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Does war spread the herding effect in stock markets? Evidence from emerging and developed markets during the Russia-Ukraine war

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ABSTRACT

This paper investigates the influence of the Russia-Ukraine conflict on herding behavior in global stock markets. Examining MSCI World and MSCI Emerging indexes alongside Russia, the study explores imitation tendencies before the invasion, immediately after commencement of war, and during an extended war period. Findings reveal that emerging markets facing heightened geopolitical risk, either due to their proximity to the conflict or to commercial interests in energy markets, exhibit herding during the initial war phase. This analysis sheds light on the impact of geopolitical events on financial market dynamics, particularly in emerging economies.

1. Introduction

On February 24, 2022, after several months of great uncertainty, the Russian army entered Ukraine, starting an armed conflict which is still active. This confrontation has caused a notable increase in geopolitical risk (GPR) in international financial markets and affected the global economy, partly due to a significant increase in uncertainty.

The financial literature has documented the negative impact of GPR on markets (Choi, 2022; Dimic et al., 2015). However, this negative evolution does not necessarily unfold in the same manner across all markets. Markets which share specific characteristics may exhibit a similar reaction among themselves, and differ from those which lack such features. The emergence of intense negative market sentiment, such as in the outbreak of war, is linked to the manifestation of irrational behaviors (Stambaugh et al., 2012; Economou et al., 2018) and simultaneously amplifies linkages between markets (Nitoi and Pochea, 2020). In this paper, we propose that the evolution of markets during high GPR periods could be associated with herding, considered an irrational behaviour and a risk amplification channel (Cai et al., 2019) in the case of Black Swan-type events.[1] Given the negative impact of the Russian-Ukrainian war observed on the financial markets, our purpose is to detect if herding appears at the outbreak of the war and whether it is a common reaction in countries sharing similar characteristics.

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[1] A Black Swan, according to Taleb (2007), is an extremely rare and unpredictable event that can strongly impact the immediate present. The war in Ukraine is considered a Black Swan because, despite geopolitical tensions, an invasion by Russia was not considered a real possibility until it finally occurred.

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Behavioral finance suggests that intense emotional reactions, such as panic, fear or euphoria, could lead investors to make irrational decisions. Herding behavior is one of the best-known psychological phenomena and its appearance has been detected in times of exceptional upheaval, such as financial crises (Mobarek et al., 2014) or the COVID-19 pandemic (Espinosa-Méndez y Arias, 2021), contributing to destabilizing markets.

To our knowledge, this is the first study which analyzes the imitative behavior of investors internationally in this turbulent period. Given that herding can contribute to market instability and systemic risk (Cont and Bouchaud, 2000; Chang et al., 2020), lead to market inefficiencies and mispricing (Bouri et al., 2021; Mnif et al., 2019), aggravating market volatility, and increasing the fragility of the financial system (Kremer and Nautz, 2013), its presence could reduce the effectiveness of diversification and risk management strategies. This paper aims to contribute to showing if imitative behavior appears in a specific high GPR situation, the outbreak of the Russia-Ukraine war, and how it may happen, because its consequences have significant implications for investors, regulators, and policymakers in their efforts to monitor market dynamics and mitigate potential adverse effects. The large sample used, which includes developed and emerging markets and markets geographically close to and distant from the conflict, allows us to draw robust and generalizable conclusions.

2. Literature review

2.1. Impact of the Russia-Ukraine war on stock markets

The impact of the Russia-Ukraine war on international markets has been extensively studied. Liadze et al. (2022) highlighted its significant impact on the global economy compared to other conflicts. Studies, such as those by Boubaker et al. (2022), Yousaf et al. (2022), and Kamal et al. (2023), have consistently documented a negative relationship between the war and returns in global stock markets. Additionally, Qureshi et al. (2022) emphasized an increase in risk beyond the Russian and Ukrainian borders. However, Nerlinger and Utz (2022) found that the negative impact was not universal, particularly in the energy sector. In fact, the recent literature has focused on energy and commodity markets, exploring their relationship with other markets, as evidenced by Adekoya et al. (2022), Wang et al. (2022), Fang and Shao (2022), Fiszeder and Małecka (2022) or Lo et al. (2022).

The literature review reveals a consensus on the negative impact of the Russia-Ukraine war on global stock markets, but highlights the complexity of the war's impact on global financial markets and the need for further research to understand the nuanced effects across different market segments.

2.2. Herding effect in financial markets. A brief review of the literature

Herding or imitative behavior is said to exist when investors decide to trade following either the transactions of those they consider to be better informed, or the market consensus, instead of following their own information or beliefs (Blasco et al., 2012).[2]

Christie and Huang (1995) and Chang et al. (2000) proposed well-known models for detecting herding based on aggregate data, focusing on the cross-sectional dispersion of returns. However, the literature presents inconclusive evidence regarding the impact of financial crises and turbulent periods on investor behavior. While some studies, such as those by BenMabrouk and Litimi (2018) and Mobarek et al. (2014), conclude that herding increases during periods of stress, others, including Andrikopoulos et al. (2017) have observed a decrease in herding behavior during such periods. However, the specific effect of an increase in the GPR on investor behavior has received limited evaluation. The invasion of Ukraine by Russia provides an appropriate scenario to analyze how GPR can affect investor imitative behavior.

3. Database and methodology

The analysis includes the main markets of the 23 countries belonging to the MSCI World Index and the 24 countries included in the MSCI Emerging Markets Index. Additionally, Russia has been included in the study.

A database free of survivorship bias has been built by compiling the daily closing prices of the assets traded in the aforementioned markets between January 2021 and February 2023. The analysis period commences in 2021, aiming to isolate the results from any initial impacts the COVID-19 pandemic might have exerted on the markets. To position the outbreak of the war approximately in the midpoint of the study's time horizon, we have considered a period of around 2 years.

The prices have been obtained from the Refinitiv Datastream database. To avoid problems arising from including extremely illiquid assets, those assets that were not traded in at least 15% of the sessions in which they were "live" have been eliminated from the sample.

The measure we use to detect the presence of imitative behavior is that proposed by Chang et al. (2000). The intuition underlying this measure is that a low dispersion of individual returns around the average market return indicates that market participants follow correlated trading patterns around the said return, considering it as a proxy for the market consensus. We follow this approach because, unlike the measure proposed by Christie and Huang (1995), it does not assume the existence of herding only during extreme price movements, but rather overcomes this limitation by considering the possible presence of this phenomenon under all market conditions. The measure is defined as follows:

[2] To expand the information, it is recommended to consult recent bibliometric compilations and analyses, such as those by Kallinterakis and Gregoriou (2017) or Choijil et al. (2022).

$$CSAD_{j,t} = \frac{1}{N}\sum_{i=1}^{N}\left|R_{i,j,t} - R_{m,j,t}\right| \quad (1)$$

where N is the number of assets in market j on day t, $R_{i,j,\,t}$ is the return on asset i on day t, and $R_{m,j,\,t}$ is the simple average of the return of the N assets listed on market j on day t.[3]

According to standard asset pricing models, the relationship between CSAD and market returns should be linear and increasing. However, if investors follow the market consensus, this relationship would become nonlinear and even decrease. For this reason, a nonlinear specification that includes a parameter that captures nonlinearities in the relationship between CSAD and market returns is used:

$$CSAD_{j,t} = \beta_0 + \beta_1\left|R_{m,j,t}\right| + \beta_2 R^2_{m,j,t} + \varepsilon_t \quad (2)$$

where $R_{m,j,\,t}$ is the average return of market j on day t and ε_t is the error term for day t. In the case of herding towards the market consensus, β_2 will take negative values and be significantly different from 0, indicating that CSAD no longer has a positive linear relationship with returns.

We estimate the model in Eq. (2) for each country for different subperiods.[4] The first subperiod ranges from January 2021 to February 23, 2022, considered as the period before the invasion; the second, from February 24[5] to May 9, 2022, begins on the day Russian troops entered Ukraine and lasts until the annual so-called Victory Day in Russia, then considered a key date which could notably change the course of the war, creating expectations of the possibility of a Russian announcement of victory or significant progress in the war[6]; finally, the third subperiod runs from May 10, 2022 to February 2023, corresponding to an extended war period, since the conflict remains active. Both the second and third subperiods include months in which the conflict was in progress. However, it has been considered relevant to distinguish between the beginning of the war, when there was greater volatility and uncertainty in the markets, and the subsequent period, which we have called "extended war", in which, although the conflict remained active, it no longer represented an unexpected novelty.

4. Results and discussion

Table 1 shows the results of estimating Eq. (2) for the MSCI World countries. Among developed markets, negative coefficients are only detected in Canada, New Zealand, Singapore, the United Kingdom and Italy. In the first three, herding disappears in the initial period of the war, indicating that at those times investors stopped following the market consensus. This result is consistent with Ferreruela and Mallor (2021), who observe how imitative behavior disappears in turbulent periods such as the 2008 Global Financial Crisis and the COVID-19 pandemic. However, the results corresponding to Italy show the existence of herding during both the initial and the extended war period. At this point it is important to note that Italy is one of the biggest importers of Russian energy in Europe. In fact, during the period 2020–2021, Italy increased its imports from Russia by 82.6%[7].

The estimation results for the MSCI Emerging countries and Russia are shown in Table 2. In line with previous literature, herding behavior is shown to be much more widespread in this group (11 of 25 countries show significantly negative β_2 coefficients in at least one subperiod). However, imitative behaviour disappears during the initial war period in some markets where herding has been detected before the war. Nonetheless, in the Czech Republic, Hungary, Poland and Turkey, the markets geographically closest to the conflict, herding appears during the war. This could indicate that countries which share geographical proximity often face similar geopolitical risks due to their interconnected histories, cultural ties, political interactions, overlapping interests and strategic concerns. As a result, they tend to react similarly to uncertainties that threaten their shared stability and security. Proximity may foster a negative sentiment of mutual vulnerability, leading neighboring countries to adopt analogous responses (herding in this case) to geopolitical challenges. Our results are consistent with the "proximity penalty" described by Federle et al. (2022) and confirmed by Martins et al. (2023a,b) in the markets of those countries closest to the conflict zone, partly driven by a perceived increase in disaster risk. On the other hand, Tajaddini and Gholipour (2023) found decline in the value of stock market indices in response to the Russia-Ukraine war was sharper in countries that have stronger trade ties with Russia and Ukraine, whereas countries with more diversified trade relationships may have experienced a less pronounced stock market reaction to the conflict. This result also supports our general findings of no herding in developed markets.

Herding is also observed at the beginning of the war in Kuwait, Qatar, Saudi Arabia and the United Arab Emirates. These are main

[3] The descriptive statistics for the return and CSAD variables have been omitted for brevity but are available from the authors upon request.

[4] We adopt the ordinary least squares (OLS) estimation procedure using heteroskedasticity-consistent standard errors. Lags of the dependent variable (typically one) have also been included if required by the regression process.

[5] The military invasion of Ukraine on February 24, 2022, marked a pivotal moment in the ongoing conflict. By commencing the analysis on this date, we can capture the immediate aftermath of the invasion and assess the war's implications on the stock markets. Furthermore, this date is the reference in most studies about the impact of this war (e.g. El Khoury et al., 2023; or Theiri et al., 2023).

[6] The Moscow market was closed between February 28 and March 24, 2022, due to the exacerbated volatility caused by international sanctions imposed on Russia following the invasion.

[7] Observatory of Economic Complexity (OEC) https://oec.world/es/profile/country/ita?yearlyTradeFlowSelector=flow1&flowSelector1=flow1 on 14th January 2024

Table 1
Estimation of herding in the different subperiods. MSCI World.

	Pre-war	*War*	*Extended war*
Austria	0,7205	3,4945	6,3681
Belgium	5,7550***	11,9673***	−0,3587
Denmark	−1,4435	−0,2325	5,9707
Finland	0,2190	−1,0536	1,1877
France	3,7046**	0,1618	2,2148
Germany	1,5911*	1,2821	−0,0607
Ireland	−2,1366	−9,5303	9,3944
Italy	−0,8701	−2,4856*	−8,7203***
Netherlands	4,4764***	1,0703	0,1100
Norway	−0,6849	5,6688	6,3859***
Portugal	−1,4385	20,4820*	24,8450**
Spain	3,1203	−4,8632	−2,5878
Sweden	0,9131	−0,2197	−0,3532
Switzerland	9,3274***	5,0560	−0,5899
United Kingdom	−1,1281	−3,3997	−8,1594**
Israel	−0,6322	−1,3307	−3,0404
Australia	1,5020	−0,4590	−2,2554
Hong Kong	−0,2533	3,9066	3,5360
Japan	4,3453**	−0,3230	14,0783***
New Zealand	−9,5354**	2,8008	−5,6333
Singapore	−14,1389*	−4,9090	−4,7600
Canada	−4,6392***	0,2106	−3,9870
United States	−5,6599	7,5367	2,4245

The table shows the results corresponding to the estimation of the model in Eq. (2) for each of the countries and subperiods studied: $CSAD_t = \beta_0 + \beta_1|R_{m,t}| + \beta_2 R^2_{m,t} + \varepsilon_t$. For reasons of space, only the value of the β_2 coefficient is shown. This coefficient captures the presence of imitative behavior.

*** indicates that the coefficient is significant at the 1% level,.

** indicates significance at the 5% level, and.

* indicates significance at the 10% level.

Table 2
Estimation of herding in the different subperiods. MSCI Emerging + Rusia.

	Pre-war	*War*	*Extended war*
Russia	−0,1158	−4,9127***	−0,4539
Czech Republic	4,4029	−12,5848*	12,5056
Greece	−4,8521	−0,6236	−4,0302
Hungary	−11,7501**	−6,2233***	3,7205
Poland	−2,4360***	−0,6343*	3,3779
Turkey	−2,9172***	−3,0094***	−1,2255***
Kuwait	−15,7905***	−115,9703*	−6,1840**
Qatar	−0,0622	−45,7799**	2,9545
Saudi Arabia	0,8352	−5.4283*	−0.1952
UAE	−10,8260*	−22,0255*	−2,4525
Egypt	5,0727***	−0,6671	4,0966***
South Africa	4,6409	−10,4507	16,7717
China	0,7163	0,3600	−1,8734
India	−4,5855	−3,1230	1,4687
Indonesia	0,9358	11,5815*	−3,5343
Korea	0,1339	4,8402	1,7532*
Malaysia	1,7694	−3,0410	3,3861
Philippines	2,6154*	−9,9299	5,2316
Taiwan	−1,6884	1,8945	3,9068***
Thailand	2,8732	1,2899	5,6562***
Brazil	1,2620	12,2562***	9,0076***
Chile	−0,9485	40,0493*	−5,2938*
Colombia	−8,9890***	4,3343	−8,3941
Mexico	8,3440	18,9439*	12,5281
Peru	−3,8428**	−4,5175	−20,3475*

The table shows the results corresponding to the estimation of the model in Eq. (2) for each of the countries and subperiods studied: $CSAD_t = \beta_0 + \beta_1|R_{m,t}| + \beta_2 R^2_{m,t} + \varepsilon_t$. For reasons of space, only the value of the β_2 coefficient is shown. This coefficient captures the presence of imitative behavior.

*** indicates that the coefficient is significant at the 1% level,.

** indicates significance at the 5% level, and.

* indicates significance at the 10% level.

oil-producing countries with large gas reserves and, therefore, deeply involved in mitigating the effects of possible cuts in energy imports from Russia. The results observed in this region could be linked to the fact that the conflict has triggered significant spillover effects, particularly those originated in the energy sector, impacting countries with vested interests in this domain and subsequently affecting stock markets globally. The interconnectedness of the global economy, coupled with the critical role of energy, underscores how geopolitical conflicts can cause widespread economic consequences and spillover effects on stock markets. Previous research has shown evidence of herding behavior in the stock markets of the Gulf Cooperation Council (GCC)[8] countries, particularly during periods of excess volatility and crisis (Balcilar et al., 2017; Gabbori et al., 2021; Youssef and Mokni, 2023). Ulussever and Demirer (2017) find that herd behavior in these markets is significantly affected by developments in the oil market, particularly during periods of extreme positive changes in the price of oil, as was the case during the initial period of the Russian-Ukrainian war.

Finally, we present the results of the Russian market. In this case, herding is detected (consistent with Bougatef and Nejah, 2023) at the beginning of the war but subsequently disappears. (It must be taken into account that the initial period is limited because the Russian market remained closed for a month after the start of the invasion).

The results suggest that there are clear differences in herding behavior between developed and emerging markets, with a more significant presence in the second group. In particular, a close relationship between herding behaviour and GPR seems to exist. The only markets that have shown herding behavior during the first months of the invasion are (1) those in the emerging countries geographically close to the conflict, (2) those emerging markets that are oil and gas producers, and (3) Italy, the developed country that had noticeably increased its dependence on Russian products.[9]

5. Conclusions

This work analyzes the relationship between GPR and the herd behavior of investors in the context of the Russian-Ukrainian conflict that began in February 2022, using data corresponding to the markets of the MSCI World and MSCI Emerging indexes, together with Russia. Three subperiods are studied, one prior to the war, another corresponding to the first two and a half months of the conflict, and a third called “extended war”, in which the conflict is still active but the impact on financial markets has softened. The measure of Chang et al. (2000) is used to estimate the presence of herding towards the market consensus.

The main contribution of the paper is showing that emerging countries sharing borders with the war zone and those competing with Russia in the energy market are the ones experiencing herding during the initial phase of the war. In developed markets, only Italy, highly dependent on Russian oil and gas, shows some herding evidence at the outbreak of the conflict.

In the case of war, proximity and significant energy dependence foster a negative sentiment of mutual vulnerability, leading neighboring stock markets and non-neighboring but crucially strategically-related markets to herd.

These results highlight the need to undertake future research that helps explain how herding occurs in markets, whether there is a transmission mechanism between markets, and how the resulting consequences can be alleviated. These new lines of research should examine, among other issues, whether the mimetic effect is irrational or intentional, whether there are spillover effects between different market segments, and how effective risk management strategies and policy interventions can be designed to mitigate the impact on market stability and investor confidence.

In sum, high geopolitical risks increase uncertainty and reduce ability to process information and consequently may cause herding behavior in the stock markets that are neighbors to the conflict zone, as well as in other countries with significant overlapping strategic interests, as these countries tend to react similarly to threats to their shared stability and security.

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CRediT authorship contribution statement

Natividad Blasco: Writing – review & editing, Supervision, Project administration, Funding acquisition, Conceptualization. **Luis Casas:** Writing – original draft, Methodology, Investigation, Formal analysis, Data curation. **Sandra Ferreruela:** Writing – review & editing, Visualization, Methodology, Formal analysis.

Declarations of competing interest

None.

[8] The GCC comprises Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates.

[9] In order to ensure the reliability and robustness of our findings, we conducted additional tests following the methodology outlined by Chiang and Zheng (2010). The outcomes of these supplementary tests closely mirror the results that have been previously discussed in this study. Since most results remain unchanged regarding the sign and significance of the coefficients, we report only those from the first model to save space. The unreported results are available upon request.

Data availability

The authors do not have permission to share data.

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