


How did advanced emerging stock markets respond to COVID-19 and the Ukraine invasion?



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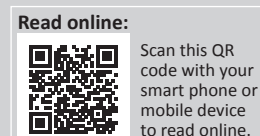
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Orientation: The global economy and stock markets have been severely affected by two recent events, namely, the COVID-19 pandemic and the Russian invasion of Ukraine.

Research purpose: This study aims to establish whether these two events had the same impact on the stock markets of the group of 11 advanced emerging markets and whether individual countries were affected to the same extent by these two events.

Motivation for the study: During periods of instability and uncertainty, emerging markets are usually more vulnerable compared to developed markets. Previous studies have confirmed the presence of herd behaviour relating to emerging markets.

Research approach/design and method: This empirical study used an event study approach to compare the stock market performance for the 30 days before the events with the 30 days after the events. The performance of the countries is further analysed and ranked to determine whether countries were affected similarly by the two events.

Main findings: The COVID-19 pandemic had a much more severe initial impact on the stock markets of the advanced emerging markets compared to the invasion of Ukraine. Regional and country-specific factors were more relevant for the Ukraine invasion, with Eastern European countries more severely affected. There is no indication of herd behaviour by investors.

Practical/managerial implications: Investors seemingly did consider country-specific factors and did not treat stock markets in this group in the same way. There is therefore scope for emerging market countries to benefit from sound fundamentals.

Contribution/value-add: The specific focus on emerging markets as a homogeneous group is a novel contribution.

Keywords: emerging markets; stock market; event study; COVID-19; Ukraine invasion.

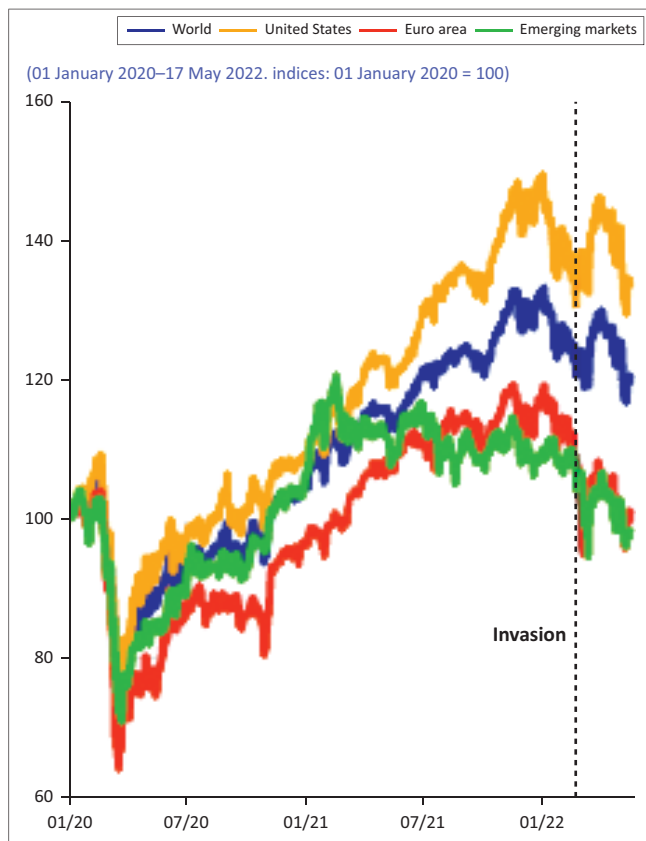
Introduction

Orientation

Uncertainty and global economic shocks usually have a more severe effect on emerging stock markets when compared to developed markets. During these periods, investors generally revert to actions that could be described as 'flight to safety'. Emerging market shares are exchanged for stocks in developed markets, gold and/or currencies such as the US dollar. At the beginning of 2020, global financial markets had recovered from the global financial crisis of 2007–2009 and the European sovereign debt crisis of 2009–2019, only to be confronted by two major events in quick succession. Coronavirus disease 2019 (COVID-19) was declared a global pandemic at the beginning of 2020, and in February 2022, Russia invaded the neighbouring country of Ukraine. The latter event is expected to severely affect future international relations.

The European Central Bank (2022) compared the movement of global stock markets since January 2020 (Figure 1). The impact of COVID-19 is evident in the first part of 2020. While the US stock markets recovered to levels at the beginning of 2020 6 months later, the emerging stock markets needed almost a year.

As evident from Figure 1, the Russian invasion left emerging stock markets vulnerable again, and the realised recoveries and growth of 2 years were wiped out. As was to be expected,



Source: European Central Bank, 2022, *Financial stability review*, viewed n.d., from, <https://www.ecb.europa.eu/pub/pdf/fsr/ecb.fsr202205~f207f46ea0.en.pdf>

FIGURE 1: Stock market trends since January 2020.

the dramatic losses on the emerging stock markets were coupled with unprecedented capital outflows. According to Beirne et al. (2020), outflows during February and March of 2020 were at least three times more than that during the global financial crisis. These outflows from emerging markets exceeded outflows of recent crises and consisted of equity and bond outflows.

The relatively poor performance of emerging markets described above raises questions about potential herd behaviour. Do investors treat all emerging markets the same or do they consider country-specific factors as part of their decision-making? Bikhchandani and Sharma (2000) provided an overview of the literature on herd behaviour. One of their findings indicates that, during periods of declining markets, herd behaviour is more common in emerging markets where information is gathered at higher cost and revealed slower. Filip, Pochea and Pece (2015) attributed increased market volatility to herding behaviour – when investors, as a group, act in similar fashion. Under these conditions, stocks are not priced according to their fundamental values. Considering emerging markets, this may happen if information is not immediate and readily available. In their own empirical study, evidence of herd behaviour is confirmed during 2008–2010 for Romania, Bulgaria, Czech Republic and Hungary, but not for Poland. A more recent study found that herd behaviour exists relating to Singapore, Mexico, Poland, South Africa, China and the Philippines (Loang & Ahmad 2020). Investors are therefore inclined to follow the strategies

of other investors where these countries are concerned and not make their decisions based on own judgement. On the contrary, herd behaviour is not found for Japan, Brazil, Malaysia, Chile and Indonesia, among others.

Research purpose and objectives

Against the background sketched in ‘Orientation’ section, the aim of this article is to investigate the impact of two recent major global events on the stock market returns of selected emerging market countries. Two specific questions are investigated. Firstly, did the outbreak of the COVID-19 pandemic and the Russian invasion of Ukraine have the same impact on the selected stock markets – or, alternatively, which event had the most severe immediate impact? Secondly, were individual countries affected to the same extent by these two events – or did a specific event have a more severe impact on certain countries? A relatively short time period after these events is considered to determine the initial impact before structural factors such as the number of COVID-19 cases per country or the economic consequences of the invasion (restricted Russian gas supply to Europe and potential limitations to global grain exports) came into effect.

As discussed in ‘Literature Review’ section, empirical studies either utilise a global sample (see, for example, Bannigidadmth et al. [2022]) or focus on specific regions (see, for example, Ahmed, Hasan & Kamal [2022]). This article contributes to the literature by focusing on a homogeneous group – the advanced emerging markets – from various regions of the world.

Literature review

Focusing on two earlier crisis periods, Pretorius and De Beer (2014) analysed the impact of the East Asian and Russian crisis, as well as the global financial crisis on selected emerging stock markets. Their sample did not include all the advanced emerging markets but does provide a picture of the relative reaction of certain stock markets. With its origin in the emerging markets, the East Asian and Russian crisis had a much more severe impact on the emerging stock markets. Measured in US dollar, the following negative returns were realised during the period May–October 1998: Russia –81.72%, Brazil –42.24%, South Africa –36.37%, India –32.99%, China –32.78%, Poland –30.02%, Mexico –29.97%, Hungary –29.35% and Thailand –15.66%. During the initial phase of the global financial crisis, March 2007–January 2008, lower negative returns were recorded: China –23.15%, Thailand –21.18%, Poland –19.27%, Brazil –17.30%, Hungary –14.32%, India –13.25%, Mexico –13.04%, South Africa –12.91% and Russia –10.92%. From these calculations, it is evident that the individual stock markets reacted differently during the two crises.

Various empirical studies have explored the impact of COVID-19 on global stock markets, and there are even studies already published on the Ukraine conflict. The rest of

the section provides a summary of the most recent studies in each case.

COVID-19

Del Lo, Basséne and Séné (2022) classified literature on the effect of COVID-19 on stock markets into three main categories: those focusing on stock market reaction to policy decisions by individual countries (including lockdowns, social distancing, limiting of gatherings, etc.), reaction to realised health data (number of COVID-19 cases and/or deaths) and the perceived risk of the pandemic as measured by increased stock market volatility. In their own empirical study, realised volatilities of 11 African stock markets are regressed, in a panel data model, on indicators of abnormal search volume activity and two health indicators (Del Lo et al. 2022). The number of online searches relating to COVID-19 is used as a proxy for perceived risk, while the health indicators consist of the number of confirmed cases and the number of deaths per country. The data confirm the increased volatility experienced by African stock markets during the pandemic – similar to international markets. Increased search volumes relating to COVID-19 are statistically significantly linked to increased stock market volatility, as is the increase in the number of confirmed cases. On the contrary, policy responses, to limit the potential spread of the virus, lowered volatility (Del Lo et al. 2022).

Following an event study approach, Bannigidadmth et al. (2022) empirically determined the impact of policy responses on abnormal returns of 25 global stock markets. Policy responses are represented by monetary stimulus packages, lockdown regulations and travel bans. Their results indicate that in a third of the countries, none of the responses influenced the stock market. With the travel ban found to have the least effect, the overall conclusion is that the negative effect of these policies outweighed the positive effects on stock returns.

Scherf, Matschke and Rieger (2022) also utilised a panel data technique to determine what impact the announcement of lockdown restrictions had on stock market returns. They combined 42 Organisation for Economic Co-operation and Development (OECD) countries with Brazil, Russia, India, China, and South Africa (BRICS) in a panel and regressed daily abnormal returns on news regarding national restrictions. Tighter restrictions were generally coupled with negative abnormal returns. Especially during the earlier period, the initial reaction was deemed to be an underreaction followed by an overreaction a few days later. During the earlier stages of the pandemic, stock markets reacted negatively to the relaxation of restrictions, but during the later stages of the pandemic, they reacted positively. Newly reported cases, included in the analysis as control variables, did not have a significant effect on returns – opposite to the findings of Del Lo et al. (2022).

Ukraine

Boungou and Yatié (2022) investigated the impact of the Ukraine–Russia conflict on the stock markets of 94 countries over the period 22 January – 24 March 2022. Although the

actual invasion took place on 24 February, the researchers started their sample earlier because there were clear signs earlier in the year that such an invasion was imminent. Panel data regressions explain daily stock market returns for this group and confirm the negative effect on global stock markets. The impact is at the strongest 2 weeks after the invasion, but recovers from weeks 3 and 4 onwards. Stock markets of countries closer to the conflict area were more affected than those further away. Countries that condemned the invasion saw a bigger decline in stock market returns than those that did not. South Africa is specifically mentioned as one of the latter.

Ahmed et al. (2022) performed an event study on the stock indices of 584 European firms. They identified the ‘event’ as 21 February 2022, the day Russia recognised the Donetsk and Luhansk regions of Ukraine as the so-called independent states. Firms from bordering countries, Poland, Norway and Finland, form a very small portion of the sample, and no tests were conducted for country-specific effects. Statistically significant negative abnormal returns and cumulative abnormal returns are recorded in a short event window of 3 days before and 3 days after the event. These results differ across industries and countries. Firms generally recorded significant negative abnormal returns, but statistically insignificant positive abnormal returns are estimated for the energy sector. Small and medium-sized firms were more negatively affected compared to large firms. Firms in the Netherlands, Denmark and Switzerland were relatively more negatively affected, while those in the UK displayed a positive reaction.

The Federle et al.’s (2022) study specifically focused on proximity to Ukraine. The analysis includes 16929 firms from 54 countries. The results confirm that countries closer to the affected areas recorded higher negative returns during the 1st week of the turmoil compared to countries further away. This vulnerability is further explained by trade links and the fear of a potential military spill-over effect.

Most of the mentioned studies utilised panel data analysis and included countries with vastly different economic fundamentals and financial markets. Although some studies did include emerging market countries,¹ none of them focused specifically on emerging markets. This study aims to fill that void in the literature by assessing the impact on stock markets of a relative homogeneous group, classified as advanced emerging.

Background on advanced emerging stock markets

The empirical study considers data from the stock markets of 11 advanced emerging markets. This section provides a brief introduction to the 11 markets. Table 1 summarises a

1. Del Lo et al. (2022) included South Africa; Bannigidadmth et al. (2022) included Turkey, Brazil and Poland; Scherf et al. (2022) included South Africa; Boungou and Yatié (2022) included all 11 advanced emerging countries; Federle et al. (2022) included all 11 countries, except Greece.

TABLE 1: Characteristics of stock markets.

Stock market	Market cap (January 2020) US\$	Weekly Sharpe ratio 2 years	Weekly Sharpe ratio 3 years	Monthly Sharpe ratio 5 years
Brazil	2 484 976 100.99	-0.10	-0.09	-0.06
Czech Republic	80 766 184.71	0.04	-0.03	-0.13
Greece	22 410 944.59	0.05	-0.04	-0.05
Hungary	836 210 523.92	-0.04	-0.08	-0.20
Malaysia	554 330 185.41	-0.11	-0.09	-0.29
Mexico	3 821 079 844.19	0.04	-0.03	-0.14
Poland	227 590 988.64	-0.04	-0.06	-0.27
South Africa	362 759 219 802.76	0.02	-0.04	-0.18
Taiwan	25 862 959 634.79	-0.01	-0.01	-0.03
Thailand	7 804 641 095.31	0.01	-0.04	-0.20
Turkey	284 046 474.34	0.28	0.21	0.24

Source: Refinitiv, 2022, Refinitiv Eikon, viewed n.d., from https://solutions.refinitiv.com/eikon-trading-software?utm_content=sitelink&utm_medium=cpc&utm_source=google&utm_campaign=596228_PaidSearchTradingandBankingBAU&elqCampaignId=16981&gclid=CjwKCAjw5pShBhB_EiwAvmnNV7U1eJFr5FI0tssZvPV-8mDcRjAAYyBMAzcre7gdCVv1n9JQ8-VjxoCbwvQAvD_BwE&gclid=aw.ds

few recent characteristics. Based on market capitalisation, as reported on 01 January 2020, the South African Stock market is by far the largest. At the beginning of 2020, it was 12 times larger than the next biggest stock market – that of Taiwan. On the other end of the scale, Greece and the Czech Republic had the smallest stock markets. The South African market was 16 000 times bigger than Greece and 4 500 times bigger than the Czech Republic.

The last three columns of Table 1 report on various Sharpe ratios calculated for the 11 stock markets. Column three roughly covers 2021–2022, column two covers 2020–2022 (which includes the sample of the empirical study in ‘Empirical Study’ section) and the last column covers 2018–2022. Turkey and Taiwan were the best performers for the 5-year period, while Malaysia and Poland were the worst performers. The stock markets of Malaysia, Hungary, Poland and Brazil were the worst over the shorter periods, while Turkey, Czech Republic and Mexico performed the best over the 2- and 3-year periods.

Based on older data, Pretorius and Kabundi (2015) estimated stock market integration from a global sample. For the period 1998–2011, South Africa was found to be the most integrated of the emerging stock markets – estimated at 62.05%. This could be expected because the South African stock market is one of the oldest in the world. The level of stock market integration, measured by the extent to which this specific market is affected by global factors, for the other countries is as follows: Thailand 60.23%, Mexico 59.92%, Hungary 59.52%, Poland 58.33%, Brazil 57.39%, Czech Republic 54.49%, Taiwan 50.56%, Turkey 38.55% and Malaysia 35.00%.

Empirical study

Data

The empirical study includes all countries classified by 2018 as ‘advanced emerging’ according to Financial Times Stock Exchange Group (FTSE). South Africa (SA) is therefore grouped together with Brazil, Czech Republic (Czech), Greece, Hungary, Malaysia, Mexico, Poland, Taiwan, Thailand and Turkey (FTSE 2018). Financial Times Stock Exchange Group proposed that Poland be reclassified from

emerging to developed by September 2018. However, according to the Morgan Stanley Capital International (MSCI) classification (2021), Poland was still regarded as an emerging market in 2021. Therefore, Poland is included in the empirical study. The group of countries allows for potential interesting linkages. South Africa and Russia are both members of the BRICS group, while Poland and Hungary share borders with Ukraine. Considering the expected geo-political impact of the invasion, Poland and Hungary as Ukrainian neighbours and South Africa as a BRICS member could potentially be affected more than the other included countries.

For each of the 11 countries, daily data on the specific stock market index’s closing values were extracted from the online Refinitiv Datastream database. These Thompson Reuters indices are expressed in US dollar, and the similarly constructed indices ensure similarity and comparability. Daily returns are calculated based on the closing index values. The mean values and volatility of the calculated daily returns are used in the analysis.

Method

The empirical analysis is based on an event study approach. Event studies analyse the behaviour of security prices in periods before and after a specific announcement or event (Bowman 1983). The analysis usually starts with the identification of an event. Then, a model is estimated, and based on the model, excess or abnormal returns are calculated. Statistical tests finally test a specified null-hypothesis – usually that a specific variable had the same value in the period before the event compared to the period after the event.

At least two of the studies mentioned in ‘Literature Review’ section followed the steps as set out above – see Scherf et al. (2022) and Bannigidadmth et al. (2022). Regression analysis estimates normal returns on time series data before the event. The predicted values for a period after the event (based on the model) are compared with the realised values in the period after the event. While this is the usual approach for event studies, Huntington-Klein (2021) proposed an alternative approach. Under the assumptions that only a specific event leads to differences in security prices and that there is no time effect, outcomes before and after the identified event can merely be compared. This approach is applicable if a relatively short time span is considered (Huntington-Klein 2021).

Research design

The first step in our event study is to identify the relevant event. With regard to the COVID-19 pandemic, two potential dates or events were considered. The first option was 11 March 2020 when the World Health Organization (WHO) declared COVID-19 a global pandemic. However, even before this declaration, the world had taken note of the virus and markets started to react. Following Liu et al. (2020), 20 January 2020 was chosen. On this day, a Chinese spokesperson admitted that the novel virus could be transmitted among humans via person-to-person contact, and it attracted global media

coverage. For the Ukraine invasion, 24 February 2022, the date of the Russian invasion, is regarded as the date of the event.

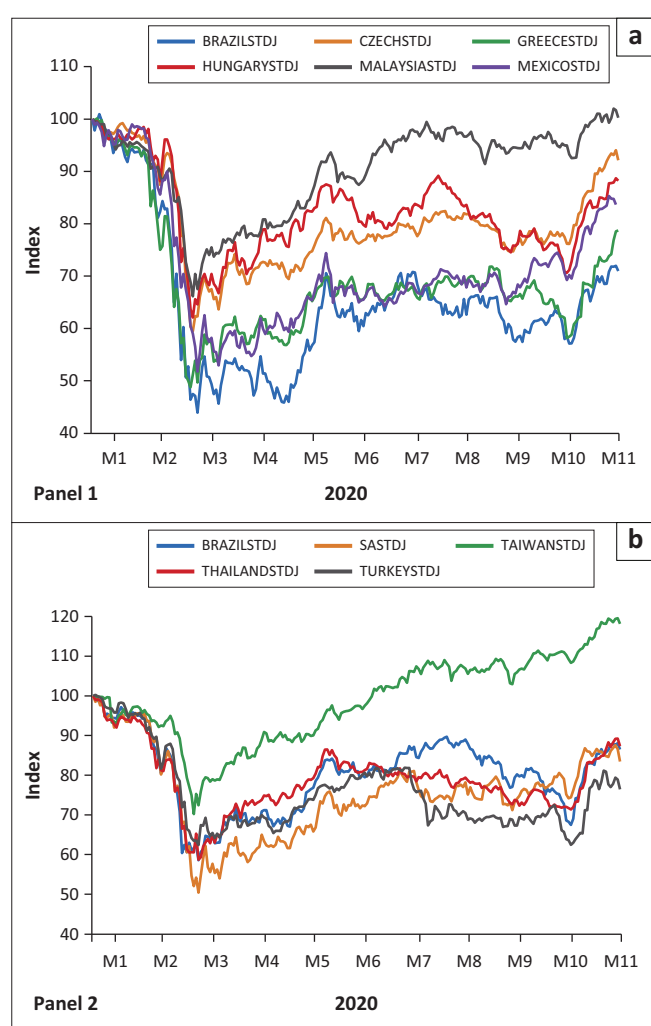
Before the actual statistical analysis, the data description starts with a graphical representation of the 11 stock market indices – all standardised and set equal to 100 on the day before the event. This provides an initial indication of the movements of the indices relative to each other and over time. In order to compare these observed movements further, returns are calculated for specific intervals after the event: 1, 2 and 3 weeks as well as 30 days. The final event analysis compares average returns and volatility for 30 days before the event with the same calculated values 30 days after the event for each stock market. Various tests of equality are performed in order to test the null hypothesis that mean returns and volatility of calculated daily returns before and after the event are equal. Event studies typically

compare periods before and after an event – in some cases for time periods of several years (Binder 1998). The choice of 30 days allows for the capturing of the immediate reaction of stock markets. A longer period after the event may also reflect the effect of country-specific factors such as the recorded number of COVID-19 cases, COVID-19 deaths, policy responses to curb the transmission of the virus, the economic consequences of the Ukraine conflict, and the movement of refugees, among others.

Results

COVID-19 as event

Figure 2 portrays the relative movement of stock market indices since 20 January 2020. The sample of 11 countries was split into two panels in order to allow for better comparisons among the line graphs.



Indices = 100 (20 January 2020).

FIGURE 2: Stock market movements since 20 January 2020 (a-b).

TABLE 2: Stock market returns after specified periods.

Period	Brazil	Czech	Greece	Hungary	Malaysia	Mexico	Poland	SA	Taiwan	Thailand	Turkey	USA
+1 week	-3.89759	-1.85504	-1.87791	-2.68679	-0.96684	-5.14358	-5.19704	-5.28037	-0.73897	-5.09167	-2.69866	-2.57948
+2 weeks	-5.02847	-2.31413	-5.12665	-3.72887	-5.81147	-4.7434	-5.75683	-7.52336	-7.1433	-7.98784	-4.21418	-2.34436
+3 weeks	-8.20172	-2.21329	-6.90352	-2.9164	-5.25713	-3.90008	-5.31151	-6.55264	-4.89958	-5.98484	-5.52878	0.582683
+30 days	-5.87819	-3.24327	-6.1533	-1.48024	-5.47818	-1.76936	-5.4723	-4.41464	-3.59653	-7.69378	-5.89478	1.792347

SA, South Africa; US, United States.

It is evident from the figure that the COVID-19 pandemic truly was a global event. All the indices lost value after 20 January 2020 and lost even more during March 2020 after the WHO declared it a global pandemic. Taiwan in Panel 2 and Malaysia in Panel 1 were the best performers recovering to January levels in July and August, respectively – while no other index could do so by the end of 2020. At the other side of the spectrum, Brazil, Mexico, South Africa and Greece reached the lowest turning points.

Table 2 summarises the stock market returns for each country after specific specified time periods after 20 January. The different rows indicate returns after 1 week, 2 weeks, 3 weeks and 30 days. Data on the USA stock market performance is included in the table to allow for some comparisons.

The USA realised the highest losses after the 1st week, started to recover after 2 weeks and displayed a slight positive return after week 3. This trend continued into the 30-day period. The 11 emerging markets reacted differently. All of the returns are negative, even after 30 days, with no sign of recovery similar to the USA. Mexico is the only market where returns, even while still negative, improved continuously after the 1st week. Except for Brazil and Greece, the rest of the stock markets performed the worse 2 weeks after the event.

Results of the formal event analysis, comparing mean daily stock market returns 30 days before the event (indicated by pre) with returns 30 days after the event (indicated by post) as well as the variance of the 30 daily returns before and after the event, are presented in Table 3.

All of the stock markets realised positive average returns in the 30 days before the event and negative average returns

TABLE 3: Results of equality tests.

Country	Mean return			Variance		
	Pre	Post	Test [†]	Pre	Post	Test [‡]
Brazil	0.213938	-0.541120	0.0964*	1.036249	2.198844	0.0117**
Czech	0.103449	-0.368650	0.0407**	0.475322	1.125511	0.0170**
Greece	0.185843	-0.895040	0.0292**	1.249100	2.311880	0.1233
Hungary	0.007982	-0.261127	0.4170	0.871774	1.574220	0.1693
Malaysia	0.160729	-0.415668	0.0062***	0.578550	0.939476	0.1708
Mexico	0.390884	-0.400546	0.0269**	1.015869	1.606061	0.0594*
Poland	0.207454	-0.605336	0.0189**	0.878295	1.603838	0.0934*
SA	0.209993	-0.598509	0.0603*	0.866470	2.117508	0.0555*
Taiwan	0.194265	-0.255375	0.1308	0.715340	1.429723	0.2647
Thailand	0.074900	-0.685732	0.0351**	0.816591	1.728432	0.1669
Turkey	0.293564	-0.593088	0.0223**	1.293294	1.609641	0.4138

[†], Difference in means tested by *t*-test, Satterwaithe-Welch *t*-test, ANOVA *F*-test and Welch *F*-test.

[‡], Difference in variance tested by *F*-test, Siegel-Tukey, Bartlett, Levene and Brown-Forsythe.

*, Significant at 10%; **, Significant at 5%; ***, Significant at 10%.

30 days after. All the stock markets experienced increased volatility after the event – evident in the higher standard deviation (SD) of returns.

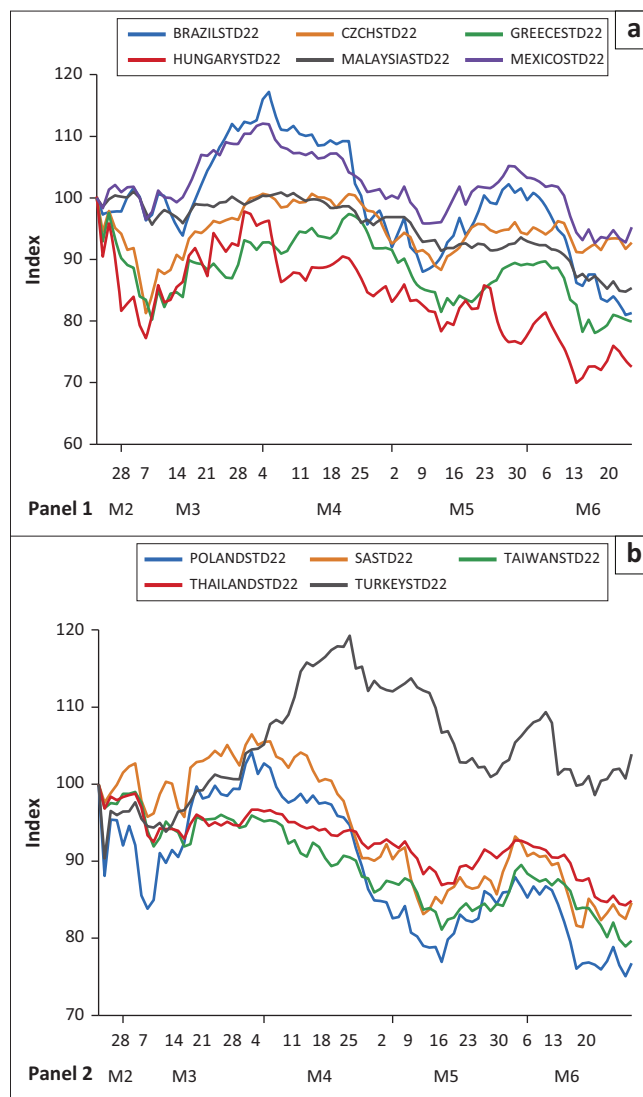
Four statistical tests help to determine whether the before mean value is equal to the after mean value: *t*-test, Satterwaithe-Welch *t*-test, ANOVA *F*-test and Welch *F*-tests. Five test statistics are calculated for the difference in variance test: *F*-test, Siegel-Tukey, Bartlett, Levene and Brown-Forsythe. For certain countries, the outcome is the same regardless of which of the four or five test statistics are considered. In other cases, the outcomes differ. Therefore the 'Test' column reports the highest probability recorded by any one of the four or five tests.

For all the countries, except Hungary and Taiwan, a difference in mean daily stock market returns is confirmed for at least a 10% statistical significance. Considering the relative strength of these indices – see the red line for Hungary in Panel 1 of Figure 1 and the green line for Taiwan in Panel 2 – immediately after the event, the result could have been expected. Again allowing for a 10% level of statistical significance, increased volatility is confirmed for Brazil, Czech, Mexico, Poland and South Africa.

Ukraine invasion as event

Similar to Figure 2, Figure 3 portrays the relative movement of stock market indices since 23 February 2022. The figure again consists of two panels.

At the end of the sample period, 4 months after the invasion, all of the indices, except Turkey, were at levels below their 23 February values. During April, all 11 stock markets started to realise losses. This may indicate the global realisation that the conflict is likely to last longer than an initial attack and of the longer-term macroeconomic impact of the conflict being reflected in share prices. Returning to the research question and focusing on the immediate stock market reaction to the Russian invasion, it is evident that Eastern European countries, such as Poland, Czech Republic, Hungary and Greece,



Indices = 100 (23 February 2022).

FIGURE 3: Stock market movements since 23 February 2022 (a-b).

experienced negative returns. On the contrary, South Africa, Mexico and Malaysia realised initial stock market growth.

Even though it is not formally part of the event study analysis, it is noteworthy that almost all returns after 90 days were negative – including the USA. Mexico and Turkey are the exceptions in Table 4. This corresponds with Turkey's good longer-term performance depicted in Figure 2. Compared to the impact after 60 days, all stock markets were worse off after 90 days. Two weeks after the invasion, all indices were lower than 1 week afterwards – even the USA.

Unlike Table 3, Table 5 does not indicate any common trend regarding daily returns. Some returns were lower before the invasion, and some were lower afterwards. With a lowest probability of 30%, although far from 10%, Thailand is the closest to confirming a difference in means before and after the event. All markets, however, did experience increased volatility in the 30 days after the event. The difference is statistically significant at 10% for seven of the 11 countries.

TABLE 4: Stock market returns after specified periods.

Period	Brazil	Czech	Greece	Hungary	Malaysia	Mexico	Poland	SA	Taiwan	Thailand	Turkey	US
+ 1 week	0.157446	-8.47921	-10.8919	-17.3422	0.06551	1.713062	-5.42986	2.305486	-1.24556	-1.41267	-3.53296	4.188907
+2 weeks	0.303888	-12.3719	-17.7248	-17.1771	-1.99131	0.070926	-10.233	0.302693	-4.84279	-5.82029	-6.19037	0.826401
+3 weeks	-0.26068	-5.49482	-10.5778	-8.37269	-0.99022	4.170486	-0.3177	2.866908	-4.21775	-3.9457	-0.8692	4.408378
+30 days	12.00445	-3.29513	-13.0617	-7.61238	0.185762	8.755001	-0.60903	3.7059	-4.69974	-5.27479	0.650651	7.323814
+60 days	0.333959	-0.97362	-3.71473	-13.2252	-4.04789	2.776768	-10.7116	-9.60549	-11.9968	-7.61376	15.26735	1.251795
+90 days	-0.78836	-5.25517	-13.8352	-14.8455	-8.52436	1.55308	-14.4322	-12.5434	-16.4707	-8.93555	0.91504	-7.88197

SA, South Africa; US, United States.

TABLE 5: Results of equality tests.

Country	Mean return			Variance		
	Pre	Post	Test†	Pre	Post	Test‡
Brazil	0.612899	0.372291	0.6014	1.376686	2.094826	0.0421**
Czech	-0.038960	-0.018895	0.9698	1.065620	2.681122	0.0176**
Greece	0.155313	-0.266711	0.5098	1.409081	3.176911	0.0468**
Hungary	-0.291398	-0.398464	0.9024	1.546571	4.489797	0.0006***
Malaysia	-0.028136	0.033622	0.7780	0.648348	1.001698	0.0501*
Mexico	0.005666	0.277511	0.4607	1.195572	1.608327	0.2465
Poland	-0.372365	0.016239	0.6280	2.093198	3.826942	0.0782*
South Africa	0.158441	0.125612	0.9480	1.798457	2.071501	0.5955
Taiwan	-0.066109	-0.174417	0.7290	0.848217	1.475440	0.0735*
Thailand	0.156848	-0.125542	0.3008	0.768317	1.263258	0.1507
Turkey	-0.002170	0.283712	0.6516	2.415647	2.462962	0.3880

†, Difference in means tested by *t*-test, Satterthwaite-Welch *t*-test, ANOVA *F*-test, Welch *F*-tests.

‡, Difference in variance tested by *F*-test, Siegel-Tukey, Bartlett, Levene, Brown-Forsythe.

*, Significant at 10%; **, Significant at 5%; ***, Significant at 10%.

Discussion

The analysis and results indicate that stock markets of the group of advanced emerging countries were not affected in the same way by recent global events. All 11 countries experienced negative returns after the Chinese announcement. For nine of the 11 markets, the difference in means tests confirmed the difference in the before and after periods. All markets also experienced increased volatility – statistically significant difference for five of the 11 markets.

Reactions after the Ukraine invasion were different. Some markets initially gained ground, while those in Eastern Europe lost ground. No common trends regarding mean returns emerged and there was no statistically significant difference in means before and after. On the contrary, all markets experienced increased volatility, and the increases were statistically significant for seven out of the 11 markets.

The final analysis is done to answer the last objective and determine whether a specific country reacted in the same way to both events. In other words, the same country was worse or best off after the COVID-19 news and after the invasion. Given the event analysis in Table 3 and Table 5, the performances of the 11 countries were ranked for both events based on average returns and volatility after 30 days. A ranking of one is assigned for the highest mean return and lowest SD. These rankings are reported in Table 6.

The rankings in Table 6 do not follow an obvious trend. Greece is a potential exception. The four rankings place the country roughly in the same position for all four indicators, while Brazil, Hungary and Taiwan display varying rankings.

TABLE 6: Rankings according to performance after events.

Country	COVID return	COVID SD	Ukraine return	Ukraine SD
Brazil	6	10	1	6
Czech	3	2	7	8
Greece	11	11	10	9
Hungary	2	4	11	11
Malaysia	5	1	5	1
Mexico	4	6	3	4
Poland	9	5	6	10
South Africa	8	9	4	5
Taiwan	1	3	9	3
Thailand	10	8	8	2
Turkey	7	7	2	7

SD, standard deviation.

TABLE 7: Spearman's rank correlations.

Variable	COVID return	Ukraine return	COVID SD
COVID return	1.000000	-	-
Ukraine return	-0.100000 (0.7699)	1.000000	-
COVID SD	0.700000 (0.0165)	-0.218182 (0.5192)	1.000000
Ukraine SD	0.072727 (0.8317)	0.281818 (0.4011)	0.154545 (0.6500)

SD, standard deviation.

Finally, Spearman rank correlation coefficients are calculated to statistically determine a potential relationship between rankings – see Table 7. The calculated correlation coefficient is reported in the first row, and the corresponding probability is shown in the brackets below.

The rank correlations indicate that there is no significant relationship between mean returns after COVID and after the invasion – with a correlation of -0.1 and probability of 77%. There is consequently no indication that stock market returns of a specific country were affected in the same way by both events. There is also no indication that volatility was affected in the same way – with a correlation of only 0.15 and not significant with a probability of 65%. The only significant coefficient is of the correlation between returns and volatility after COVID. With a correlation of 0.70 and probability of 1.65%, it is evident that countries experiencing higher returns after COVID also experienced less volatility. The same observation cannot be made for the aftermath of the Russian invasion.

Conclusion

The outbreak of the COVID-19 pandemic had a much more severe impact on the stock markets of the advanced emerging markets than the Russian invasion of Ukraine did. The whole group saw their stock markets losing value – similar to the

USA. As such, the pandemic was a truly global event with losses across the globe. The Ukraine invasion did not have the same effect on the selected markets. Regional and country-specific factors came into play and had an impact on the Eastern European countries, closer to the conflict area. There is therefore no suggestion of herd behaviour nor any indication that investors reacted in the same way towards countries in this group.

Lastly, there was also no evidence that specific countries were equally vulnerable during these two periods of instability. Markets with the worst performances after the COVID-19 outbreak were not the same to be worst hit by the Russian invasion. These latest findings are good news for countries being classified as emerging markets. It is often expected that all will be affected by bad news or negative performances relating to one of the group. There is therefore always the possibility to attract investors with solid economic performances and good fundamentals.

While this article focuses on stock markets, it could be interesting to also consider the impact of similar crises on the bond markets of the emerging markets group. It is possible that investments in government bonds of these countries, with relative high yields, could follow different patterns.

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The author has declared that no competing interests exist.

Authors' contributions

A.P. was the sole author of this article. She was responsible for the conceptualisation, data download, data analysis and writing of the article.

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References

- Ahmed, S., Hasan, M.M. & Kamal, M.R., 2022, 'Russia-Ukraine crisis: The effects on the European stock market', *European Financial Management* 1–41. <https://doi.org/10.1111/eufm.12386>
- Bannigidadmth, D., Narayan, P.K., Phan, D.H.B. & Gong, Q., 2022, 'How stock markets reacted to COVID-19? Evidence from 25 countries', *Finance Research Letters* 45, 102161. <https://doi.org/10.1016/j.frl.2021.102161>
- Beirne, J., Renzhi, N., Sugandi, E.A. & Volz, U., 2020, *Financial market and capital flow dynamics during the COVID-19 pandemic*, Asian Development Bank Institute working paper, WP1158.
- Bikhchandani, S. & Sharma, S., 2000, 'Herd behavior in financial markets', *IMF Staff papers* 47(3), 279–310. <https://doi.org/10.2139/ssrn.228343>
- Binder, J., 1998, 'The event study methodology since 1969', *Review of Quantitative Finance and Accounting* 11(2), 111–137. <https://doi.org/10.1023/A:1008295500105>
- Bougou, W. & Yatié, A., 2022, 'The impact of the Ukraine-Russia war on world stock market returns', *Economics Letters* 215, 110516. <https://doi.org/10.1016/j.econlet.2022.110516>
- Bowman, R.G., 1983, 'Understanding and conducting event studies', *Journal of Business Finance & Accounting* 10(4), 561–584. <https://doi.org/10.1111/j.1468-5957.1983.tb00453.x>
- Brooks, R., Ribakova, E., Lanau, S., Fortun, J. & Hilgenstock, B., 2020, *Capital flows report: Sudden stop in emerging markets*, Institute of International Finance, viewed 15 June 2022, from https://www.iif.com/Portals/0/Files/content/2_IIF2020_April_CFR.pdf.
- Del Lo, G., Basséne, T. & Séne, B., 2022, 'COVID-19 and the African financial markets: Less infection, less economic impact?', *Finance research letters* 45, 102148. <https://doi.org/10.1016/j.frl.2021.102148>
- European Central Bank, 2022, *Financial stability review*, viewed n.d., from <https://www.ecb.europa.eu/pub/pdf/fsr/ecb.fsr202205~f207f46ea0.en.pdf>.
- Federle, J., Müller, G., Meier, A. & Sehn, V., 2022, *Proximity to war: The stock market response to the Russian invasion of Ukraine*, CEPR Discussion Paper No. DP17185, viewed 03 August 2022, from <https://portal.cepr.org/discussion-paper/19897>.
- Filip, A., Pochea, M. & Pece, A., 2015, 'The herding behaviour of investors in the CEE stocks markets', *Procedia Economics and Finance* 32, 307–315. [https://doi.org/10.1016/S2212-5671\(15\)01397-0](https://doi.org/10.1016/S2212-5671(15)01397-0)
- FTSE, 2018, *FTSE country classification – March 2018 interim update*, viewed 28 May 2022, from https://research.ftserussell.com/products/downloads/FTSE_Interim_Country_Classification_Review_2018.pdf.
- Huntington-Klein, N., 2021, *The effect: An introduction to research design and causality*, Chapman and Hall/CRC, viewed 15 June 2022, from <https://theeffectbook.net/ch-EventStudies.html>.
- Liu, H., Manzoor, A., Wang, C., Zhang, L. & Manzoor, Z., 2020, 'The COVID-19 outbreak and affected countries stock markets response', *International Journal of Environmental Research and Public Health* 17(8), 2800. <https://doi.org/10.3390/ijerph17082800>
- Loang, O.K. & Ahmad, Z., 2020, 'Social factors and herd behaviour in developed markets, advanced emerging markets and secondary emerging markets', *Journal of Contemporary Eastern Asia* 19(1), 97–122.
- MSCI, 2021, *MSCI Market classification framework*, viewed 28 May 2022, from <https://www.msci.com/our-solutions/indexes/market-classification>.
- Pretorius, A. & De Beer, J., 2014, 'Comparing the South African stock markets response to two periods of distinct instability the 1997–98 East Asian and Russian crisis and the recent global financial crisis', *International Business & Economics Research Journal (IBER)* 13(3), 427–442. <https://doi.org/10.19030/iber.v13i3.8583>
- Pretorius, A. & Kabundi, A., 2015, 'Stock market integration of emerging markets: A factor analysis', *paper presented at the 13th INFINITI Conference on International Finance, 8–9 June 2015, Ljubljana, Slovenia*.
- Refinitiv, 2022, Refinitiv Eikon, viewed n.d., from https://solutions.refinitiv.com/eikon-trading-software?utm_content=sitelink&utm_medium=cpc&utm_source=google&utm_campaign=596228_PaidSearchTradingandBankingBAU&elqCampaignId=16981&gclid=CjwKCAjw5pShBhB_EiwAvmnNV7U1eJFr5FI0tssZVPV-8mDcRjAAYyBMAz-cre7gdCVv1n9JQ8-VjxoCbwwQAvD_BwE&gclid=aw.ds
- Scherf, M., Matschke, X. & Rieger, M.O., 2022, 'Stock market reactions to COVID-19 lockdown: A global analysis', *Finance research letters* 45, 102245. <https://doi.org/10.1016/j.frl.2021.102245>