Performance of the Chinese energy market in times of Russian military interventions

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10 April 2022

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Abstract

China is the world's largest importer and Russia one of its main exporters, particularly of energy. Consequently, foreign military activities by Russia could influence the performance of China's energy market. The research objective is to present evidence on the effects of the 2002-2022 Russian military interventions on the returns of the Chinese energy market. Using event study methodology, we found evidence that Russian military intervention announcements had positive and negative effects on these returns. These findings suggest that the effect of these interventions could be related to the level of acceptance of each intervention and relationship between China and Russia.

JEL codes: G11, G14 y G15
Keywords: China, energy markets, war, market efficiency, event study

I Introduction

Relations between China and Russia have become closer in recent decades (Lukin, 2021), facilitated by their participation in important international organizations and integration projects such as the Belt and Road Initiative (BRI) and the Eurasian Economic Union (EAEU) (Railian et al., 2021). China —the largest energy consumer in the world (Taghizadeh-Hesary et al., 2021)— has found a strategic ally in Russia around three key issues: (a) political and regulatory opposition to the West, (b) energy, and (c) security and defense (Aris et al., 2021). Regarding energy, Russia is currently its largest supplier of crude oil in the world (Paik et al., 2021) and is in the process of increasing natural gas exports to China with the construction of the gas route "*Power of Siberia*", which will allow the export of 38 billion cubic meters of natural gas each year (Geng, 2021), equivalent to 40% of its total imports of this resource.

The impact of financial crises, natural disasters and epidemics on financial markets have been widely documented; this has not been the case for military interventions, especially concerning energy markets. If we consider that China is the most populous country in the world, ranking first in imports[1], then we can suppose that its energy market is significant in value. This is the same assumption reached by Huang and Liu (2021), Sun et al. (2021) y Si et al. (2021) when studying the effects of the COVID-19 pandemic on the Chinese energy market. There is evidence that after the Asian (1997) and Russian (1998) financial crises, China's energy market index exhibited a somewhat positive response (Babecký et al., 2013), and that Russian political and war-related events influenced the raw materials of the energy markets (Costola and Lorusso, 2021). There is also evidence that fluctuations in the price of oil affect Russia's trade strategy risk profile (Soucek and Todorova, 2013) and China's stock market performance (Fang and You, 2014).

Military interventions have more significant negative effects if they revolve around nations with compromised resources (Corallo, 2007). At the same time, Szczygielski et al. (2021) show that the a country's energy index reacts to shocks differently depending on whether it is a net exporter or importer of energy and oil. Therefore, considering the strong energy market interdependence between China and Russia (Garcia-Herrero and Xu, 2019; Geng, 2021; Paik et al., 2021), their status as emerging superpowers, and looking at the currently ongoing Russia-Ukraine war, it is apposite to investigate this line of events. Our research objective is to present evidence related to the effects of Russian military interventions from 2002 to 2022 on the Chinese energy market index.

Using event study methodology (Binder, 1985; Karafiath, 1988; Malatesta, 1986), we found evidence that Russian military intervention announcements had both positive and negative effects on the cumulative returns of the China energy index. Our findings suggest that the effect of these interventions on China's energy market could be related to the level of acceptance of the justifications for their occurrence, and to how much the trade relationship between China and Russia is affected.

[1] https://wits.worldbank.org/CountryProfile/en/Country/WLD/Year/2019/TradeFlow/Import/Partner/by-country.

II Empirical Strategy

We used data from the Refinitiv Eikon database, specifically, the **MSCI** Energy Index at World and China levels (we abbreviate the MSCI World Energy Index as WER and the MSCI China Energy Index as CER). According to the MSCI GICS (Global Industry Classification Standards) definition, updated in 2018, the MSCI World Energy Index groups companies into those engaged in equipment and services, and those engaged in consumables. They are then further divided into seven industries (Szczygielski et al., 2021), including oil and gas. We used the return of the Shenzhen stock market index (SZSE), abbreviated as CR, the return of the Euro/Ruble exchange rate,ER, and the return on oil volatility, ROV, which were all extracted from a public source[2]. The modality of daily returns is continuous on a percentage basis[3], with the period of analysis being from 2002 to 2022.

Regarding Russia's military interventions, we considered four events: i) "*Ossetia*", 08-August-2008. Georgian President Mikheil Saakashvili sends troops to South Ossetia and Russia responds by moving its troops to the border[4]. ii) "*Ukraine I*", 01-March-2014. Russia's parliament approves President Vladimir Putin's request to use force in Ukraine to protect Russian interests[5]. iii) "*Syria*", 30-September-2015. The Russian parliament approved a request by President Vladimir Putin to launch air strikes in Syria. Within hours, the country's first intervention in the Middle East in decades began[6]. iv) "*Ukraine II*", February 24, 2022. The Russian president gave a speech stating that he had decided to carry out a "special military operation", justifying said action with the objective of protecting those who had been subjected to eight years of abuse and genocide by the regime of Kiev[7].

$$CER_t = \begin{array}{c} \alpha + \beta_1 \cdot CER_{t-1} + \beta_2 \cdot WER_t + \beta_3 \cdot ROV_t + \beta_4 \cdot ROV_{t-1} \\ +\beta_4 \cdot CR_t + \beta_5 \cdot ER_t + \sum_{\tau=-S}^{+S} \theta_{\tau,t} \cdot E_{\tau,t} + \varepsilon_{i,t} \end{array} \tag{1}$$

To address the effect of Russian military intervention announcements on the Chinese energy market, we will use the event study method with dummy variables (Binder, 1985; Karafiath, 1988; Malatesta, 1986), for each military interventions. This is shown in Equation (1), where the dependent variable is CER_t, which represents the return of the MSCI China Energy Index, with CER_{t-1} as the first lag, controlling for the momentum effect[8]. WER_t is the return of the MSCI World Energy Index as a market benchmark, CR_t is the daily percentage return of the Chinese SZSE index, benchmarking general Chinese market conditions, ER_t is the return of the Euro/Ruble exchange rate as an approximation of the effect of the European community sanctions imposed on Russia, ROV_t is the return of the volatility of oil prices, as a measure of energy market volatility, with ROV_{t-1} as its first lag, controlling for potential early investors actions in the Chinese energy market (Makkonen et al., 2021). To study the event, we include the binary variables $E_{\tau,t}$, which take the value 1 depending on the day of the event considered in the window $S = 1, 2, 4, 5$, such that, for each window, the subscript $\tau = 0$ represents the day on which Russia's corresponding military intervention was announced. The estimation window for normal returns contemplates a total of 120 days, from lag 6 to 126 of the date of the event. The primary parameter $\theta_{\tau,t}$ identifies the abnormal return that occurred on day $\tau \in \pm S$, such that the accumulated sum $\sum_{\tau=-S}^{+S} \theta_{\tau,t}$ represents the CAR (*Cumulative Abnormal Return*) for the various intervention analysis windows S.

[2] https://finance.yahoo.com/

[3] The continuous return percentage is calculated as $r = [ln(Price_t) - ln(Price_{t-1})] \times 100\%$

[4] https://edition.cnn.com/2014/03/13/world/europe/2008-georgia-russia-conflict/index.html

[5] https://www.bbc.com/news/world-middle-east-26248275

[6] https://www.bbc.com/news/world-middle-east-34416519

[7] https://edition.cnn.com/2022/02/24/europe/ukraine-russia-attack-timeline-intl/index.html

[8] The *momentum* effect refers to the inertia carried by prices due to the trend (Zaremba et al., 2021)

III Results

The estimation of the CARs for the Chinese energy market after the announcements of military intervention by Russia are summarized in Table 1 (also see Annex, Table 2). Our estimates present CARs with different signs, magnitudes and significance. This shows that there is no evident pattern in the behavior of the Chinese energy market for the last 20 years of Russian military interventions. This seems to be consistent with findings presented by similar studies (Corallo, 2007; Ferguson, 2008). We find that, for the South Ossetia event, the accumulated returns of the Chinese energy market present their highest value at $CAR(-1,+1) = 2.4\%$, with a significance of 5%. These results vanish with increasing windows, which could be related to the fact that the control of the oil pipeline that passes through this territory was not affected, and that investors reacted to this fact quickly. Russia's military intervention in Syria had a positive effect on the cumulative returns of China's energy market, as shown in Graph (c) of Figure 1, reaching its highest value in the window $CAR(-4,+4) = 9\%$. This could be due to the reason given by Russia for the invasion: the "fight against terrorism" was supported by a non-aggression pact with the United States[9].

Table 1: CARs for the MSCI China Energy Index related to Russian military interventions

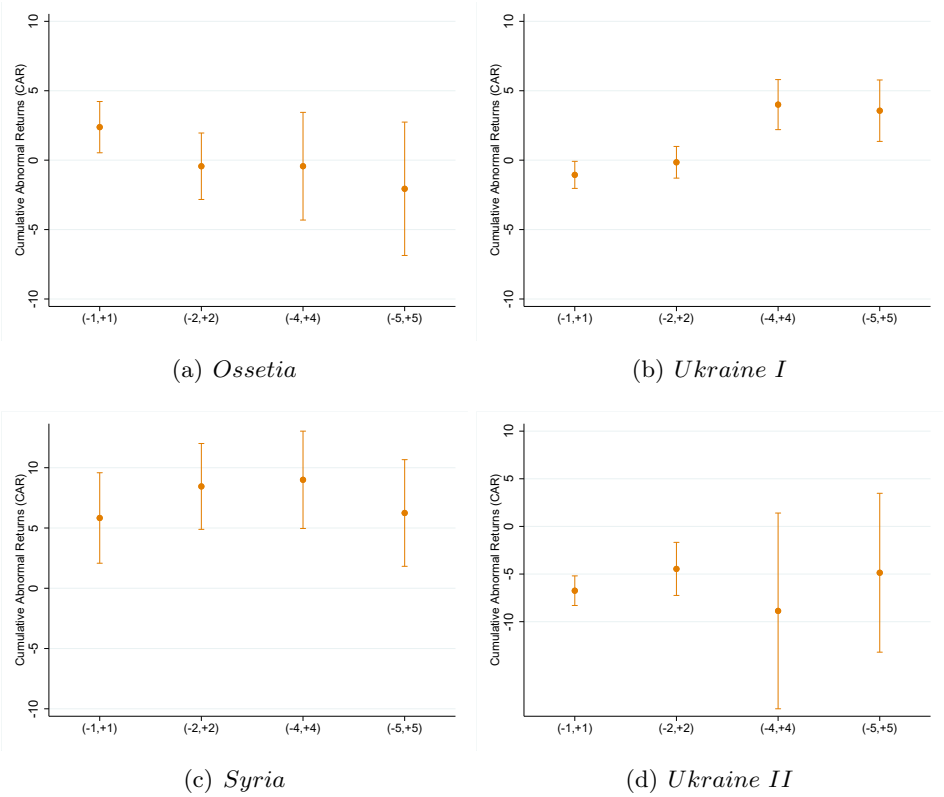
Window	Ossetia	Ukraine I	Syria	Ukraine II
$(-1,+1)$	2.3786**	-1.0589*	5.8304**	-6.7457***
	(2.1186)	(-1.7871)	(2.5548)	(-7.1410)
$(-2,+2)$	-0.4379	-0.1531	8.4489***	-4.4596***
	(-0.3009)	(-0.2208)	(3.9023)	(-2.6332)
$(-4,+4)$	-0.4356	4.0018***	8.9980***	-8.8694
	(-0.1848)	(3.6513)	(3.6655)	(-1.4201)
$(-5,+5)$	-2.0614	3.5637***	6.2454**	-4.8615
	(-0.7059)	(2.6496)	(2.3216)	(-0.9591)
Observations	126	126	126	126

Note: The table reports the results of the CARs for the Chinese energy market, as described in Equation (1). The first column describes each estimated window for the event. The *Ossetia*, *Ukraine I*, *Syria* and *Ukraine II* columns represent the cumulative abnormal returns for each of the Russian intervention announcements 2002-2022. Wald test, $z - statistic$ in parentheses. */**/*** significant at 10%/5%/1%, respectively.

The two Russian military interventions in Ukraine initially had a negative effect on the accumulated returns of the Chinese energy market, which were more accentuated for the second intervention, with $CAR(-1,+1) = -6.7\%$. This is over six times more negative than for the same window in the first Ukrainian war ($CAR(-1,+1) = -1.1\%$) and with less significance (see Graphs (b) and (d) in Figure 1). This sharper drop may be due to the increasingly close China-Russia bilateral relations in recent years, which generates more dependence on Russian energy products for China.

[9] https://www.bbc.com/news/world-middle-east-34588286

Figure 1: CARs for the MSCI China Energy Index related to Russian military interventions



(a) *Ossetia* (b) *Ukraine I*

(c) *Syria* (d) *Ukraine II*

Note: The vertical axis corresponds to the CAR in percentage points, with interval bands at 90% confidence. Figures (a), (b), (c) and (d) show the CARs for each Russian military intervention announcement 2002-2022. The horizontal axis indicates the size of the windows, in increasing order left to right.

Our results also show that the first lag of the return of oil volatility records a negative result for all events, with at least 5% significance, in the last two interventions (see Annex, Table 2). This suggests that China's energy market has started taking anticipatory measures when expecting impending interventions. Table 2 shows that there is a positive correlation between the returns of the Chinese financial and energy markets. There was a particularly large reaction for the Ukraine II intervention, which could be associated with the increased interaction between China and Russia. However, the Euro/Ruble exchange rate is not significant, indicating that the sanctions imposed by the European community on Russia have little effect on the relationship between these two countries.

IV Conclusions

Our research presents evidence suggesting that announcements of Russian military interventions influence China's energy market index, although there is no evident pattern. This result seems to agree with Corallo (2007), possibly because the temporal distance between these military interventions present an obstacle for investors to assimilate and apply lessons learned (Ferguson, 2008). Our evidence also suggests that the different reactions of the Chinese energy market to this type of announcement could be linked to the justifications given for the actions taken. It seems that more acceptable justifications for the intervention generate a more positive effect on MSCI China Energy Index returns. When the interventions occurred

in South Ossetia and Syria, they brought with them an increase in the price of oil but not in its volatility, causing a positive effect on the performance of the Chinese energy market ((Rigobon and Sack, 2005)—possibly because they were better perceived by the public. However, when the Russian interventions occurred in Ukraine, both the price of oil and its volatility increased, causing a fall in the returns of the MSCI China Energy Index (Fang and You, 2014; Soucek and Todorova, 2013). This time, sanctions were imposed on Russia, which evidences that their intervention was not generally well-received.

The fact that Russian military interventions in Ukraine had a negative effect on the MSCI China Energy Index could also suggest that the increase in oil volatility affected the energy trade relationship between China and Russia (Geng, 2021; Paik et al., 2021), causing a drop in the cumulative returns of the MSCI China Energy Index. Military announcements, such as wars, seem to have negative effects on energy markets when the place where they occur compromises resources worldwide (Corallo, 2007), and are then further influenced by the potential impact on domestic energy imports. This would explain why the biggest drop in the MSCI China Energy Index was for Russia's intervention in Ukraine in February 2022, when the political relationship between China and Russia was at its closest within the study period (Szczygielski et al., 2021).

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V Annex

Table 2: Panel estimate of the MSCI China Energy Index's abnormal returns after announcements of Russian military interventions

VARIABLES	[1] South Ossetia	[2] Ukraine I	[3] Syria	[4] Ukraine II
CER_{t-1}	-0.0695	0.1181	-0.0384	0.0040
	(-0.9583)	(1.3695)	(-0.3799)	(0.0509)
WER_t	0.2009	0.1348	0.2694	0.3118***
	(1.0899)	(0.7811)	(1.6417)	(4.0217)
ROV_t	0.0161	-0.0476*	0.0118	0.0026
	(0.2576)	(-1.6786)	(0.3680)	(0.1408)
ROV_{t-1}	-0.0672	-0.0317	-0.0963***	-0.0393**
	(-1.2931)	(-1.1711)	(-2.9669)	(-2.4211)
CR_t	0.4480***	0.6549***	0.3357***	1.2030***
	(5.7778)	(4.7977)	(6.4766)	(7.7421)
ER_t	0.8541	0.0848	-0.0819	0.2469
	(1.1437)	(0.6390)	(-0.6601)	(1.3857)
Window dummies				
E_{-5}	-0.0753	-0.2478	-2.7285***	-0.3740
	(-0.2099)	(-0.6144)	(-8.3349)	(-1.4859)
E_{-4}	0.0572	1.9392***	-1.0035**	0.8587***
	(0.0913)	(5.2975)	(-2.4027)	(3.5965)
E_{-3}	-3.5533***	1.2486***	0.7951***	0.0379
	(-9.3515)	(6.7278)	(2.7847)	(0.1169)
E_{-2}	-0.7774	1.9286***	0.5404	0.9640
	(-1.3791)	(10.2749)	(0.8982)	(1.1089)
E_{-1}	-0.2974	-0.8559***	-5.7947***	-2.6691***
	(-0.7538)	(-3.2826)	(-25.5803)	(-7.2160)
E_0	1.2771**	-1.1789***	3.7567***	2.4805***
	(2.0354)	(-3.4150)	(4.9199)	(4.3578)
E_{+1}	1.3990*	0.9760**	7.8684***	-6.5572***
	(1.8462)	(2.1277)	(4.2030)	(-8.7731)
E_{+2}	-2.0392***	-1.0228***	2.0780	1.3221***
	(-7.5271)	(-3.9824)	(1.5183)	(3.7502)
E_{+3}	-0.4507	0.5549***	1.4114***	-6.4112
	(-1.1483)	(2.6921)	(3.6228)	(-1.4391)
E_{+4}	3.9490***	0.4121*	-0.6538*	1.1048***
	(13.7985)	(1.8370)	(-1.7903)	(3.3090)
E_{+5}	-1.5504***	-0.1902	-0.0242	4.3819***
	(-2.9243)	(-0.4693)	(-0.0681)	(3.5126)
Constant	0.0426	-0.0665	-0.1771	0.1476
	(0.1763)	(-0.6412)	(-1.0767)	(0.9881)
Observations	126	126	126	126
R-squared	0.3024	0.4087	0.6423	0.4320
FE date event	YES	YES	YES	YES
FE Year	YES	YES	YES	YES
FE Month	YES	YES	YES	YES

Note: The table reports the panel estimates of Equation (1). The dependent variable CER_t is the return of the MSCI China Energy Index. The controls are: CER_{t-1} the first lag of China's MSCI Energy Index returns; WER_t corresponds to the MSCI World Energy Index returns; ROV_t and ROV_{t-1} are the return on oil price volatility and its first lag; CR_t is the Chinese stock market return (Shenzhen); and, ER_t is the return of the Euro/Ruble exchange rate. All in percentage returns. $E_{\pm S}$ —with $S = 1, 2, 4, 5$— is a binary variable that takes the value 1, individualizing each day of the window of each military intervention. $t - statistic$ in parentheses. */**/*** significant at 10%/5%/1%, respectively.