOCK RETURNS IN EAST ASIAN COUNTRIES

Chinmaya Behera
Goa Institute of Management, India., chinmayaeco@gmail.com

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Chinmaya Behera

Economics and General Management, Goa Institute of Management, Goa, India.
Email: chinmayaeco@gmail.com

ABSTRACT

We contribute to the literature by investigating the connectedness between crude oil prices and stock returns and the impact of the Russia-Ukraine war on stock returns in selected East Asia countries. Using the TVP-VAR model, we find that, on average, 42.52% of shocks to an asset spill over to all other assets, whereas, on average, 57.48% of the shocks affect the asset itself. We also find that the major transmitters of shocks are the Singapore Exchange (SGX) and the Korea Exchange (KRX); they transmit at least 54% of shocks. Using the GARCH model augmented with a war dummy, we find that the recent Russia- Ukraine war has significantly impacted the Indonesian stock market.

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I. INTRODUCTION

This study investigates the connectedness between crude oil prices and stock returns and the impact of the Russia-Ukraine war on stock returns in selected East Asia Summit (hereafter, EAS) countries. Firstly, we hypothesize that shocks to the crude oil prices spill over to the stock markets. It is important to understand volatility transmission among the financial assets along with crude oil prices, as the stock valuation channel is impacted. The stock valuation channel says stock returns are affected by a change in crude oil prices, impacting firms' future cash flows, as current stock prices reflect expected cash flow. Secondly, the study hypothesizes that the recent war between Russia and Ukraine has had a significant impact on the stock returns and crude oil prices. It is crucial to unravel the nexus between war and the stock market to help investors and policymakers. There is a plethora of empirical studies, which find that crude oil impacts financial market returns (see, for example, Broadstock and Filis, 2014; Narayan and Gupta, 2015; Hashmi *et al.*, 2021). Broadstock and Filis (2014) confirm that oil price shocks of different kinds show substantial variation in their effect on stock market returns. Contrary, Narayan and Gupta (2015) opine that oil prices have a positive impact on stock market returns. Moreover, there is also evidence of an asymmetric impact of oil prices on the stock markets (Hashmi *et al.*, 2021).

Similarly, another strand of literature studies the nexus between oil prices and stock returns using different macroeconomic factions, nations, and methods (Filis, 2010; Narayan and Sharma, 2011; Narayan and Narayan, 2010; Nguyen and Bhatti, 2012; Fowowe, 2013; Reboredo and Rivera-Castro, 2014; Zhu *et al.*, 2014; Kang *et al.*, 2015; Bouri, 2015; Smyth and Narayan, 2018; Cheema and Scrimgeour, 2019; Khalfaoui *et al.*, 2019, Narayan, 2020). Further, some studies also focus on the interconnectedness between crude oil prices and stock returns (Behera and Mishra, 2022; Maghyereh, 2016; Ferrer *et al.*, 2018; Hussain, 2019; Mensi *et al.*, 2021), and on exchange rate risk (Devpura *et al.*, 2021; Kirikkaleli *et al.*, 2022) However, the findings of these studies require further investigation. Moreover, the literature on the interconnectedness between average crude oil prices and stock markets in EAS is scanty. Thus, this study tries to fill the research gap by examining the volatility connectedness between average oil prices and the stock markets in selected EAS countries.

Theoretically, any shocks to the crude oil prices transmit to stock returns. This can be understood through the stock valuation channel. Firstly, we define stock returns as the log first difference of stock prices. Secondly, as per economic theory, the current stock prices reflect the discounted future cash flows of stocks (Narayan and Sharma, 2011). These two scenarios show that stock returns are impacted by factors that can alter the expected cash flows and/or the discount rate, such as oil prices. The change in oil prices can alter a firm's future cash flows (see Oberndorfer, 2009; Mohanty and Nandha, 2011). For instance, the oil-consuming firm considers oil as one of the major production factors. Any increase in oil prices leads to an increase in production costs. As a result, it will reduce profit levels and, thus, future cash flows (Filis *et al.*, 2011). On the other hand, the oil-producer's profit margin will increase due to the oil price increase and, thus, increase expected cash flows (Degiannakis *et al.*, 2018).

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However, to best of our knowledge, none of these studies considers countries from the EAS and crude oil average prices to investigate the connectedness between crude oil averages and stock returns. Furthermore, the recent Russian-Ukraine war has an adverse impact on crude oil and stock prices. The contribution of this study is as follows.

First, most studies in the literature consider WTI or Brent variant of crude oil prices for their analysis. This study takes average crude oil prices because they incorporate all the available information on crude oil prices. Secondly, it is necessary to unravel the shock transmission nexus between average crude oil prices and the stock returns as it helps policymakers and investors in understanding the dynamics of risk available in the stock markets and crude oil prices. For example, the transmission of volatility among the assets can be used to predict volatility shocks transmission from one stock to another. Moreover, investors make portfolio selection decisions after understanding the shock transmission among asset classes, whereas policy makers think of market stabilization during the pandemic. Third, the recent war and its impact on the stock market add insights to investors and policymakers for robust decision making. Finally, different studies investigate connectedness among financial assets and the effect of the Russia-Ukraine war on stock returns. In contrast, this study considers the connectedness between stock returns and average crude oil prices using the TVP-VAR approach. Further, we use the GARCH model with a war dummy to evaluate the impact of the Russia-Ukraine war on the stock markets.

This study offers the following insights. First, we find that, on average, 42.52% of the shocks to one asset spill over to all other assets, whereas, on average, 57.48% of the shocks affect the asset itself, which indicates the existence of interconnectedness between the selected stock returns and average crude oil prices. Secondly, the results suggest that the major shock transmitters are SGX (Singapore) and KRX (South Korea), which transmit 59.59% and 54.61% of the shocks, respectively. Thirdly, the least transmitting variable is Shanghai (China), RTS (Russia), and average oil prices, which transmit only 24.14%, 25.55%, and 14.18% of the shocks, respectively. Fourthly, the study finds Shanghai (China) and RTS (Russia) are the net receivers of shocks, as the net directional value is negative. Finally, we find the Russia- Ukraine war has had a significant impact on Indonesia's stock market.

The remaining sections of this paper are organized as follows. Section II presents the data and methodology. Section III briefly discusses the empirical results and Section IV concludes.

II. DATA AND METHODOLOGY

The present study makes use of daily data from January 5, 2016 to June 13, 2022. The closing stock price of the benchmark index of the EAS stock markets is extracted from the CEIC database. These stock price indices are Shanghai Shenzhen (China), Nifty (India), IDX (Indonesia), RTS (Russia), SGX (Singapore), and KRX (South Korea). The commonality among the chosen countries is that most of the countries are emerging and oil consuming countries. We calculated the stock returns using the closing price data series of each country's stock market and took the average

of all seven countries to obtain average EAS stock returns. Further, we consider average crude oil prices calculated from WTI and Brent oil prices. Additionally, we created a war dummy by taking the recent Russia and Ukraine ware that unfolded on February 24, 2022. The observations from the period February 24, 2022 were treated as 1, and 0 otherwise.

The second part of this section briefly presents the methodology. The present study employs a dynamic connectedness technique base on the Time-varying Parameters-Vector Autoregressive (TVP-VAR) Approach (Antonakakis and Gabauer, 2017; Korobilis and Yilmaz, 2018). This Approach has advantages over VAR-based connectedness (Diebold and Yilmaz, 2009, 2012). Firstly, there is no need to choose a rolling-window. Thus, the question of loss of information does not arise. Second, since the method is built on multivariate Kalman filters (Durbin and Koopman, 2012), the output is insensitive to the outliers.
TVP-VAR(1) model can be written as follows:

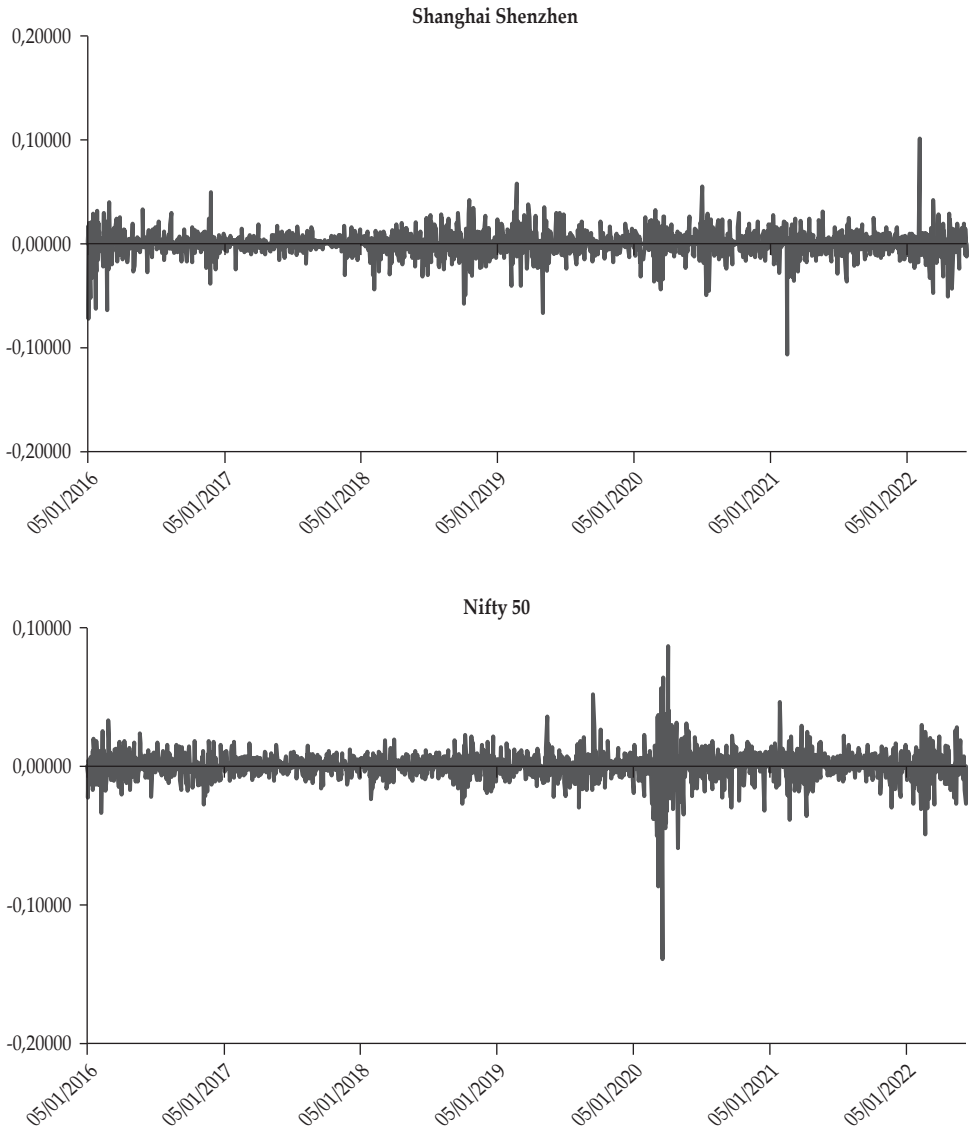$$z_t = A_t z_{t-1} + u_t \qquad u_t \sim N(0, S_t) \tag{1}$$

$$vec(A_t) = vec(A_{t-1}) + v_t \qquad v_t \sim N(0, R_t) \tag{2}$$

where z_t, z_{t-1}, and u_t are $K \times 1$ dimensional vector; A_t and S_t are $K \times K$ dimensional matrices, and $vec(A_t)$ and v_t are $K^2 x1$ dimensional vectors, whereas R_t is the $K^2 x K^2$ dimensional matrix. The detailed methodology can be found in Chatziantoniou *et al*. (2022).

III. RESULTS AND DISUSSION

This section briefly explains the empirical results pertaining to this study. Initially, Figure 1 shows the stock return series and average oil prices. From the graphs, it is observed that all stock return series are volatile in nature. Further, average oil price series has also volatility clustering effect. Similarly, the study finds the adverse impact of COVID-19 and war on stock return series and average oil price series. Thus, it is necessary to unravel the volatility transmission and magnitude of the war's impact on stock returns.

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Figure 1.
Stock Return Series of Stock Indices

Figure 1.
Stock Return Series of Stock Indices (Continued)
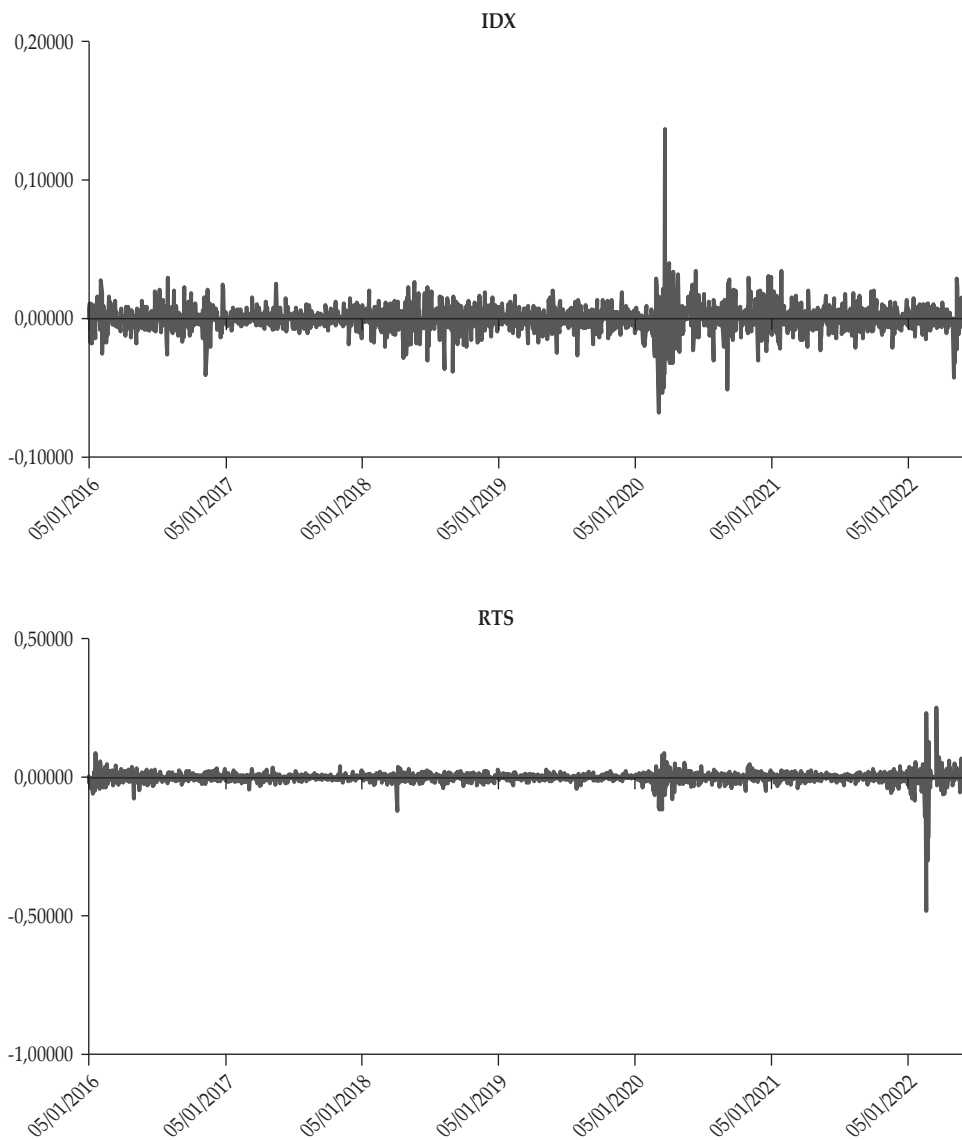
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Figure 1.
Stock Return Series of Stock Indices (Continued)

SGX

KRX

104
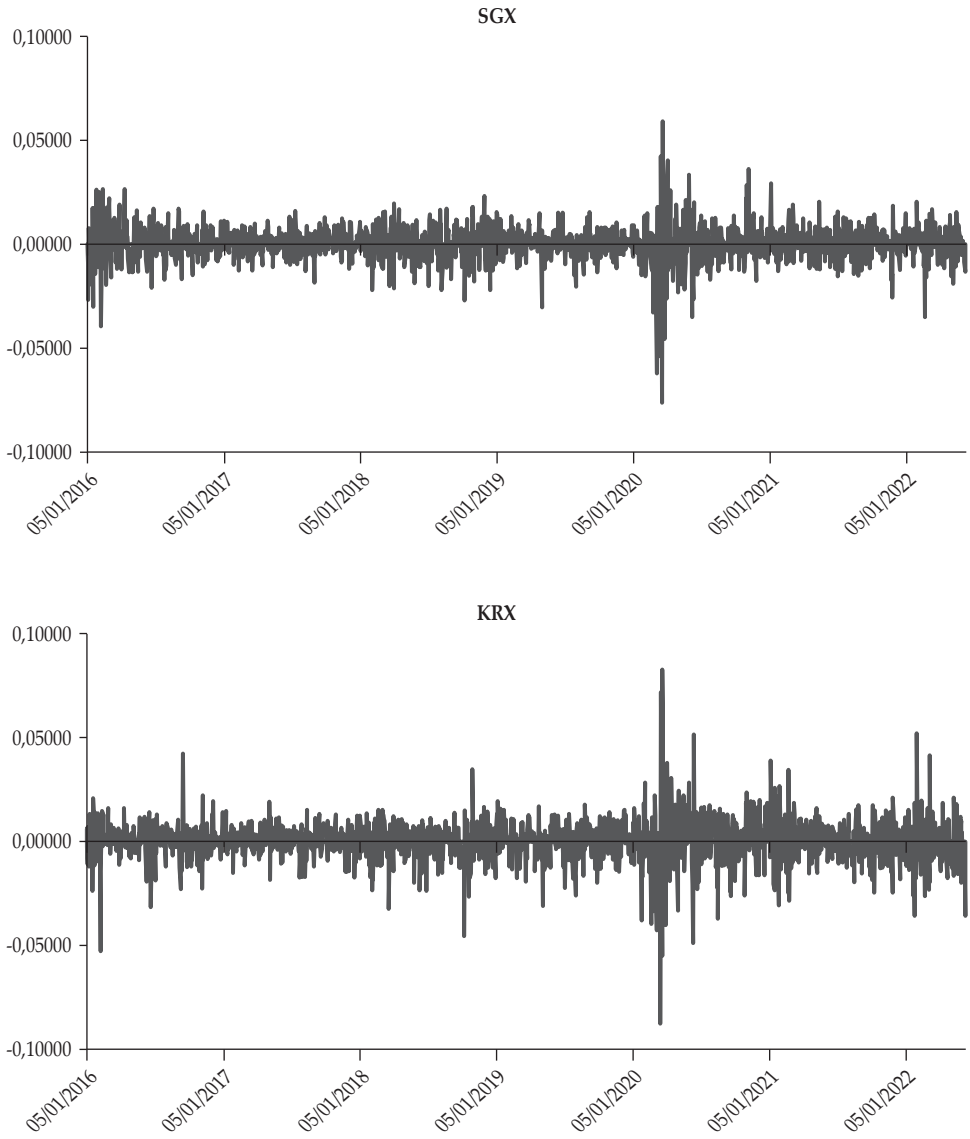
Figure 1.
Stock Return Series of Stock Indices (Continued)
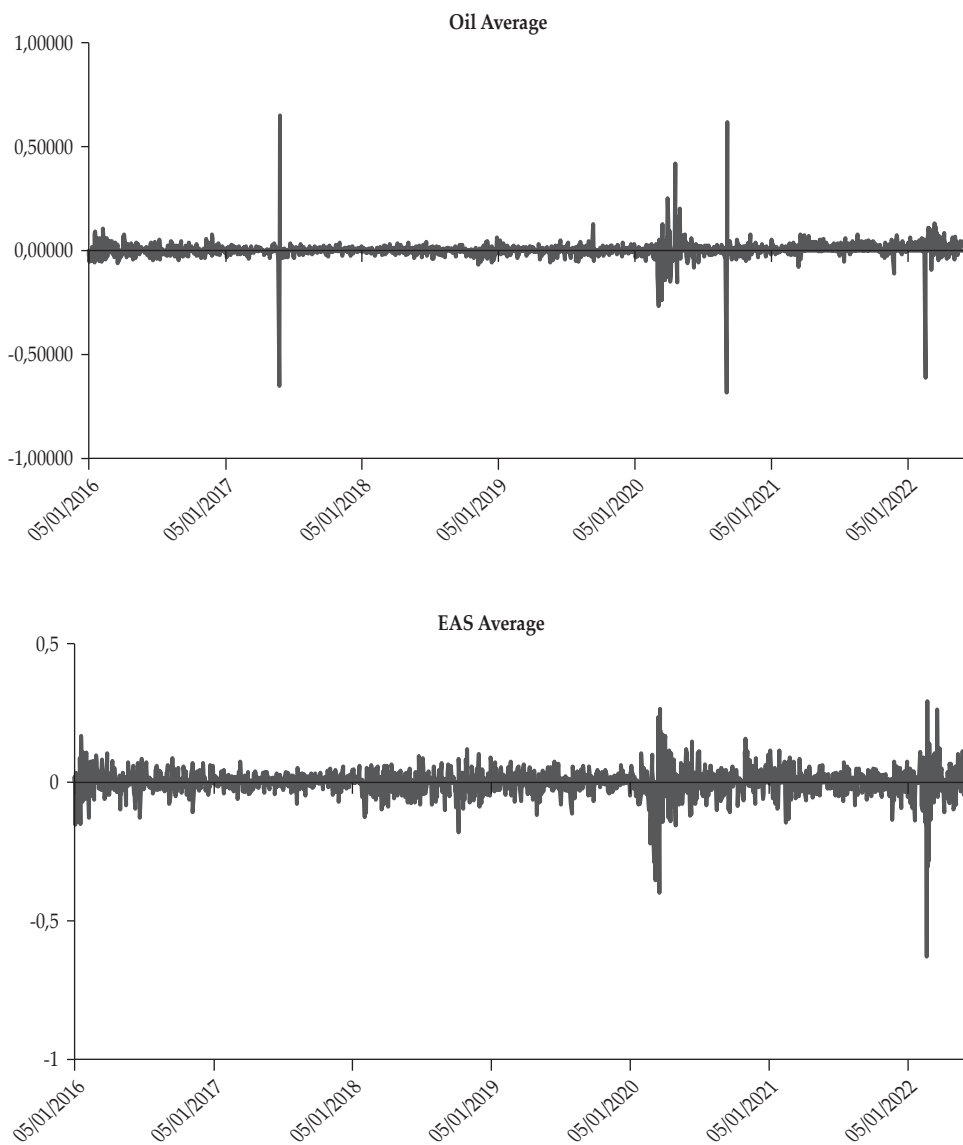
Next, we report descriptive statistics in Table 1. It is found that the standard deviation is minimum for the stock return series, whereas it is maximum for the average oil price series. Further, all stock returns are negatively skewed, except the IDX (Indonesia). Similarly, the average oil price series is also negatively skewed. Finally, all the variables under consideration follow fat-tailed and leptokurtic distributions.

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Table 1.
Descriptive Statistics of Sock indices

Table 1 represents descriptive statistics. It is found that average oil price series is more volatile than stock indices. All the variables are leptokurtic and fat tailed.

	IDX	KRX	Nifty 50	RTS	SGX	Shanghai Shenzhen	Oil Average
Mean	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Median	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Std. Dev.	0.01	0.01	0.01	0.02	0.00	0.01	0.04
Skewness	0.71	-0.25	-1.35	-4.87	-0.54	-0.52	-1.62
Kurtosis	24.49	12.08	22.95	112.96	12.14	10.71	111.18

We report the network plot between stock returns and average oil prices. The network plot shows the SGX (Singapore) index impacts all other markets, including the oil market. Further, the KRX (Korea) has a significant impact on China's stock market. The Nifty 50 (India) has an impact on the IDX (Indonesia) and Shanghai Shenzhen (China).

Figure 2.
Network Plot of Stock Returns and Oil Average.

The network plot shows the SGX (Singapore) index impacts all other markets, including the oil market. The Nifty 50 (India) has an impact on the IDX (Indonesia) and Shanghai Shenzhen (China).
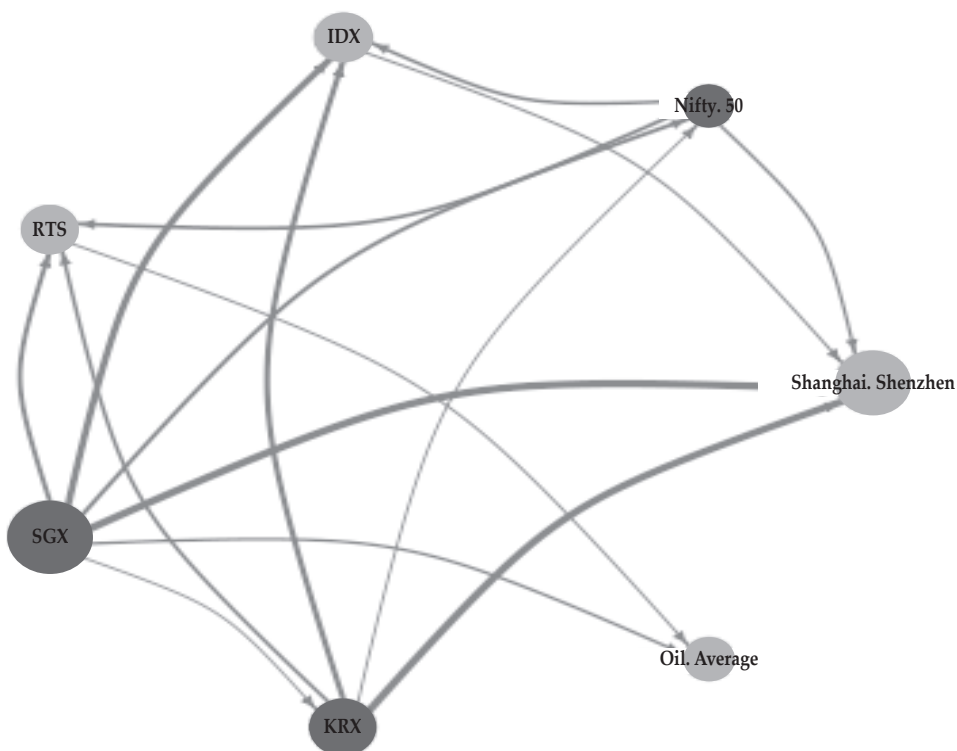
Table 1 reports the dynamic connectedness results based on the TVP-VAR Approach. These show spillover impacts among the different asset classes. On average, 42.52% of the shocks from one asset spill over to all other assets, whereas, on average, 57.48% of the shocks affect the asset itself. This indicates the market is highly interconnected between the selected EAS stock markets and average crude oil prices. The results show that the major transmitter of shocks is the SGX (Singapore) and KRX (South Korea), which transmit 59.59% and 54.61% of the shocks, respectively. The finding of the connectedness complies with the findings of Behera and Rath (2022a), Bouri *et al.* (2021), Behera and Rath (2022b), and Gabauer (2020), and. The least transmitting variables are the Shanghai (China) RTS (Russia), and average oil prices, which transmit only 24.14%, 25.55%, and 14.18% of the shocks. The study finds Shanghai (China) and RTS (Russia) are the net receivers of shocks, as the net directional value is negative.

Table 2.
Average Connectedness with EAS Stock Returns and Average Oil Prices
(TVP-VAR Approach)

Table 2 reports the average connectedness results. *CTOO*: Contribution TO others, *NETDC*: NET directional connectedness

	Shanghai Shen.	Nifty 50	IDX	RTS	SGX	KRX	Oil Average	FROM
Shanghai Shen.	**68.17**	4.22	4.10	2.03	9.23	10.17	2.17	31.84
Nifty 50	**3.14**	56.05	7.78	6.11	13.31	11.87	1.74	43.95
IDX	**3.16**	9.02	65.15	2.42	9.98	8.79	1.48	34.85
RTS	**2.00**	7.48	2.54	71.03	6.00	5.27	5.68	28.97
SGX	**6.61**	11.88	7.81	4.48	49.74	17.26	2.22	50.26
KRX	**7.64**	11.14	7.03	4.03	17.99	51.28	0.89	48.72
Oil Average	**1.59**	2.13	1.82	6.47	3.28	1.24	83.47	**16.53**
CTOO	**24.14**	45.86	31.00	25.55	59.79	54.61	14.18	TCI
NETDC	**-7.70**	1.90	-3.85	-3.42	9.53	5.89	-2.35	**42.52**

Table 2 reports the average connectedness results. It is observed that all stock indices and average oil prices are interconnected.

Next, we investigate the impact of the Russia and Ukraine war on the EAS stock returns using a GARCH model with a war dummy. The results are reported in Table 3. We find the war has a significant impact only on the Indonesian stock market. Other markets are not affected by war during the study period.

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Table 3.
GARCH Model with War Dummy Results

Table 3 represents the GARCH results. It is found that the recent Russia-Ukraine war has a significant impact on the IDX. Probability values in parenthesis. * indicates 1% level of significance.

	Shanghai Shen.	Nifty 50	IDX	RTS	SGX	KRX
c (Constant)	0.00*	0.00*	0.00*	0.00*	0.00*	0.00*
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
α (Resid.)	0.09*	0.09*	0.15*	0.13*	0.11*	0.12*
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
β (GARCH)	0.89*	0.88*	0.77*	0.86*	0.81*	0.83*
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
γ (War)	0.00	0.00	0.00*	0.00	0.00	0.00
	(0.56)	(0.50)	(0.00)	(0.77)	(0.68)	(0.15)

Finally, we use an alternative model to check the robustness of the results. Here, we use WTI crude oil prices instead of average crude oil prices. Then, we estimate the dynamic connectedness based on the TVP-VAR methodology. The results are reported in Table 4. The results are consistent with the results reported in Table 2. Thus, we conclude that the findings are robust to alternative specifications.

Table 4.
Average Connectedness of the EAS Stock Returns and the WTI Crude Oil Prices Based on the TVP-VAR Approach

Table 4 reports the average connectedness results. It is observed that stock returns and average crude oil prices are interconnected. *CTOO*: Contribution TO others, *NETDC*: NET directional connectedness

	Shanghai Shen.	Nifty 50	IDX	RTS	SGX	KRX	WTI	FROM
Shanghai Shen.	66.67	4.40	4.27	2.31	9.28	10.21	2.86	33.33
Nifty 50	3.37	55.45	7.65	6.01	13.34	11.50	2.68	44.55
IDX	3.31	8.76	64.19	2.49	9.92	9.10	2.23	35.81
RTS	2.24	7.40	2.66	73.41	5.85	5.00	3.44	26.59
SGX	6.70	11.85	7.75	4.27	49.75	16.92	2.76	50.25
KRX	7.85	10.64	7.29	3.97	17.63	50.78	1.85	49.22
WTI	2.44	3.27	3.07	3.85	4.24	2.17	80.96	19.04
CTOO	25.92	46.32	32.69	22.90	60.26	54.90	15.82	TCI
NETDC	-7.42	4.00	-3.13	-3.69	10.01	5.68	-3.22	43.13

IV. CONCLUSIONS

The aim of this paper was to investigate the connectedness between stock returns and crude oil prices and to estimate the impact of the Russia-Ukraine war on stock returns in selected EAS countries. Using the TVP-VAR approach, the study confirmed the presence of volatility transmission among the stock returns and oil prices. Further, we found that, on average, 42.52% of the shocks to one asset spill over to all other assets, whereas, on average, 57.48% of the shocks affect the asset itself. This indicates the stock and crude oil markets are highly interconnected. Further, the results indicated that the major transmitter of shocks are the SGX

(Singapore) and KRX (South Korea), which transmit 59.59% and 54.61% of the shocks, on average, respectively. Further, the least transmitting variables are the Shanghai (China), RTS (Russia), and average crude oil prices, that transmit only 24.14%, 25.55%, and 14.18% of the shocks, on average, respectively. Further, the study found Shanghai (China) and RTS (Russia) are the net receivers of shocks, as their net directional value is negative. Using a GARCH model with a war dummy, we found that the recent Russia- Ukraine war has had a significant impact on Indonesia's stock market. However, other markets were not much affected by the war.

From policy perspectives, our findings may help investors to better diversify their investment portfolios. For example, if the magnitude of the interconnectedness between crude oil prices and stock returns is high, then it would be appropriate for investors to diversify their investment portfolios in short-run trading rather than putting all money in one asset class, such as stocks. The volatility transmission between crude oil prices and stock returns would also provide directions to foreign institutional investors to switch their investment from a country's stock markets to those of another country. Further, investors need to safeguard their investments during the war, preferably choosing debt instruments, as war has an adverse impact on the stock market. Similarly, policymakers need additional mechanisms during the war for the purpose of stability in the stock market.

REFERENCES

Antonakakis, N., & Gabauer, D. (2017). Refined Measures of Dynamic Connectedness Based on TVP-VAR. *MPRA*, 78282.

Behera, C., & Mishra, P. K. (2022). Interconnectedness and Nonlinearity in Indian Energy Futures during the COVID-19 Pandemic. *Energy Research Letters*, 3, 32629.

Behera, C., & Rath, B. N. (2022a). The Connectedness between Twitter Uncertainty Index and Stock Return Volatility in the G7 Countries. *Applied Economics Letters*, 29, 1876-1879.

Behera, C., & Rath, B. N. (2022b). The Interconnectedness between COVID-19 Uncertainty and Stock Market Returns in Selected ASEAN Countries. *Emerging Markets Finance and Trade*, 1-13.

Broadstock, D. C., & Filis, G. (2014). Oil Price Shocks and Stock Market Returns: New Evidence from the United States and China. *Journal of International Financial Markets, Institutions and Money*, 33, 417-433.

Bouri, E. (2015). Return and Volatility Linkages between Oil Prices and the Lebanese Stock Market in Crisis Periods. *Energy*, 89, 365-371.

Bouri, E., Gabauer, D., Gupta, R., & Tiwari, A. K. (2021). Volatility Connectedness of Major Cryptocurrencies: The Role of Investor Happiness. *Journal of Behavioral and Experimental Finance*, 30, 100463.

Chatziantoniou, I., Floros, C., & Gabauer, D. (2022). Volatility Contagion Between Crude Oil and G7 Stock Markets in the Light of Trade Wars and COVID-19: A TVP-VAR Extended Joint Connectedness Approach. *In Applications in Energy Finance*, 145-168.

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Cheema, M. A., & Scrimgeour, F. (2019). Oil Prices and Stock Market Anomalies. *Energy Economics, 83*, 578-587.

Degiannakis, S., Filis, G., & Arora, V. (2018). Oil Prices and Stock Markets: A Review of the Theory and Empirical Evidence. *The Energy Journal*, 39.

Devpura, N., Gunadi, I., & Sasongko, A. (2021). Volatility Spillover of Intraday Exchange Rates on some Selected ASEAN Countries. *Bulletin of Monetary Economics and Banking*, 24, 335-364.

Diebold, F. X., & Yilmaz, K. (2009). Measuring Financial Asset Return and Volatility Spillovers with Application to Global Equity Markets. *The Economic Journal*, 119, 158-171.

Diebold, F. X., & Yilmaz, K. (2012). Better to Give than to Receive: Predictive Directional Measurement of Volatility Spillovers. *International Journal of Forecasting*, 28, 57-66.

Durbin, J., & Koopman, S. J. (2012). Time Series Analysis by State Space Methods (Vol. 38). OUP Oxford.

Ferrer, R., Shahzad, S. J. H., López, R., & Jareño, F. (2018). Time and Frequency Dynamics of Connectedness between Renewable Energy Stocks and Crude Oil Prices. *Energy Economics*, 76, 1-20.

Filis, G. (2010). Macro Economy, Stock Market and Oil Prices: Do Meaningful Relationships Exist among Their Cyclical Fluctuations? *Energy Economics*, 32, 877-886.

Fowowe, B. (2013). Jump Dynamics in the Relationship between Oil Prices and the Stock Market: Evidence from Nigeria. *Energy*, 56, 31-38.

Gabauer, D. (2020). Volatility Impulse Response Analysis for DCC-GARCH Models: The Role of Volatility Transmission Mechanisms. *Journal of Forecasting, 39*, 788-796.

Hashmi, S. M., Chang, B. H., & Bhutto, N. A. (2021). Asymmetric Effect of Oil Prices On Stock Market Prices: New Evidence from Oil-exporting and Oil-importing Countries. *Resources Policy*, 70, 101946.

Huang, D. R., Masulis, R. W. & Stoll, H. (1996). Energy Shocks and Financial Markets. *Journal of Futures Markets*, 16, 1-27.

Hung, N. T., & Vo, X. V. (2021). Directional Spillover Effects and Time-frequency Nexus between Oil, Gold and Stock Markets: Evidence from pre and during COVID-19 Outbreak. *International Review of Financial Analysis*, 76, 101730.

Husain, S., Tiwari, A. K., Sohag, K., & Shahbaz, M. (2019). Connectedness Among Crude Oil Prices, Stock Index and Metal Prices: An Application of Network Approach in the USA. *Resources Policy*, 62, 57-65.

Kang, W., Ratti, R. A., & Yoon, K. H. (2015). The Impact of Oil Price Shocks on the Stock Market Return and Volatility Relationship. *Journal of International Financial Markets, Institutions and Money, 34*, 41-54.

Khalfaoui, R., Sarwar, S., & Tiwari, A.K., (2019). Analysing Volatility Spillover between the Oil Market and the Stock Market in Oil-importing and Oil-exporting Countries: Implications on Portfolio Management. *Resour Pol*, 62, 22–32.

Kirikkaleli, D., Kartal, M. T., & Adebayo, T. S. (2022). Time and Frequency Dependency of Foreign Exchange Rates and Country Risk: Evidence from Turkey. *Buletin Ekonomi Moneter dan Perbankan*, 25, 37-54.

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Korobilis, D., & Yilmaz, K. (2018). Measuring Dynamic Connectedness with Large Bayesian VAR Models. *SSRN*, 3099725.

Maghyereh, A. I., Awartani, B., & Bouri, E. (2016). The Directional Volatility Connectedness between Crude Oil and Equity Markets: New Evidence from Implied Volatility Indexes. *Energy Economics*, 57, 78-93.

Mensi, W., Al Rababa'a, A. R., Vo, X. V., & Kang, S. H. (2021). Asymmetric Spillover and Network Connectedness between Crude Oil, Gold, and Chinese Sector Stock Markets. *Energy Economics*, 98, 105262.

Mohanty, S. K., & Nandha, M. (2011). Oil Risk Exposure: The Case of the US Oil and Gas Sector. *Financial Review*, 46, 165-191.

Narayan, P. K. (2020). Oil Price News and COVID-19—Is There Any Connection? *Energy Research Letters*, 1, 13176.

Narayan, P. K., & Narayan, S. (2010). Modelling the Impact of Oil Prices on Vietnam's Stock Prices. *Applied Energy*, 87, 356-361.

Narayan, P. K., & Gupta, R. (2015) Has Oil Price Predicted Stock Returns for Over a Century? *Energy Economics*, 48, 18-23.

Narayan, P. K., & Sharma, S. S. (2021) New Evidence on Oil Price and Firm Returns. *Journal of Banking and Finance*, 35, 3253-3262.

Nguyen, C. C., & Bhatti, M. I. (2012). Copula Model Dependency between Oil Prices and Stock Markets: Evidence from China and Vietnam. *Journal of International Financial Markets, Institutions and Money*, 22, 758-773.

Oberndorfer, U. (2009). Energy Prices, Volatility, and the Stock Market: Evidence from the Eurozone. *Energy Policy*, 37, 5787-5795.

Reboredo, J. C., & Rivera-Castro, M. A. (2014). Wavelet-based Evidence of the Impact of Oil Prices on Stock Returns. *International Review of Economics & Finance*, 29, 145-176.

Smyth, R., & Narayan, P. K. (2018). What Do We Know About Oil Prices and Stock Returns? *International Review of Financial Analysis*, 57, 148-156.

Zhu, H. M., Li, R., & Li, S. (2014). Modelling Dynamic Dependence between Crude Oil Prices and Asia-Pacific Stock Market Returns. *International Review of Economics & Finance*, 29, 208-223.