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The Impact of Russia's Invasion of Ukraine on the Capital Markets from the CEE Countries

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Abstract. *The price of stocks is a good indication of investors' expectations for the evolution of capital markets, comprising their fears and hopes regarding future developments. The information regarding a disruptive event such as a military attack spreads rapidly across countries affecting investors' perceptions and causing them to sell their stocks and target safer investments. The scientific literature on the topic is growing lately due to the ongoing Russo-Ukrainian war and its consequences. The research paper investigates the impact of Russia's invasion of Ukraine on the capital markets from the Central and Eastern European region using the event study methodology. The paper studies the abnormal returns recorded by each capital market on the event day (February 24, 2022), as well as the cumulative abnormal returns for 6-day, 11-day and 16-day event windows following the attack. The findings show that most of the capital markets recorded sharp declines on the event-day, reaching a negative abnormal return event of 10% on February 24. For the longer event windows the negative impact persisted through cumulative abnormal returns recorded for most of the markets. The highest declines were recorded on the 6-day and 11-day event windows as all capital markets considered incorporating the bad news of the war outbreak and lost the initial hope of being a disinformation or a short-term military attack. Within 35 trading days following the invasion, 64% of the markets rebounded and returned to their pre-attack level. However, 4 capital markets recorded more than 200 trading days with a level lower than the one registered before the invasion. The paper contributes to literature extending the studies of capital markets' behavior during military conflicts focusing on neighboring countries.*

Keywords: Capital markets, Russia-Ukraine war, CEE countries, Event study methodology, Market resilience, Abnormal returns

Introduction

In general, the price of individual stocks reflects the investors' expectations as well as their hopes and fears about the future development of the capital market. When information about a disruptive event such as an armed attack or an act of terrorism emerges, or even the possibility of these events occurring in the near future, investors withdraw from a particular market affected by this event in search of safer financial instruments triggering simultaneous panic selling. The simultaneous movements of individual capital markets can aggregately generate a flurry of activity and market disruption.

Armed attacks, acts of terrorism, military invasions and other unforeseen catastrophic events can impact stocks and bonds by having an impact on their liquidity. This situation may see a correction if investors' sentiments tend towards hoping the market will return to the initial trend, or it may escalate into market chaos with prolonged price declines in the coming period.

The Russian invasion of Ukraine which started on February 24 of 2022 is an unprecedented military attack that nobody was thinking would be possible in the modern era we are living in. As the consequence of the invasion, approximately 8 million of Ukrainians were forced to leave their homes in search of a safe place to live. The main countries where Ukrainians leaving their country took refuge were Russia, Poland, Germany and Czech Republic. Figure 1 presents the total number

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of Ukrainians leaving Ukraine from 24th of February 2022 onwards and their countries of destination.

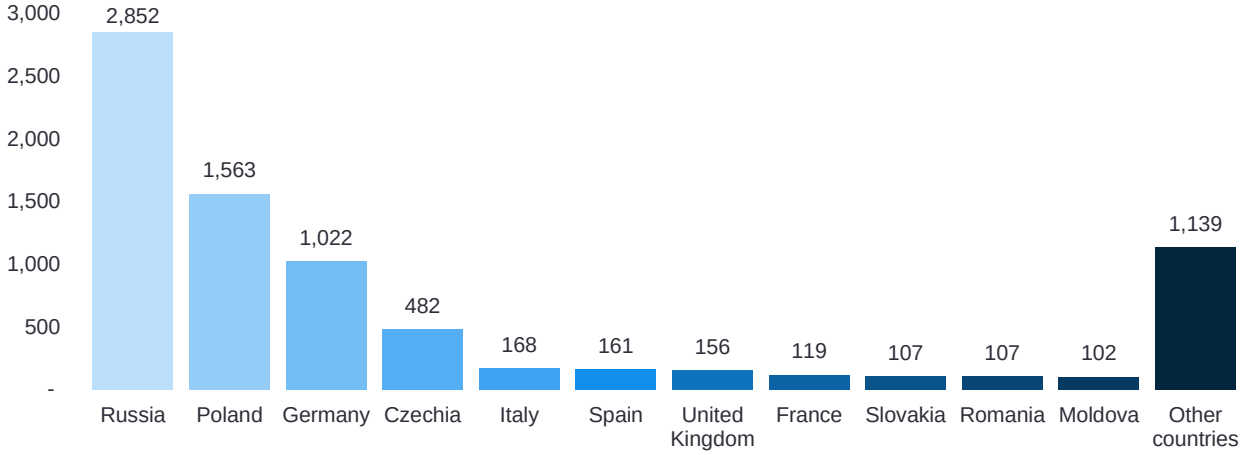


Figure 1. The number of Ukrainian refugees and their destination countries as of January 17, 2023

Source: United Nations High Commissioner for Refugees.

*The category "Other countries" includes the refugees from Ukraine recorded in 33 other countries from Europe and Asia such as Austria, Turkey, Netherlands, Switzerland, Lithuania, Ireland, Belgium, Estonia, Portugal etc.

The information about Russia invading Ukraine and the fear about an imminent war spreading across Europe and the world has quickly traveled affecting investors' sentiments and disrupting the activity of the financial sector. In the following months, the trade and commodity markets suffered perturbances due to affected trading routes and hindered commercial relations between countries, both the interest rate and the inflation rate increased worldwide while the energy priced surged. Moreover, the financial markets were negatively affected recording unusual movements and abnormal returns. Figure 2 shows the returns of the capital markets' indexes for the CEE countries for the period between January 2021 and December 2022.

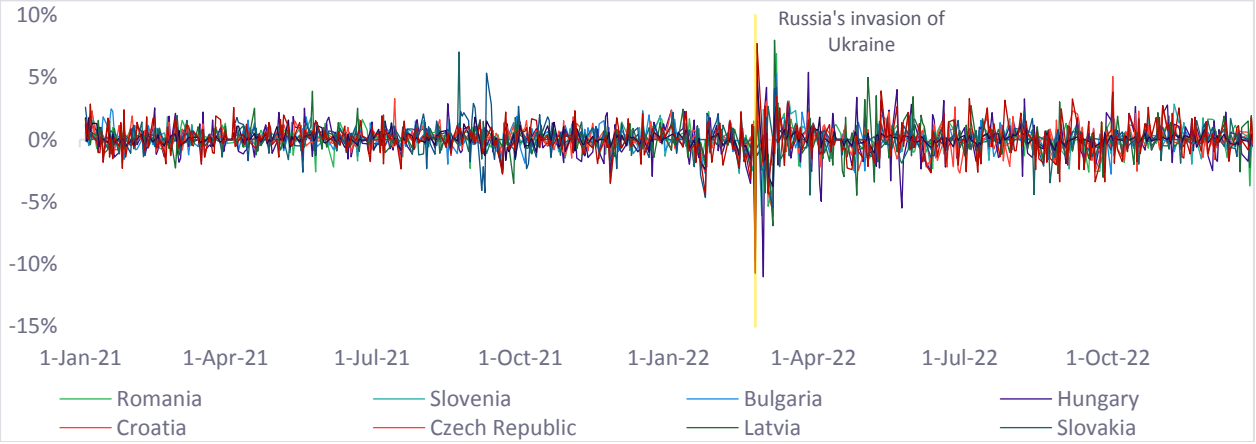


Figure 2. The stock market returns in CEE countries during 2021-2022

Source: Data from investing.com, author's own research.

*The stock market returns for each country's index from the above figure are presented in the Appendix

The present paper investigates the impact of the recent Russian invasion of Ukraine on the capital markets of the Central and Eastern European countries using the event study methodology.

The research question of this paper refers to "Is Russia's invasion of Ukraine associated with significant negative abnormal returns in the capital markets from the CEE countries?".

Further on, the paper is organized as follows: Section 2 presents the literature review regarding the impact of military attacks on capital markets, Section 3 details the data and describes the methodology used and Section 5 explains the results.

Literature review

In recent literature, research papers focus more on studying capital markets' behavior during crises, terrorist and military attacks and health hazards as these major events affect regular market movements, while also investigating capital markets' resilience, the methods and policies needed to improve it. The disruptive events are more frequent in recent times (9/11 terrorist attacks, the global financial crisis, the Covid-19 pandemic, Russian-Ukrainian war etc.), underlying the need for countries to develop a better approach to build strong markets for future circumstances.

Frey and Kutcher (2001) analyze price movements of bonds issued by five European governments (Germany, Austria, France, Belgium and Switzerland) which are traded on the Swiss stock exchange between 1928 and 1948, paying particular attention to the war years. The historical events considered take place during World War II, from Hitler's appointment as chancellor in January 1933 to the Marshall Plan conferences in September 1947.

The study is based on the idea that war events considered crucial are generally reflected in the price of government bonds. The analysis is based on the identification of structural breaks and addresses two main questions: to what extent changes in government bond prices can be connected to historical events and to what extent historical events are reflected as changes in government bond values. Based on the results, the hypothesis turns out to be true for some war related events such as the official outbreak of war and changes in national sovereignty, but other events considered historically important are not reflected in the price of government bonds (German surrender in 1945).

Based on preliminary research started in 2002, Chen and Siems (2004) investigate the response of global capital markets to military attacks and acts of terrorism. First, the study examines the reaction of the United States capital market to military and terrorist attacks, including government-initiated invasions of other countries, beginning with events dating back to 1915 (the sinking of the ocean liner Lusitania by a torpedo). It thus tests the abnormal returns of the Dow Jones Industrial Average index following 14 attacks including the attack on Pearl Harbor (December 1941), North Korea's attack on South Korea (June 1950), the bombing of Beirut, Air India and Korean Air etc. The article also investigates the reaction of global capital markets to more recent events that adversely affect the capital market in the United States: Iraq's invasion of Kuwait in 1990 and the September 2001 terrorist attack in the United States. Among the global capital markets analyzed are the ones from London, Frankfurt, Switzerland, Austria, Tokyo, Hong Kong, Singapore, Johannesburg, etc.

The applied methodology is the "event study methodology" which allows the testing of several hypotheses: whether terrorist and military attacks, either historical or recent, are associated with significant negative abnormal returns in the United States and global capital markets and whether the banking and financial sector can contribute to minimize the crises following these attacks. The results indicate higher interconnected global markets in recent times, while the US capital market shows greater resilience and a shorter recovery period following armed attacks than other global capital markets. The banking and financial sector contributes to this resilience by providing liquidity that helps stabilize the market and reduce panic.

Furthermore, Hartwell (2018) examines the link between political and transitional capital markets volatility in Central and Eastern European countries and Central Asia to document the potential disruptive effect of political instability on financial markets. Using a methodology based on asymmetric GARCH models applied to monthly data, the research results show that informal political institutions and their volatility were important determinants of financial market performance, with informal volatility contributing to much lower stock returns than in a no-volatility environment. On the other hand, formal political changes, such as elections, corresponded to much higher financial market volatility, even though they had no discernible effect on stock market returns.

More recently, research papers focus on the Russia's invasion of Ukraine studying either the day of the official announcement of war (i.e., January 24, 2022) (Lo et al, 2022; Federle et al., 2022; Boubaker et al., 2022; Boungou and Yatié, 2022) or the days leading to this event like the recognition of Donetsk and Luhansk regions as autonomous (i.e., January 21, 2022) (Ahmed et al., 2022).

Lo et al. (2022) investigates the impact of the war between Russia and Ukraine on financial markets, conditioned by the dependence of each country on Russian commodities. The paper considers a panel data methodology using the daily stock index data of 73 countries. The regression employs the stock market return as dependent variable, while the independent variables include the daily realized volatility, a fear indicator based on the Google search index volume related to "Russo-Ukrainian war" and the indicator quantifying the dependence on Russian commodities (computed as ratio between commodities imported from Russia and the ones imported from other countries during 2020).

The findings show that the analyzed financial markets reacted to the shock resulting from the Russian-Ukrainian war by increasing the markets' volatility and decreasing assets' returns. The results demonstrate that the military conflict negatively affects the stock markets and increases the volatility, irrespective of the country's trade dependence. However, the trade dependence on Russia's commodities above the 0-20% level leads to a significant effect of the war on returns.

At the same time, Boungou and Yatié (2022) investigated the reaction of 94 global stock markets to the war between Russia and Ukraine using stock returns for the period between 22 January and 24 March 2022 and a panel data methodology. The findings show that the performance of world stock market indexes is negatively affected by the Russia-Ukraine conflict, the impact being greater after Russia's invasion on 24th of February 2022 compared to the period before. At the same time, the impact is greater in the first two weeks after the invasion and starts to diminish three to four weeks after the event, the global markets starting to recover. Furthermore, the countries which are geographically closer to Ukraine and Russia have been more affected, while the UN member countries which condemned the attack registered a higher negative impact.

Federle et al. (2022) prove that the proximity of a country to a conflict area, more specifically to the war between Russia and Ukraine in the particular case analyzed, is a key determinant of the economic spillovers it is exposed to. The study shows based on a panel of 66 countries that capital markets which are geographically closer to the war area registered negative returns in the first two weeks after the invasion, suffering a sizable proximity penalty, while the countries which are geographically further from Russia and Ukraine coped better with the conflict. Moreover, around half of the effect is the result of commercial relations with Russia and Ukraine which tend to be closer with neighboring countries.

Furthermore, Boubaker et al. (2022) document a strong negative impact of the 2022 Russian invasion of Ukraine on global capital markets on the day of the event, while in the very next day

most of the markets show a positive impact. The cumulative effect is generally negative on these markets, with few exceptions of countries in Asia and pan-America. The level of economic globalization measured by the trade-to-GDP ratio is negatively associated with returns in the event day and post event, but in the same time the markets in countries which are NATO members show higher returns due to the expected economic incentive of military readiness. The findings show that the more globalized a country is, it is more vulnerable to international conflicts, with significant heterogeneity across studied countries.

Thus, in the context of the precarious international political situation and Russia's invasion of Ukraine, which risks expanding to the Eastern European states, the research presented above represents a starting point in the analysis of the impact of political situations and armed and terrorist attacks on the capital markets from the affected regions, in this sense the CEE countries being located closest to the conflict.

Methodology

The data regarding the stock market returns was computed based on the daily index price of the main capital market index of each Central and Eastern European country (based on the list of CEE countries of OECD) for the period between January 1, 2021 and December 31, 2022. As the stock markets are not open on weekends and holidays, the analysis takes into consideration just the trading days of each country. The daily price for each index was retrieved from Investing.com. For Albania, the Tirana stock market does not have a defined market index.

The present paper uses the event study methodology to investigate the impact of the military conflict between Russia and Ukraine on the capital markets from CEE countries. The event date considered is February 24, 2022 as it is the date when Russia's military invasion of Ukraine began. The stock price and return data for each capital market, as well as the computations of abnormal returns and cumulative abnormal returns were done using Excel.

The event study methodology is focusing on identifying abnormal returns to companies or stock indexes from a specific event. If the abnormal stock return is positive around the event date, the market sentiment is favorable and investors react positively to the specific event. Oppositely, if the abnormal stock return is negative around the event date, the market sentiment is unfavorable and investors react negatively to the specific event.

The event study methodology was proposed by Fama et al. (1969) and is based on the efficient market hypothesis which states that if new information becomes available regarding a significant unpredicted event, the investors will shortly take it into consideration in order to assess its impact. Following a significant event, investors quickly assess the ability of stock markets and countries to cope with economic, political and societal changes.

To measure the stock market's abnormal performance, the present paper uses the excess return approach proposed by Brown and Warner (1985). This methodology allows the comparison of the returns around the event date with their past averages and the testing of this deviation statistical significance in order to assess the economic impact of a disruptive event on a particular stock market.

Following the proposed methodology of Chen and Siems (2004), the daily abnormal returns are measure by the mean-adjusted-returns approach, computing for each day at and following the Russia's invasion of Ukraine:

$$AR_{it} = R_{it} - \underline{R_i}$$

Where AR_{it} is the abnormal return for stock index i at time t, R_{it} is the actual rate of return for stock index i at time t and $\underline{R_i}$ is the mean of stock index i's daily returns for the estimation period.

The day of Russia's invasion of Ukraine is the event date noted as t=0. The estimation period over which the mean adjusted returns model is considered to be over is of 30 working days, meaning an interval of (-40,-11) days before Russia's invasion of Ukraine. Due to the military buildup intensifying in the days preceding the invasion a period of 10 working days is considered between the end of the estimation period and the event date. Thus, the estimation period is considered between December 29, 2021 and February 09, 2022.

The mean $\underline{R_i}$ is computed as follows:

$$\underline{R_i} = \frac{1}{30}\sum_{t=-40}^{-11} R_{it}$$

The event window under study is the event date itself (t=0), 5 working days following the event (t=+5), 10 working days after the event (t=+10) and 15 working days after the event (t=+15). The cumulative average abnormal returns (CARs) are also computed for these event windows as follows:

$$CAAR_i = \frac{1}{5}\sum_{t=0}^{5} AR_{it}$$

$$CAAR_i = \frac{1}{10}\sum_{t=0}^{10} AR_{it}$$

$$CAAR_i = \frac{1}{10}\sum_{t=0}^{10} AR_{it}$$

Furthermore, the research shows the time window necessary for each market to recover after the event, computed as the number of trading days needed for the stock market index to return to the level recorded before Russia's invasion of Ukraine.

Results and discussions

Nowadays, the information travels fast, news spreading worldwide in a matter of minutes and affecting the investors' expectations. The global capital markets are more connected than ever leading to spillover and contagion effects expanding rapidly across markets. In this section, the research paper investigates the effect of Russia's invasion of Ukraine on the capital markets from the CEE countries which are, at the same time, territories geographically close to Ukraine and the military conflict.

Table 1 shows the abnormal returns for 11 capital markets from the CEE countries for four different event windows, namely the event day (t=0), +5, +10 and +15 trading days following the official date of Russia's invasion of Ukraine, February 24, 2022. The table shows in parentheses the t-statistic which serves as an indication of how significant is the economic impact associated with a specific event to the capital market. The t-statistic shows whether the index returns deviate from their means more than what would be considered a normal variation. If the event has consequences on the market, the expected return deviation would be significant. Also, the table presents in the last column the number of trading days needed for each global capital market to return to the level before the invasion.

Of the 11 capital markets from CEE countries considered, 9 experienced significant negative abnormal returns on February 24, 2022, the day when investors found out officially about Russia's invasion of Ukraine. Of the 9 capital markets with significant results on the event date, 8 of them had negative abnormal returns significant at 0.01 level, while one market registered significant negative abnormal results at 0.05 level. Bratislava and Tallinn are the only CEE countries where the abnormal returns were not significant.

Table 1. The abnormal returns of capital markets in the CEE countries following Russia's invasion of Ukraine on February 24, 2022

Global stock index	Capital market	Country	Event-day AR	6-day CAR	11-day CAR	16-day CAR	Days to recover
BET	Bucharest	Romania	-4.18% ***	-9.64% ***	-10.66% ***	-6.55%	> 200
			(4.47)	(4.20)	(3.43)	(1.75)	
Budapest SE	Budapest	Hungary	-9.97% ***	-13.42% ***	-13.38% ***	-8.46%	> 200
			(8.06)	(4.43)	(3.26)	(1.71)	
BSE SOFIX	Sofia	Bulgaria	-1.88% **	-3.17%	-5.64% *	-1.05%	21
			(2.32)	(1.59)	(2.09)	(0.32)	
CROBEX	Zagreb	Croatia	-6.65% ***	-7.32% **	-9.23% ***	-6.08% *	32
			(7.70)	(3.46)	(3.22)	(1.76)	
SBITOP	Ljubljana	Slovenia	-6.49% ***	-3.79%	-9.83% **	-3.50%	18
			(6.91)	(1.65)	(3.15)	(0.93)	
PX	Prague	Czech Republic	-4.91% ***	-3.56%	-10.00% ***	-8.40% **	> 200
			(6.26)	(1.86)	(3.84)	(2.68)	
Riga General	Riga	Latvia	-4.13% ***	-13.65% ***	-8.09% **	-8.85% **	> 200
			(4.75)	(6.42)	(2.81)	(2.55)	
SAX	Bratislava	Slovakia	0.61%	-2.73%	-0.66%	-1.47%	4
			1.01	(1.85)	(0.33)	(0.61)	
Tallinn SE General	Tallinn	Estonia	-1.29%	-8.29% *	-5.05%	-1.09%	18
			(0.92)	(2.41)	(1.08)	(0.19)	
Vilnius SE General	Vilnius	Lithuania	-6.55% ***	-5.15% **	-7.41% ***	-4.97% *	28
			(9.41)	(3.02)	(3.21)	(1.78)	
WIG	Warsaw	Poland	-10.72% ***	-1.95%	-3.78%	3.37%	16
			(7.93)	(0.59)	(0.84)	0.62	

Source: Author's own research; Data from investing.com

*For the Tallinn capital market, the event-day was considered to be February 25, 2022, as the market is closed on February 24 because Estonia is having a holiday to celebrate the Independence Day. In addition to this, every event window considered following the day of February 24, 2022 is delayed with one day for the Tallinn market in order to take into consideration the holiday and a similar number of days in each window.

The event day ARs for the capital markets in the CEE countries considered are presented graphically in Figure 3, arranged from the highest positive abnormal return to the highest negative. The highest significant decline following Russia's invasion of Ukraine was registered by the Warsaw and Budapest stock markets, one of the highest capital markets in the region. The capital markets recorded sharp declines following Russia's invasion of Ukraine, having a negative abnormal return of approx. 10% for Warsaw and Budapest and above 6% for the capital markets in Zagreb, Vilnius and Ljubljana. At the same time, the Sofia stock markets displayed a significant decline due to the military attack, but with a lower abnormal decline than the larger capital markets in the region. The correlation between the size of a capital market and the depth of decline was previously documented in the literature (Chen&Siems, 2004) showing that the larger the market, the lower the decline, larger markets having a greater resilience to shocks.

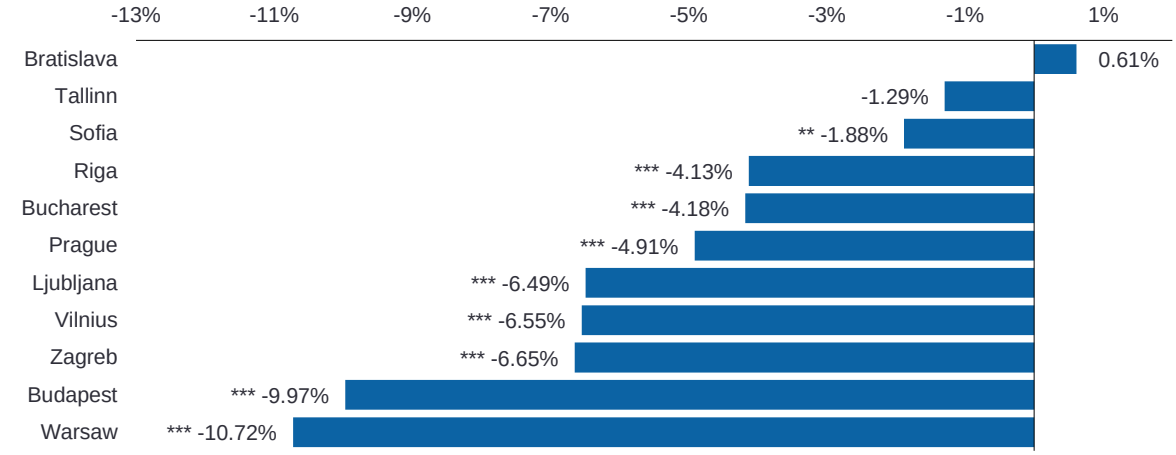


Figure 3. The abnormal returns of the capital markets of the CEE countries on the event date of Russia's invasion of Ukraine

Source: Author's own research.

Note: *** means significant at 0.01 level; ** means significant at 0.05 level; * means significant at 0.10 level.

The abnormal return on the day of the event shows the immediate reaction of investors in a particular country and globally to unexpected military attacks and wars. However, on a long-term perspective, the cumulative abnormal returns (6-day, 11-day and 15-day CARs) present evidence to the resilience of a specific capital market and show their ability to recover after the attack.

Further on, Figure 4 presents graphically the cumulative abnormal returns for the capital markets in the CEE region on the 6-day window following the outbreak of the Russia-Ukraine war, more precisely from February 24, 2022 to March 3, 2022.

Over the 6-day event window following Russia's invasion of Ukraine, all the capital markets taken into consideration show a cumulative abnormal return, the stock markets in the CEE countries suffering a deterioration. However, from the 11 capital markets analyzed, just 6 show significant negative cumulative returns over the 6-day window: Riga, Budapest, Bucharest, Tallinn, Zagreb and Vilnius. The results reveal that these 6 markets were slower to incorporate the decline in the day of the event, but as the information spread to investors and the news proved right, the prices and returns dropped.

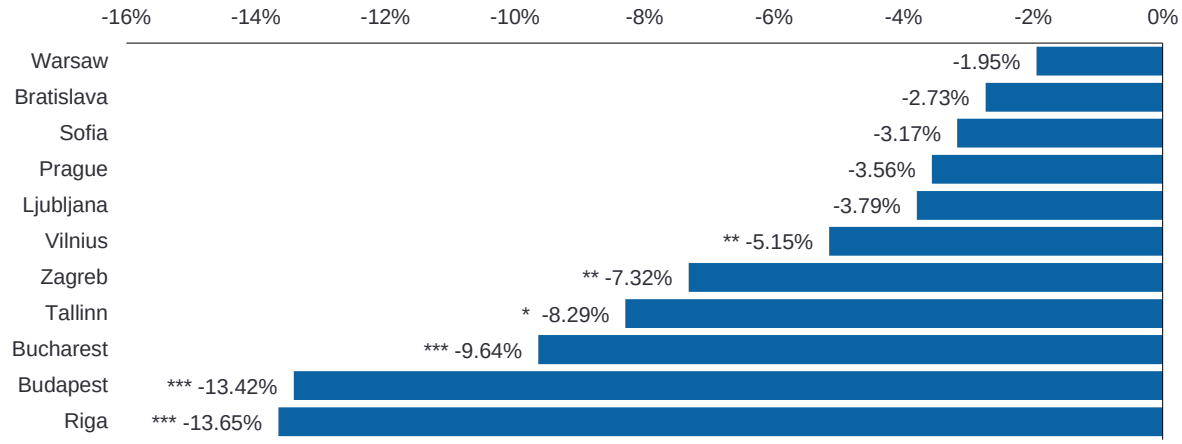


Figure 4. The cumulative abnormal returns of the capital markets of the CEE countries on the 6-day event window following Russia's invasion of Ukraine

Source: Author's own research.

Note: *** means significant at 0.01 level; ** means significant at 0.05 level; * means significant at 0.10 level.

Over the longer 11-day event window, negative cumulative returns persisted in all the markets investigated, while just 8 of them proved to be significant (except Bratislava, Warsaw and Tallinn). Figure 5 presents graphically the cumulative abnormal returns for the capital markets in the CEE region on the 11-day window following the outbreak of the Russia-Ukraine war, more specifically meaning from February 24, 2022 to March 10, 2022.

The negative impact of Russia's invasion of Ukraine is endured even after 2 weeks from the official attack, the initial assumptions of being a short-term war proving to be more and more wrong every day. The capital markets from the CEE region showing the largest cumulative negative return over the 11-day window are Budapest, Bucharest and Prague.

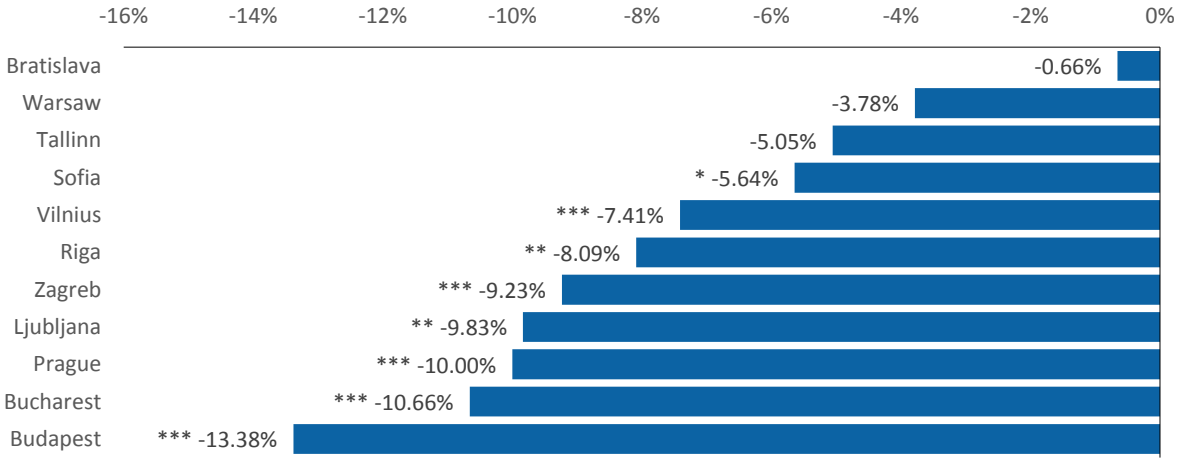


Figure 5. The cumulative abnormal returns of the capital markets of the CEE countries on the 11-day event window following Russia's invasion of Ukraine

Source: Author's own research.

Note: *** means significant at 0.01 level; ** means significant at 0.05 level; * means significant at 0.10 level.

Additionally, over the 16-day event window, 10 out of 11 capital markets considered show cumulative negative returns (except Warsaw). However, only 4 of the declines registered by the markets in the CEE region are significant: Riga, Prague, Zagreb and Vilnius. The findings show a small recovery from the previous week taken into account, the 11-day event window. The cumulative abnormal returns are higher for the 16-day window, yet still negative, showing that the investors start to recover from the initial panic of a war happening in our times.

The cumulative abnormal returns for the capital markets in the CEE region on the 16-day window following Russia's invasion of Ukraine war, more specifically meaning from February 24, 2022 to March 17, 2022, are presented graphically in Figure 6.

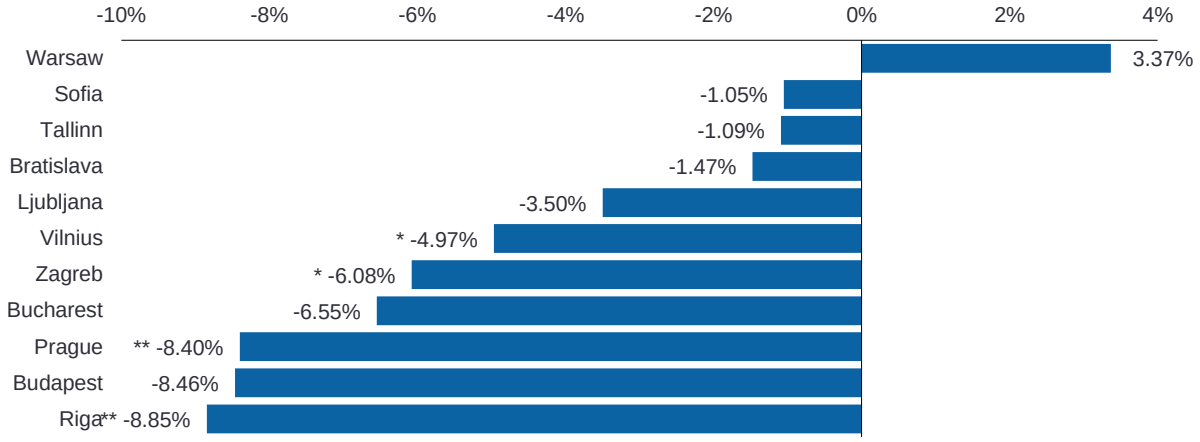


Figure 6. The cumulative abnormal returns of the capital markets of the CEE countries on the 16-day event window following Russia's invasion of Ukraine

Source: Author's own research.

Note: *** means significant at 0.01 level; ** means significant at 0.05 level; * means significant at 0.10 level.

Furthermore, the last column of Table 1 shows the number of trading days needed for each market index from the CEE countries considered to return to the pre-event level, meaning to the price of each index on February 23, 2022.

The findings show that within 20 trading days, 4 of the 11 markets (36%) returned to the level before Russia's invasion of Ukraine. Within 35 trading days following the attack, 7 markets (64%) fully rebounded and returned to their pre-attack level. However, 4 of the markets considered had more than 200 trading days (until December 31, 2022) with a level lower than the one registered before the invasion. More specifically, these capital markets are the ones in Bucharest, Budapest, Prague and Riga. Even if these capital markets show small rebounds during 2022, the indexes' price never increased enough to return to the level before the war outbreak.

However, at the end of 2022 the war between Ukraine and Russia was still ongoing, making it difficult for investors to return to the hopes and expectations they had before the invasion. The continuous nature of this attack, the shift of powers and perceptions together with the implication of multiple global countries through military support and economic sanctions hinder the possibility of several capital markets to incorporate the same level of optimism they had before the invasion. The economic and financial implications (high inflation, surging energy prices, etc.) of this political and military tensions hamper investors' sentiments toward a brighter future.

Conclusion

In conclusion, the stocks' price is a good indication of investors' expectations of market evolution, containing their fears and hopes regarding capital markets' future improvements. Nowadays, news travels fast and information regarding a disruptive event such as an armed attack, a war or an act of terrorism spreads rapidly across countries affecting investors' perceptions and causing them to sell their stocks and target safer investments. The panic selling caused by multiple investors withdrawing at the same time could be reversed by increased hopes that the market will return to the initial trend or could degenerate to prolonged market declines.

The research paper investigates the impact of Russia's invasion of Ukraine on the capital markets from the Central and Eastern European region using the event study methodology. The event date considered is February 24, 2022, as it is the date when Russia's military invasion of Ukraine began. The paper studies the abnormal return recorded by each capital market on the event day, as well as the cumulative abnormal returns for 6-day, 11-day and 16-day event windows following the attack.

The findings show that most of the capital markets recorded sharp declines on the event-day, having a negative abnormal return of approx. 10% for Warsaw and Budapest and above 6% for the capital markets in Zagreb, Vilnius and Ljubljana. Of the 11 capital markets taken into consideration, 9 had significant negative abnormal returns on the event day. For the longer event windows, the negative impact persisted through cumulative abnormal returns recorded for most of the markets. The highest declines were recorded on the 6-day and 11-day event windows as all capital markets considered incorporating the bad news of the war outbreak and lost the initial hope of being a disinformation or a short-term military attack.

Within 35 trading days following the invasion, 7 markets (64%) rebounded and returned to their pre-attack level. However, 4 of the capital markets considered recorded until December 31, 2022 more than 200 trading days with a level lower than the one registered before the invasion. The ongoing nature of this attack makes it difficult for investors to return to the hopes and expectations they had before the invasion, thus the prices of the index for these capital markets didn't increase considerably.

The policy implications of this research refer to the need to understand how military attacks affect stock markets in order to build stronger and more resilient markets. As the global capital markets are connected, policymakers and regulators have to be aware of possible disruptions happening across the world and have to ensure a proper cooperation and communication channel to develop and establish quick recovery plans. At the same time, the financial and banking sector was proved to help capital markets cope with shocks in a better way, thus the importance of building strong and healthy financial systems.

For future developments, research papers could focus on extending the event window analyzed and taking into consideration multiple global capital markets to investigate the impact of Russia's invasion of Ukraine across continents and larger markets.

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Appendix

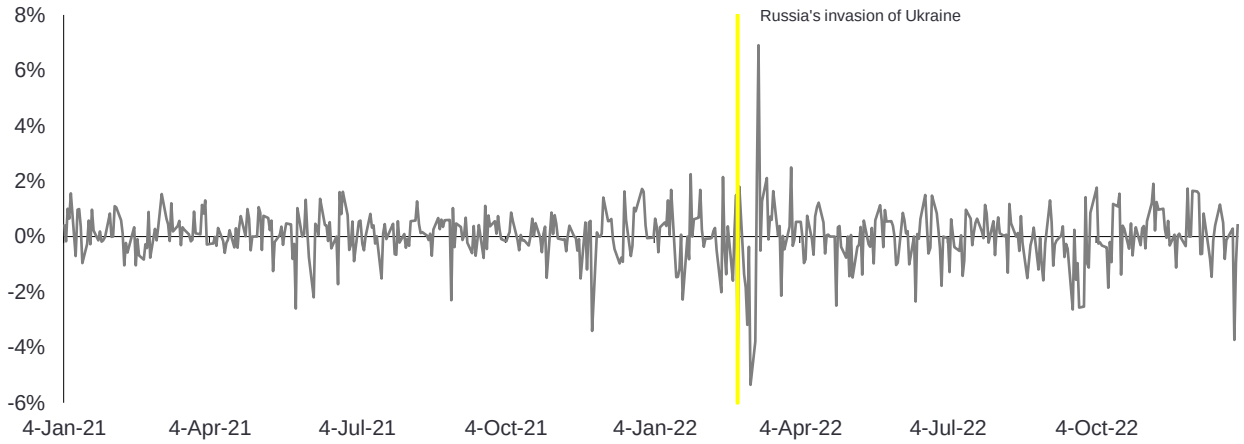


Figure 2.1. The stock market returns on Bucharest capital market (Romania) during 2021-2022



Figure 2.2. The stock market returns on Ljubljana capital market (Slovenia) during 2021-2022



Figure 2.3. The stock market returns on Sofia capital market (Bulgaria) during 2021-2022



Figure 2.4. The stock market returns on Budapest capital market (Hungary) during 2021-2022



Figure 2.5. The stock market returns Zagreb capital market (Croatia) during 2021-2022



Figure 2.6. The stock market returns on Prague capital market (Czech Republic) during 2021-2022



Figure. 2.7. The stock market returns on Riga capital market (Latvia) during 2021-2022

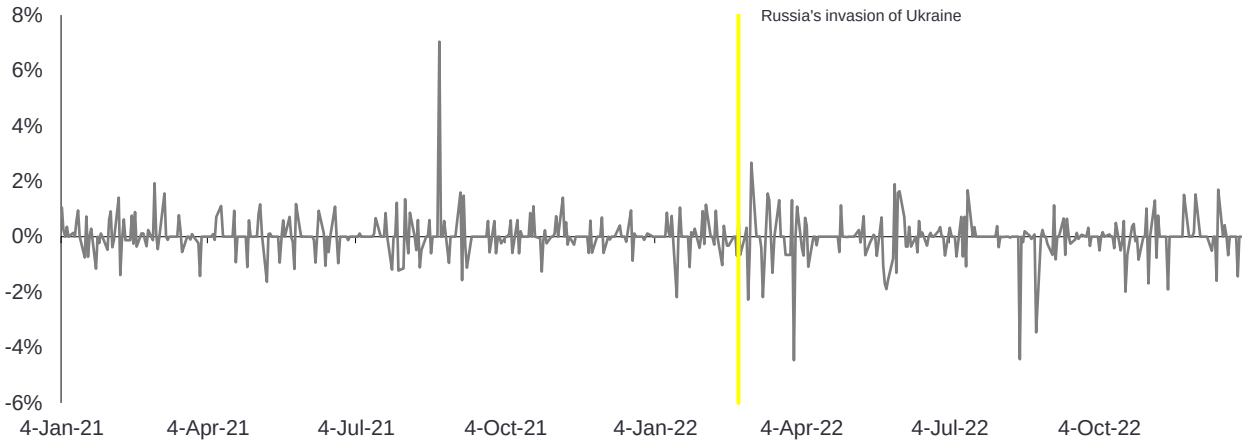


Figure 2.8. The stock market returns on Bratislava capital market (Slovakia) during 2021-2022



Figure 2.9. The stock market returns on Tallinn capital market (Estonia) during 2021-2022

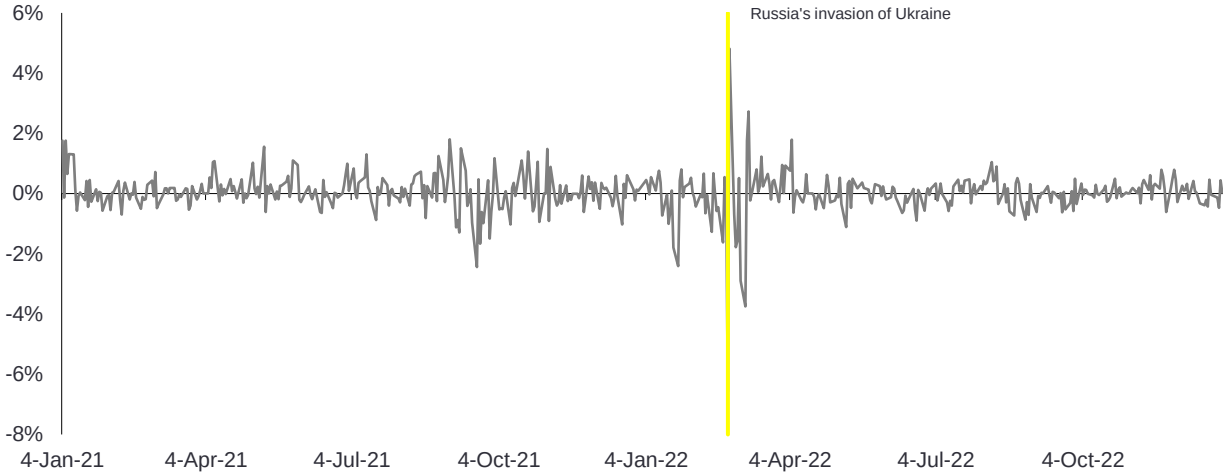


Figure 2.10. The stock market returns on Vilnius capital market (Lithuania) during 2021-2022



Figure 2.11. The stock market returns on Warsaw capital market (Poland) during 2021-2022