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Assessing the Impact of the Russia-Ukraine War on Industry-Specific Stock Market Performance in India

Abstract

The Russia-Ukraine war brought a wave of economic uncertainty, prompting questions around how firms respond and how markets react to such geopolitical disruptions. While past research has mostly focused on country-level effects, there's less work on how individual firms' communication during crises affects investor behaviour. This study analyses how 81 NSE-listed Indian firms across five major sectors responded to the Russia-Ukraine war through their earnings calls, and how the stock market interpreted these disclosures. Using earnings call transcripts from February 24 to June 15, 2022, firms that explicitly referenced the war were classified as the treatment group, while those that did not formed the control group. We employ an event study methodology to compute cumulative abnormal returns (CARs) and conduct textual analysis to derive sentiment scores and an uncertainty indicator. We find that treatment firms in the Oil and Gas and Energy sectors experienced significantly higher CARs vis-à-vis their sectoral control groups, whereas Auto, FMCG, and Metal firms saw significantly lower CARs vis-à-vis their respective control groups. While sentiment analysis suggested that sentiment scores had no statistical effect on CAR differentials, uncertainty-related language had a positive and significant association overall, though with negative effects in consumer-facing sectors. These findings offer insights into investor interpretation of firm narratives during geopolitical crises.

1. Introduction

Geopolitical shocks have cemented their position as some of the most prominent drivers of financial market volatility over the last couple of years. The wider world no longer depends on and limits the influence of wars, sanctions, or tensions that originate within a certain region; they spill over into commodity prices, capital flows, and investor sentiment, along with trade-related linkages. Earlier research has revealed that geopolitical shocks influence the economy in many ways. These shocks have been associated with changes in commodity markets (Gong and Xu, 2022), liquidity adjustments (Jopp, 2020), fluctuations in exchange rates (Salisu et al, 2022), and even the overall instability of firms (Phan et al., 2022).

The Russia-Ukraine war has become a stated example of that particular situation, beginning in February 2022. After prolonged political tension, the sudden onset of armed conflict triggered a series of disruptions to the world economy: crude oil prices surged, supply chains were disrupted due to sanctions, and investor uncertainty rose sharply (Zhou et al., 2022; Umar et al., 2022). The early phases witnessed turbulence on financial markets mainly in emerging countries. Some studies have, in fact, investigated how the war has affected stock indices and market trends (Boungou and Yatie, 2022; Abbassi et al., 2022).

Despite being geographically distant from the warzone, India experienced immediate economic consequences due to its dependence on oil imports, exposure to global capital flows, and the heightened volatility in global markets. While the humanitarian cost of the conflict was severe, the economic ramifications were also huge. India's retail inflation reached an eight-year high by April 2022, driven largely by rising fuel and food prices.

The Reserve Bank of India was forced to respond with a tightening cycle earlier than expected, and the Indian rupee depreciated notably against the US dollar. Foreign exchange reserves came under pressure, and foreign portfolio investors (FPIs) withdrew large volumes of capital from Indian equity and debt markets. In March 2022 alone, over ₹45,000 crore exited the equity market. Despite strong headline GDP growth of 13.5% in Q1 FY22–23, the underlying recovery was fragile, particularly in sectors reliant on global inputs and trade linkages.

These macroeconomic effects were mirrored in the stock market. Indian equities experienced one of their worst drawdowns since the COVID-19 pandemic. In the first three weeks of the war, the BSE Sensex fell by nearly 4,000 points, slipping below the 51,000 marks. Investors reacted with caution, shifting to safe-haven assets as they braced for global economic fallout. Sector-wise, the impact was uneven: defence and energy stocks gained on expectations of higher demand and supply constraints, while FMCG, auto, and IT sectors came under pressure from rising costs, declining demand, and currency fluctuations. Market sentiment was deeply shaken, and investor decisions became more sensitive to firm-level cues, especially during moments of public disclosure such as quarterly earnings calls. (Bhandari and Mishra, 2023)

War led to one of the biggest market crashes since 2020

Despite gaining significantly over the last 2 years, the BSE index witnessed few worst days.

Dates	Biggest crashes
March 12, 2020	-2,919
March 16, 2020	-2,713
March 23, 2020	-3,935
May 4, 2020	-2,002
February 24, 2022	-2,702

Source: BSE; Times of India, 2023

In such periods of uncertainty, how firms communicate externally can influence investor confidence and stock performance. Management tone, the acknowledgement (or omission) of external shocks, and signals of risk or resilience can all serve as inputs into market valuation models. Although the role of corporate disclosure in shaping investor expectations is well-established in finance literature, few studies have examined this in the context of a geopolitical crisis particularly using text-based firm-level data in an emerging market setting. The Russia-Ukraine war provides a clear opportunity to evaluate how Indian firms used their earnings calls to manage perceptions, and how markets responded to those narratives.

The existing literature on the economic impact of geopolitical shocks has tended to focus on macro- or sector-level outcomes. For instance, Bounou and Yatie (2022) and Chortane and Pandey (2022) examine index-level responses across global markets. Similarly, Bhandari and Mishra (2023) analyse sectoral stock price movements in India in response to the conflict, while Salisu et al. (2022) explore currency volatility under geopolitical stress. These studies provide useful insights into broad market trends, but they leave out the firm-specific

mechanisms through which shocks are processed and interpreted by investors. Recent advances in text mining and sentiment analysis have opened new avenues for studying such mechanisms particularly through the lens of corporate communication. Yet few papers have applied these methods in the context of geopolitical risk, and even fewer have focused on emerging markets like India, where firm behaviour and investor expectations may differ significantly from those in developed economies.

This study is closely related to recent research on firm-level communication during crises, particularly the work by Mathur et al. (2023) on market responses to surprise COVID-19 lockdowns. Like that study, we adopt an event study methodology using cumulative abnormal returns (CARs) and apply sentiment and uncertainty analysis to earnings call transcripts. However, while their focus was on sudden pandemic-driven policy shocks, our study examines a global geopolitical event, highlighting a different channel of investor sensitivity and firm signalling.

20 This study aims to fill that gap by analysing the Indian stock market's firm-level response to the Russia–Ukraine war, with a focus on corporate communication during earnings calls. Using transcripts from 81 NSE-listed firms between February 24 and June 15, 2022, we construct a treatment-control design based on whether a firm mentioned the war in its Q4 FY22 earnings call. Companies that explicitly referred to the conflict were categorized as the treatment group, while those that did not were assigned to the control group. The companies were divided based on 5 major sectors: Energy, Oil and Gas, FMCG, Auto and Metal. We then apply an event study methodology to calculate cumulative abnormal returns (CARs) around the event window and assess the market reaction across both groups.

24 In addition to the event study, we conduct a sentiment analysis of the earnings calls to capture the emotional tone of the communication. Furthermore, we construct a binary indicator of uncertainty, assigning a value of one to firms that included language reflecting ambiguity, concern, or risk regarding the geopolitical situation. This allows us to test whether uncertainty or sentiment captured through text-based measures can explain variation in abnormal returns across firms. Finally, we introduce sectoral interaction terms to explore whether the market response to uncertainty varied depending on industry characteristics.

Our results show that firms mentioning the war experienced significantly different CARs than those that did not, with sectoral differences playing a substantial role. On average, the presence of uncertainty-related language in earnings calls was positively associated with CARs, suggesting that markets may have rewarded transparency or proactive risk acknowledgment during the crisis. However, this effect reversed in specific sectors most notably FMCG, Auto, and Manufacturing where uncertainty was met with negative market reactions. These findings point to a nuanced investor response: while communication during uncertainty can inspire confidence, its effect is context-dependent and mediated by sectoral expectations.

21 This study makes several contributions to the literature. First, it introduces a novel firm-level framework for analysing the economic impact of geopolitical shocks in an emerging market context. Second, it leverages text-based indicators of sentiment and uncertainty tools increasingly relevant in financial research to offer a deeper understanding of how corporate narratives shape market outcomes. Third, it highlights the importance of sectoral heterogeneity in shaping investor behaviour, showing that the same communication strategies

may elicit different responses depending on the industry. Finally, the paper adds to the limited literature on India-specific firm responses to global crises, offering insights that are both theoretically grounded and practically relevant.

Understanding how markets react to corporate signalling in the face of crises has important implications for policy-makers and managers. Given geopolitical wranglings, investors are not just reacting to global headlines, but are interpreting signals at the level of firms. Those firms that can communicate unequivocally and credibly may stand a better chance of maintaining investor trust and stock stability in uncertain times. To the extent that this research supports the proposition, earnings call conferences and corporate disclosures may, to some extent, stand as early warning signals for market stress or resilience during external shocks from the point of view of regulators and analysts. As geopolitical risk becomes a more enduring facet on the global stage, the ability to study and interpret responses at the firm level will grow increasingly helpful in grasping the dynamics of financial markets.

Here is the remainder of the study: The literature review on geopolitical shocks, prior studies on Russia-Ukraine War is presented in Section 2. In Section 3 and 4, the hypothesis development and research methodology are covered. Findings are presented in Sections 5 and 6 discusses the conclusion and policy suggestions.

1. Literature Review

2.1. *Geopolitical Shocks and Financial Market Reactions*

Geopolitical shocks have long been attributed as critical factors causing volatility in global financial markets. These events may range from military confrontations, impositions of international sanctions, to territorial claims engulfing them with macroeconomic disturbances-so forth and so-on. Presumably, such shocks to the system have been documented in the past to affect asset classes and economic fundamentals in a wide array of ways. For instance, Gong and Xu (2022) developed the idea of geopolitical uncertainty impacting the connectedness within the commodity markets, showing how evidence concerning conflict-related disruptions in energy markets that permeate through global supply chains. Likewise, Jopp (2020) presents cases that show that liquidity constricts during times of heightened geopolitical risk.

Beyond the usual macroeconomic indicators, studies have examined the effect of geopolitical instability on microeconomic behaviour and how firms react to changes. Luo et al. (2016) suggest firms often modify their strategic posture and investment plans for global tension and calls such movement "entrepreneurial demarches." These changes could include risk avoidance, unwanted delays in expansion, or sectoral re-allocation. Banerjee and Dutta (2022) further comment on investor preference shifts during conflict periods, where investors have a strong preference for low-volatility assets and sectors that historically have been resilient to extra shocks. Phan et al. (2022) also find that companies exposed to geopolitical risk have lower stability of returns and are more severely penalized by markets, in spite of fundamentals. Meanwhile, Salisu et al. (2022) have documented the sensitivity of foreign exchange markets to conflict-related news and how cross-border capital reallocations affect currency volatility.

From the systemic perspective, researchers have drawn an analogy between geopolitical shocks and cascading failures in complex global networks. In a globalized world economy,

production and consumption of essential goods such as food and energy are interdependent across countries (D'Odorico et al., 2018; Ruhl, 2019; Gaupp, 2020). Sudden and localized disturbance can become a war or a trade embargo and cause a wider systemic failure, known as cascading failure. Lee and Goh (2016) conceptualize this risk within network science, explaining that even one regional breakdown may be propagated rapidly across all of the interconnected nodes of the global economy. Cascading failures have been observed successfully in cases of infrastructures (Guo et al., 2017; Liu et al., 2021), finance network (Havlin & Kenett, 2015; Smolyak et al., 2018), and digital systems (Xing, 2020; Ren et al., 2018).

In the context of international trade, cascading failure occurs whenever some country suffers a supply or demand shock, and things begin to domino down the economic trade network. Li et al. (2012) and Zhu et al. (2014) define two types of cascading disruption: edge-based attacks (disruptions of trade linkages) and node-based attacks (disruptions of whole economies or regions). These frameworks theoretically direct us toward a broader realm of investigation, helping them understand why certain geopolitical shocks, like the Russia-Ukraine conflict, have inordinate spillovers far beyond the immediate conflict zone.

Together, these studies indicate that geopolitical events are neither isolated nor localized with respect to their economic impact. Instead, they spark industrial sector, asset-class, and country-wise ripple effects, often in unanticipated ways. An extensive literature on macroeconomic, trade, and network-induced contagion provides a solid background for firm-level studies, such as ours, that attempt to understand how these shocks manifest into commensurate behaviour at the individual company level in the market.

2.2. *Financial Market Dynamics and Risk Assessment During the Russia – Ukraine War*

The outbreak of the Russia-Ukraine war offers an ideal setting to observe how perceived risk, fear, and expectations manifest in asset prices across geographies and sectors. One of the central findings across recent studies is that heightened investor attention to the conflict significantly increased price volatility. Halousková, Stašek, and Horváth (2022), for instance, developed an event-specific attention index using Google Trends data and showed that investor focus during the conflict's onset led to pronounced volatility in European markets, particularly those with strong economic or geographic ties to Russia.

The global network analysis by Zhou et al. (2022) has shown that cascading failures in energy and food trade as a result of the war negatively affected already vulnerable economies, which in turn heightened market fears over supply instabilities. These fears were translated into asset prices. Using an event study approach, Umar, Riaz, and Yousaf (2022) showed that clean energy markets experienced a positive return spike on the day of the invasion, whereas traditional energy and metal markets experienced muted or mixed reactions, respectively witnessing how viewers from various domains operate on segregated belief systems.

Currency markets also reacted sharply to geopolitical pressure. Aliu, Hašková, and Bajra (2023) revealed that the EUR/RUB exchange rate played a central role in driving the euro's depreciation during the war period. This reflects how currency traders perceive and respond to conflict-related macro shocks, often focusing on short-run risk signals rather than fundamentals. Similarly, Boubaker et al. (2022) demonstrated that global financial markets especially in developed economies experienced immediate negative abnormal returns following the invasion. Their study highlights how trade exposure, exchange rate

fluctuations, and political alignment (such as NATO membership) shape investor reaction in complex ways.

Investor behaviour also appears to differ between emerging and developed markets. Obi, Waweru, and Nyangu (2023) compared equity markets in G7 countries with those in Africa, finding that while G7 markets suffered larger and more persistent losses, African markets were more resilient in equity terms but heavily affected by commodity price shocks and currency depreciation. These findings challenge traditional assumptions about informational efficiency in developed markets and reinforce the role of behavioural frictions during crises.

Event study analyses of the war's early impact also support the narrative of sentiment-driven market segmentation. Abbassi, Kumari, and Pandey (2022) examined 531 firms from G7 economies and found that those with higher trade exposure and greater geopolitical risk experienced sharper declines in abnormal returns. Their results reinforce the idea that firms' external ties become liabilities during conflict periods, particularly when investors are seeking safety. Ahmed et al. (2022) reached similar conclusions in the European context, showing that industries dependent on Russian and Ukrainian exports such as oil, gas, and agriculture saw marked declines in cumulative abnormal returns.

The market perception and informational asymmetry get further treatment in Clancey Shang and Fu (2022, pp. 19-20), who show that American Depository Receipts (ADRs) from firms of countries politically neutral or pro-Russian witnessed a greater deterioration of market liquidity vis-à-vis their domestic counterparts. Hence, they found that they can support investor reactions under uncertainty being driven by political stance rather than firm fundamentals. On the same lines, Sun and Zhang (2023), using a global sample of over 21,000 firms across 86 countries, show that market reactions varied with respect to trade exposure to Russia and firm-specific characteristics such as leverage or liquidity.

Mnif, Mouakhar, and Jarboui (2022) provided a different approach to the study of cryptocurrencies. They concluded that energy-conserving digital assets, which had witnessed a negative reaction of COVID-19, were actually performing better during the Russia-Ukraine war. This implies that investors' sentiment toward energy-related themes, even when it comes to alternative assets, changes depending on geopolitical context.

Tarigan, Delia, and Hatane (2024) investigated how the macro-drivers of geopolitical risk, commodity prices, and foreign exchange rates explain volatilities across sector indices of the G20. Their study further adds that foreign exchange risk had a more or less uniform positive influence on stock volatility across sectors, whereas sector-specific effects of geopolitical and commodity shocks exist-witnessing again that investor recognition of macro information is based on micro expectation.

These studies clearly demonstrate that investor sentiment in the face of a geopolitical crisis emerges both from direct exposures and from economic narratives at large. Market responses, therefore, are not only grounded in fundamentals but also on behavioural interpretations relating to alignment, risk, and resiliency virtue of which given by experimental interpretations. Hence, the literature robustly supports firm-level investigations, specifically those concerned with sentiment, uncertainty, and disclosure patterns during highly risky periods.

2.3. Corporate, Industry, and Methodological Perspectives on Crisis Response

In addition to macro-level drivers, firm performance across geopolitical shocks is also influenced by internal firm attributes and industry environment. Hawawini, Subramanian, and Verdin (2002), employing U.S. data, identified that firm-specific variables such as internal abilities and strategic positioning explained far greater proportions of variance in performance than industry effects. Their results indicated that whereas industry situations matter, firm-level resource allocation and implementation largely shaped financial performance. Similar conclusions were reached by Adetunji and Owolabi (2016), who demonstrated that in Nigerian firms, growth indicators, leverage, and firm size had a greater effect on returns compared to sector level variables such as R&D intensity or concentration.

On a larger level, public opinion also determines the manner in which economies and companies respond to global downturns. Ngo et al. (2022), examining a million social media posts in more than 100 nations, showed that popular opinion on sanctions in the Russia Ukraine conflict differed according to regime type and economic alignment. Public opinion in democracies influenced their government responses, especially where freedom of expression allowed for active public involvement with policy issues. This demonstrates the relationship between market sentiment, political reaction, and national alignment.

Methodologically, studies like Mathur, Sengupta, and Pratap (2023) offer a strong blueprint for understanding market reactions to exogenous shocks. Examining India's COVID-19 lockdown, the authors used an event study model focused on CARs, supplemented by cross-sectional regressions and natural language processing (NLP) applied to earnings calls. Their integration of textual data with financial indicators enables a more holistic view of how uncertainty and communication influence investor behaviour an approach particularly relevant to this dissertation's focus.

Together, these studies emphasize the need to consider multiple lenses firm structure, public sentiment, and analytical tools when evaluating how markets interpret crises. Their insights inform both the design and interpretation of this study's firm-level investigation.

2.4. India-Specific Evidence and Emerging Market Context

Although geographically removed from the warzone, India experienced notable economic and financial spillovers from the Russia–Ukraine conflict. Several recent studies have analysed how the Indian stock market and broader economy responded to the shock.

Pandey, Assaf, and Rai (2023) employed an event study and OLS regression on 1,422 NSE-listed firms, showing that larger firms were more resilient during the conflict's initial phase. Their results provide insight into risk mitigation strategies in emerging markets. Bhandari and Mishra (2023) analysed eight sectoral indices and found significant volatility post-conflict, particularly in energy, IT, FMCG, and oil and gas, while auto and banking sectors showed negative sensitivity.

Bhattacharjee, Gaur, and Gupta (2023) examined abnormal returns across sectors and found that while many initially recorded gains, these were short-lived. The study highlights India's exposure to global disruptions through trade and strategic ties, despite its physical distance from the conflict. Dey Sarkar and Gupta (2023), using input–output modelling, demonstrated how transport-related disruptions propagated across sectors, identifying vulnerable nodes in the economy.

Jha and Katiyar (2024) focused on oil & gas, metals, and commodities. They found that metals, particularly steel, benefited from shifts in global supply chains post-conflict. The study points to sectoral opportunities arising from global realignments, even during periods of uncertainty.

These findings collectively underscore India's indirect but significant exposure to geopolitical shocks, revealing sector-specific risks and short-lived market gains amidst broader volatility.

2.5. Identified Gaps and Hypotheses Overview

Although there are a number of studies that have evaluated the sectoral and macroeconomic impacts of the Russia Ukraine war, there are few that have looked at how Indian companies' own disclosures regarding the war impacted investor reactions. Much of current research lies either on stock indices or general firm attributes, which creates a research gap for understanding how individual disclosures like mention of geopolitical risk in earning calls influence stock market results. In an emerging market such as India, in which investor sentiment is exceptionally sensitive to outside shocks and firm-specific signals, this is a crucial but underdeveloped field.

To address this, the present study classifies companies on whether or not they specifically saw fit to mention the Russia–Ukraine war in their Q4 FY22 earnings call transcripts. The first hypothesis tests whether this dichotomy is accompanied by substantial differences in cumulative abnormal returns (CARs), a measure of market reaction to inferred firm exposure or disclosure. The second hypothesis tests whether the sentiment expressed in these messages positive, neutral, or negative further clarifies variation in investor response, implying that tone is important beyond simple mention of the event.

Lastly, the third hypothesis tests whether the communication of uncertainty, as quantified by a binary indicator from transcript analysis, affects CARs and if so, does so differentially across sectors. This permits a more refined comprehension of how investors decode firm-level risk signals in a crisis environment. Collectively, these hypotheses seek to add to the emergent literature on corporate communication, sentiment analysis, and financial market reaction to geopolitical shocks especially with regard to emerging economies.

3. Theoretical Framework and Hypothesis Development

Periods of geopolitical uncertainty, such as wars or international conflicts, pose a significant challenge for financial markets. Investors face heightened risk and reduced visibility, leading them to seek reliable signals from firms to inform their decisions. In this context, corporate communication becomes a key mechanism through which firms can either calm or alarm the market. This study draws on **signalling theory**, **investor attention theory**, and **behavioural finance frameworks** to develop a structured understanding of how firm-level disclosures during the Russia–Ukraine conflict may have influenced stock market reactions in India.

3.1. Signalling Theory and Information Asymmetry

Signalling theory, originally presented by Spence (1973), suggests that companies transmit signals to the market in an effort to minimize information asymmetry between internal

managers and external stakeholders. In crises, where uncertainty peaks, the market focuses more on the quality and clarity of these signals. Companies are able to transmit their interpretation of risks outside their control, their strategic responses, and their exposure. Investors then use these disclosures to infer them as measures of transparency, preparedness, and credibility.

In the context of the Russia–Ukraine conflict, companies that openly discuss the war during their earnings calls might come across as more transparent and better equipped to deal with unexpected challenges. On the flip side, companies that steer clear of the topic could raise eyebrows about their preparedness or their reluctance to reveal any potential weaknesses. Therefore, whether a company mentions or avoids mentioning the conflict sends a signal—either intentionally or not about their awareness of risks and how responsive their management is.

This brings us to the first hypothesis:

- **H1:** Companies that reference the Russia–Ukraine war in their earnings calls will see significantly different cumulative abnormal returns (CARs) compared to those that don't.

This hypothesis is in line with the findings from Yarovaya and Mirza (2022), which indicated that mutual funds linked to conflict zones tended to perform poorly, while those in politically neutral areas fared better. At the firm level, this study builds on that idea by examining whether companies that acknowledge the conflict are either rewarded or penalized by investors.

3.2. Investor Attention, Sentiment, and Behavioural Biases

The second theoretical anchor for this study is **investor attention theory**, which emphasizes the cognitive limits of market participants. According to Barber and Odean (2008), investors tend to react more strongly to salient or emotionally charged information, particularly during periods of heightened uncertainty. Similarly, Da et al. (2011) introduced an attention index derived from online search activity, showing that attention-grabbing events significantly affect trading volume and pricing.

When applied to corporate communication, this theory suggests that not only the content but also the tone of disclosure plays a role in shaping investor reaction. Firms that communicate in a calm, forward-looking, or optimistic tone may succeed in mitigating negative market responses even if the fundamental outlook remains uncertain. On the other hand, firms using cautious, hesitant, or negative language may trigger stronger adverse reactions.

Accordingly, the second hypothesis is:

- **H2:** The sentiment expressed in earnings call transcripts helps explain the difference in CARs between firms that mention the conflict and those that do not.

This hypothesis reflects the growing literature on text-based sentiment analysis in financial research. It also captures the intuitive idea that **how** a firm communicates may matter as much as **what** it communicates during a crisis.

3.3. *Uncertainty and Investor Perception*

The third theoretical pillar draws from behavioural finance, particularly in how individuals navigate uncertainty and risk. Investors don't solely focus on the hard data; they also consider how companies express their views on uncertainty. If a company uses language that suggests ambiguity or concern like referring to unpredictability or volatility investors may question the firm's transparency or perceive it as having weaknesses. Such messages can either soothe the markets, indicating that the company is effectively managing risks, or they can trigger alarms if they seem to signal trouble. This underscores the significant impact that uncertainty can have on investor expectations, especially during periods of geopolitical unrest.

This perception is often shaped by the firm's industry. In sectors like Oil and Gas or Metals, openly addressing geopolitical uncertainty may reflect sound risk awareness, particularly when macroeconomic tailwinds are present. However, in more demand-sensitive or consumer-facing sectors like FMCG and Auto, uncertainty may raise red flags for investors, suggesting instability in supply chains, margins, or future outlook.

From this, we can propose the third hypothesis:

- **H3:** References to uncertainty in corporate communication are linked to notable differences in cumulative abnormal returns (CARs).

This hypothesis is in line with the work of Mathur, Sengupta, and Pratap (2023), who utilized natural language processing to assess how firms were feeling during India's COVID-19 lockdown. Their findings revealed that textual indicators significantly influenced how investors reacted. In this study, uncertainty is also gauged using a binary indicator based on earnings call transcripts, providing a firm-level perspective on how narrative cues can sway market behaviour.

Together, these three hypotheses are designed to test not just whether investors react to firm-level disclosures during geopolitical crises, but how they react and why. By integrating sentiment analysis and uncertainty indicators into an event study framework, this study seeks to build a more comprehensive understanding of the investor decision-making process in emerging markets.

The theoretical framework here provides a basis for evaluating not only the existence of an effect (through H1), but also its psychological and communicative drivers (H2 and H3). This multi-level perspective drawing from signalling, attention, and behavioural theories adds depth to the analysis and aligns with the evolving literature on firm-level crisis communication.

4. **Research Methodology**

4.1. *Event Study Design and Sample Selection*

This section outlines the methodology used in this study. To test whether firms that mentioned the Russia-Ukraine war in their Q4 FY22 earnings calls experienced significantly different cumulative abnormal returns (CARs) than those that did not, an event study methodology was employed. The event date was set as **February 24, 2022, the day Russia**

12 launched a full-scale invasion of Ukraine. Firms were grouped into treatment and control categories based on whether they referred to the war in their earnings calls, with analysis conducted separately across sectors using a consistent framework. The firms that mentioned the war in their earnings call transcripts were clubbed in the treatment group, while those who didn't were a part of the control group. The earnings call transcripts were collected from multiple sources, including the National Stock Exchange (NSE) website, Trendlyne, AlphaStreet, and official company investor relations archives.

16 Daily stock prices for a selected sample of companies were retrieved from Yahoo Finance using the *yfinance* Python library, covering the period from August 1, 2021, to June 15, 2022. The NIFTYBEES exchange-traded fund (ETF), which tracks the Nifty 50 index, was used to represent market returns. The estimation window spanned from August 1, 2021, to February 23, 2022, while the event window extended from February 24, 2022, to June 15, 2022. Stock returns were calculated as daily percentage changes in closing prices. A similar method was used to compute market returns. These returns were then merged into a single dataset along with firm identifiers and group labels (treatment or control).

4.2 Market Model Estimation and Abnormal Return Calculation

For each firm, a market model regression was estimated over the estimation window using ordinary least squares (OLS). This regression took the form:

$$R_{it} = \alpha_i + \beta_i R_{mt} + \epsilon_{it},$$

2 where R_{it} is the daily return of firm i , R_{mt} is the corresponding market return, and α_i and β_i are firm-specific coefficients capturing intercept and sensitivity to the market, respectively. The estimated alpha and beta values were then used to compute expected returns during the event window. Specifically, expected return on each event day was calculated as:

$$E[R_{it}] = \alpha_i + \beta_i R_{mt}$$

14 Abnormal returns (ARs) were calculated as the difference between actual and expected returns for each trading day. The cumulative abnormal return (CAR) for each firm was then obtained by summing these abnormal returns across the event window.

7 To calculate Cumulative Abnormal Returns (CARs) for each firm, we summed up their daily abnormal returns throughout the entire event window. After that, we grouped these CARs by treatment and control category to find the average CARs for both treatment and control firms. The goal of this comparison was to see if recognizing the geopolitical shock had any noticeable impact on firm performance, as shown by stock prices. We conducted the analysis using Python, leveraging the pandas library for data manipulation, statsmodels for regression analysis, and matplotlib for creating visualizations. This method provided a thorough comparison of how the market reacted between firms that addressed the Russia–Ukraine war in their public communications and those that did not.

4.3. Statistical Testing of CARs

15 To assess whether the difference in average CARs between treatment and control firms was statistically significant, a two-sample t-test assuming unequal variances (Welch's t-test) was conducted in Microsoft Excel. This test does not assume equal population variances between the two groups, making it appropriate for financial data where variability across firms may

differ. The test compared the mean CARs of firms that mentioned the Russia–Ukraine war (treatment group) with those that did not (control group). A one-tailed was selected based on the directional nature of the hypothesis, and statistical significance was evaluated at conventional confidence levels. This step provided formal statistical validation of the visual and numerical differences observed in average CARs between the two groups.

4.4. *Sentiment Analysis of Earnings Calls*

To capture how firms framed the Russia–Ukraine war in their earnings calls, a sentiment analysis was conducted on Q4 FY22 earnings call transcripts. Standard financial sentiment dictionaries such as Loughran–McDonald were initially considered but ultimately deemed unsuitable due to their inability to reflect the contextual nuances and market-specific language used in Indian corporate communications during a geopolitical event. Consequently, a custom sentiment dictionary was developed. Each keyword or phrase potentially indicating positive, negative, or neutral sentiment was manually labelled and assigned a score based on its perceived tone and relevance to the war context. A sample of this dictionary is presented in Appendix Table A1.

Earnings call transcripts were processed from PDF files for each firm using Python. Text was extracted using the PyPDF2 library and cleaned for analysis. Each transcript was scanned for matches with the custom sentiment dictionary. For every match, the corresponding sentiment score was multiplied by its frequency of occurrence, and a total sentiment score was computed per firm. An average sentiment score was then derived by dividing the total score by the number of matched phrases, to account for variation in transcript lengths. To ensure comparability across firms, z-scores of the average sentiment scores were also computed.

The sentiment data was later used in a cross-sectional regression model to test whether the tone and framing of firms' communications around the war explained variations in their cumulative abnormal returns (CARs). The regression was structured to examine the difference between each treatment firm's cumulative abnormal return (CAR) and the average CAR of control firms within the same sector. This approach helped control for sector-wide effects unrelated to firm-level communication. The model included an overall sentiment score (average_sentiment) as the key independent variable, along with interaction terms between sentiment and sectoral dummy variables. Oil and Gas was omitted to serve as the reference category. The regression model can be formally expressed as:

$$CAR_i - Average\ CAR_{control, sector} = \alpha + \beta_1 \cdot Sentiment_i + \beta_2 \cdot (Sentiment_i \times Sector_{Metal}) + \dots + \varepsilon_i$$

4.5. *Analysis of Uncertainty Mentions*

To further investigate whether the nature of firm-level communication influenced abnormal stock returns, a binary variable was constructed to capture the presence of uncertainty in firms' earnings calls. This variable was derived through textual analysis of Q4 FY22 earnings transcripts for treatment firms. Keywords and phrases indicative of uncertainty were adapted from Sandile (2016) and Mathur et al. (2023), including terms such as “*uncertain*,” “*volatile*,” “*unpredictable*,” and similar expressions. A comprehensive list of keywords used for the textual analysis is listed in the appendix table A2. If a treatment firm explicitly mentioned uncertainty in relation to the Russia–Ukraine war, it was assigned a value of 1; otherwise, a 0 was assigned. This indicator was constructed for treatment firms only, as

control firms did not mention the war and thus were not evaluated on this dimension. Examples of qualifying phrases are listed in appendix B.

The dependent variable was, again, the difference between each treatment firm's CAR and the average CAR of the control firms within the same sector. The model included the uncertainty dummy and interaction terms between uncertainty and sectoral dummies (FMCG, Auto, Energy, Metal), with Oil and Gas as the reference category.

$$CAR_i - \text{Average } CAR_{\text{control, sector}} = \alpha + \beta_1 \cdot \text{Uncertainty}_i + \sum_k \beta_k (\text{Sector}_k \times \text{Uncertainty}_i) + \varepsilon_i$$

5. Results and Discussion

This section presents the empirical findings from the event study and regression analysis designed to test the three hypotheses. The analysis focuses on how the Indian equity market responded to firm-level disclosures during the early months of the Russia-Ukraine war.

5.1. Treatment vs Control Differences

The results in the Table 1 show clear sectoral patterns in how markets reacted to war-related disclosures. In the Oil and Gas sector, treatment firms recorded a markedly higher average CAR of 0.3065, compared to -0.0043 for control firms. The difference is statistically significant with a p-value of 0.02. This suggests that investors reacted positively to war mentions in this sector, likely due to the favourable macroeconomic developments following the conflict. India's crude oil imports from Russia surged nearly thirteen-fold in FY 2022–23, benefiting Indian refiners who gained access to discounted Russian oil and expanded their export markets, especially to Europe (India: One of the Biggest Beneficiaries of the War in Ukraine - Jamestown, 2023).

The Energy sector also demonstrated a positive effect, with treatment firms showing an average CAR of 0.0846, while control firms posted -0.0986. Although the p-value here is 0.06, this is still significant at the 10% level, indicating a marginal but positive investor response to war-related disclosures. As India increased its import of coal and other energy inputs from Russia during the conflict, companies in this sector may have been perceived as better positioned to capitalize on supply-side opportunities (Dhar, 2024).

Conversely, in consumer-oriented sectors such as FMCG, treatment firms underperformed. Their average CAR was 0.0207, compared to 0.1662 for control firms, with a p-value of 0.021. This suggests that war-related references by firms in this sector were interpreted negatively by investors possibly due to concerns over input cost inflation, currency volatility, and weaker consumer demand. A similar trend was observed in the Auto sector, where treatment firms had a negative CAR of -0.0330, compared to 0.129 for control firms with the result again being statistically significant at the 5% level ($p = 0.02$). Auto firms are often highly exposed to global supply chain disruptions and input costs, which may have fuelled investor pessimism.

In the Metal sector, a strong and significant divergence was found: treatment firms had an average CAR of -0.0767, while control firms recorded 0.1569. This difference was highly significant ($p = 0.008$). Despite metals being a strategic export commodity, investor reaction suggests that war mentions in this sector may have been interpreted as a signal of vulnerability to global market and logistics shocks.

Overall, these results support Hypothesis 1, confirming that firm-level references to the Russia–Ukraine conflict were associated with significant differences in abnormal returns. The direction and magnitude of the impact, however, varied considerably by sector, underscoring the importance of industry context in shaping investor interpretation. While energy-linked sectors benefited from India’s shifting trade dynamics with Russia, sectors more sensitive to costs and consumption responded less favourably to geopolitical disclosures. These findings set the stage for a deeper exploration into the role of sentiment and uncertainty, which is undertaken in the next sections.

Table 1

Summary of Average Cumulative Abnormal Returns (CARs) by Sector

Sector	Group	Avg. CAR	P-value	Significance
Energy	Treatment	0.0846	0.06	*
Energy	Control	-0.0986		
Oil & Gas	Treatment	0.3065	0.02	**
Oil & Gas	Control	-0.0043		
FMCG	Treatment	0.0207	0.021	**
FMCG	Control	0.1662		
Auto	Treatment	-0.033	0.02	**
Auto	Control	0.1293		
Metal	Treatment	-0.0767	0.008	***
Metal	Control	0.1569		

Note: Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$

5.2. Sentiment Analysis and Market Response

The output as shown in Table 2 indicates that sentiment scores did not have a statistically significant effect on abnormal returns, either on their own ($\beta = 0.057$, $p = 0.60$) or in combination with sectoral dummies. Among the interaction terms, the only marginally significant result was the interaction of Metal \times Sentiment ($\beta = -0.407$, $p = 0.0453$), which showed a negative relationship contrary to expectations. This suggests that higher sentiment scores may not always be interpreted positively in capital-intensive industries like metals, where market participants might view overly optimistic narratives as disconnected from underlying fundamentals or risk realities.

The model’s explanatory power was limited ($R^2 = 0.124$), and the overall regression was not statistically significant ($F = 1.02$, $p = 0.42$). This may be due to noise in how investors perceive tone during geopolitical crises or a limitation in using sentiment as a standalone explanatory variable without more granular control for content or delivery cues.

Taken together, these findings suggest that tone alone does not significantly drive differential market responses, and investor interpretation during crises may rely more heavily on concrete signals such as expressions of uncertainty or clarity about firm strategy than on general optimism or pessimism. The role of perceived uncertainty is explored next.

Table 2

Regression results: Sentiment Score vs CAR differentials by Sector

Variable	Coefficient	Std. Error	t-Stat	p-Value	95% CI Lower	95% CI Upper	Significance
Intercept	0.0371	0.0548	0.6779	0.5021	-0.0739	0.1482	
Sentiment Score	0.0572	0.109	0.5247	0.6029	-0.1639	0.2783	
Metal * Sentiment	-0.4075	0.1965	-2.07	0.0453	-0.8059	-0.0089	**
Energy * Sentiment	-0.1279	0.1555	0.8238	0.4155	-0.4428	0.1869	
Auto * Sentiment	-0.0261	0.2165	0.1208	0.8991	-0.4407	0.3885	
FMCG * Sentiment	-0.0583	0.1602	0.3637	0.7182	-0.3832	0.2666	

Note: Oil & Gas is the baseline sector. Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$

5.3. Uncertainty in Corporate Communication and Market Reactions

Table 3 presents the results of the cross-sectional regression analysis conducted to test Hypothesis 3. The uncertainty dummy had a positive and highly statistically significant effect ($\beta = 0.4218$, $p = 0.0029$), indicating that, on average, firms that acknowledged uncertainty in their earnings calls experienced higher cumulative abnormal returns (CARs) compared to sector peers. This suggests that the market may have rewarded transparency or interpreted such disclosures as indicators of responsible risk management during the crisis.

The interaction terms revealed important sector-specific nuances. In the FMCG sector, the coefficient was statistically significant at the 5% level ($\beta = -0.4569$, $p = 0.0385$), and in the Auto sector, the coefficient was marginally significant at the 10% level ($\beta = -0.4832$, $p = 0.0583$). These results suggest that investors penalized expressions of uncertainty in consumer-facing and cyclical industries, likely due to concerns over demand-side fragility or operational unpredictability.

In the Metal sector, the coefficient was also marginally significant at the 10% level ($\beta = -0.4268$, $p = 0.0744$), indicating a similar cautious investor response. The coefficient for the Energy sector was negative but not statistically significant, pointing to a more neutral market reaction. Since Oil and Gas is the reference category, the positive and significant coefficient on the uncertainty dummy ($\beta = 0.4218$, $p = 0.0029$) reflects the effect of uncertainty disclosures within this sector. This suggests that, in Oil and Gas, transparency about geopolitical risk was interpreted positively by investors, potentially due to favourable macroeconomic dynamics during the war.

The model showed substantially better explanatory power than the sentiment-based model (H2), with an R^2 of 0.2455, and the overall regression was statistically significant at the 10% level ($F = 2.34$, $p = 0.061$). These findings indicate that uncertainty in firm-level communication is a more meaningful driver of investor response during geopolitical crises compared to general tone or sentiment alone.

Table 3

Regression Results: Uncertainty vs CAR differential by Sector

Variable	Coefficient	Std. Error	t-Stat	p-Value	95% CI Lower	95% CI Upper	Significance
Intercept	-0.05945	0.06229	-0.945	0.351	-0.187	0.0682	
Uncertainty Dummy	0.42181	0.1324	3.1859	0.0029	0.1533	0.6903	***
U × FMCG	-0.45698	0.21269	-2.149	0.0385	-0.8883	-0.0256	**
U × Auto	-0.48319	0.24712	-1.955	0.0583	-0.9844	0.018	*
U × Energy	-0.2332	0.19318	-1.207	0.2353	-0.625	0.1586	
U × Metal	-0.42676	0.24712	-0.928	0.0744	-0.928	0.0744	*

Note: Oil & Gas is the baseline sector. Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$

6. Conclusion and Policy Implications

This study investigates how Indian equity markets responded to the Russia–Ukraine war by examining firm-level communication during the early phase of the conflict. Leveraging data from earnings call transcripts of 81 NSE-listed firms between February 24 and June 15, 2022, we employed an event study methodology to calculate cumulative abnormal returns (CARs) and assess whether abnormal returns differed across firms based on how they referenced the war. We then tested whether these differences could be explained by sentiment and expressions of uncertainty in managerial communication, using textual analysis grounded in the finance and behavioural literature.

We identified significant disparities in market reactions between firms that mentioned the war (treatment group) and those that did not (control group). The CARs varied considerably across sectors. Firms in the Oil and Gas and Energy sectors that addressed the conflict saw strong positive market reactions, likely reflecting India’s increased crude imports from Russia at discounted rates, which boosted the domestic energy economy and enhanced export competitiveness. On the other hand, firms in the Auto, Metal and FMCG sectors experienced significantly weaker abnormal returns, potentially due to concerns about input cost inflation, demand-side softness, and currency fluctuations triggered by global market volatility.

Next the study tested whether sentiment score, quantified using a custom-built dictionary had any explanatory power over the variation in CARs among treatment firms. The regression results showed no statistically significant association between sentiment scores and CAR differentials, and the model demonstrated limited explanatory power. While sentiment analysis is widely used in financial research, these results suggest that during periods of acute uncertainty, such as geopolitical crises, sentiment scores alone may be insufficient to drive investor behaviour. This aligns with the view that in crisis settings, investors prioritize clarity, specificity, and actionable signals over general emotional tone.

The third aspect of the analysis yielded the study’s most compelling findings. By introducing a binary indicator of uncertainty assigned based on firm statements containing ambiguity or expressions of unpredictability we identified a strong and statistically significant positive link between uncertainty-related disclosures and CARs. This suggests that investors interpreted such disclosures as signs of transparency and prudent risk management. The effect of uncertainty, however, was not uniform across sectors. In consumer-facing and cyclical sectors like FMCG, Auto, and Metals, uncertainty was penalized, with interaction terms showing

significantly negative coefficients. This highlights the role of industry-specific investor expectations and risk tolerance in moderating the effect of firm-level communication on stock performance.

From a policy standpoint, these results highlight the importance of structured and transparent communication during external shocks. For corporate decision-makers, the findings provide practical insights into how different types of communication are received by the market. Firms in sectors that are more exposed to global inputs or consumer sentiment should be particularly mindful of how they frame risk and uncertainty in public disclosures. While being open about geopolitical risk can enhance credibility, excessive emphasis on unpredictability without accompanying mitigation strategies may erode investor confidence in sensitive sectors.

Moreover, investor relations teams may benefit from aligning their messaging with sector-specific investor expectations. In industries like Oil and Gas or Metals, where macro conditions may offer strategic tailwinds, proactive communication even if uncertain may strengthen investor trust. Conversely, in sectors where demand and pricing are fragile, clear messaging around risk management and operational resilience becomes crucial.

At a broader level, this research reinforces that corporate narratives are a significant component of market behaviour, particularly in turbulent times. As geopolitical risks continue to shape global financial dynamics, the ability to effectively communicate firm positioning, strategic foresight, and adaptability will become an increasingly critical factor in investor evaluation. A structured, context-aware approach to disclosure may thus act as both a market stabilizer and a competitive edge in volatile times.

7. Limitations and Future Research

This study has several limitations that should be acknowledged. The sample consists of only 81 NSE-listed firms, constrained by the availability of earnings call transcripts from publicly accessible (free) sources. As a result, the sample may disproportionately reflect larger or more media-visible companies, limiting the broader applicability of the findings across the entire market. Additionally, the use of custom keyword dictionaries for sentiment and uncertainty measurement, while grounded in prior research, may not fully capture the nuances of managerial tone or investor interpretation.

Future research could address these limitations by expanding the dataset through paid databases or API access, incorporating firm-level financial variables, and applying more sophisticated textual analysis methods such as machine learning or deep learning-based NLP models. Replicating this analysis across different geopolitical events or in cross-country settings would also help generalize the conclusions and provide deeper insight into how investors process firm-level communication during crises.

Appendix

Table A1

Sample of Custom Sentiment Dictionary Used for Scoring

Keyword or Phrase	Sentiment	Score
less depending on Russian gas	Positive	1
accelerate	Positive	1
commodity price increase	Negative	-1
international sanctions and countermeasures impacting business activities	Negative	-2

Note: This table presents a sample of the full dictionary used in sentiment scoring. The complete list was manually compiled based on commonly used phrases in earnings calls during the Russia–Ukraine conflict. Phrases were scored based on their perceived tone and economic implications, with higher weights assigned to stronger signals of optimism or concern.

Table A2

Keywords used in the text analysis

Topic	Words / Phrases
Russia–Ukraine War	“Russia”, “Ukraine”, “Russian invasion”, “Ukraine crisis”, “Russia–Ukraine conflict”, “war in Ukraine”, “geopolitical tensions”, “Putin”, “sanctions on Russia”, “military conflict”, “Russian oil”, “crisis in Europe”, “Ukraine war”, “Eastern Europe conflict”, “economic sanctions”
Supply Demand	“supply”, “supplies”, “supply chain(s)”, “imports”, “exports” “demand”
Uncertainty	“uncertainty”, “uncertainties”, “uncertain”, “risk(s)”, “threat(s)”, “unknown”, “fear”, “exposed”, “unclear”, “possibility(ies)”, “doubt(s)”, “predict”, “unpredictable(ity)”, “variable”, “chance”, “pending”, “instability”, “prospect”, “danger/dangers/dangerous”, “likelihood”, “queries”, “vary(ing)”, “probability(ies)”, “tricky”, “fluctuate(ing)”, “reservation(s)”, “speculative(ion)”, “dilemma”, “unsure”, “debatable”, “hesitant(cy)”, “unstable”, “hazardous”, “unsafe”, “halting”, “hairy”, “jeopardize”, “unforeseeable”, “question(s)”, “difficult(ies)”, “concern(s,ed)”, “affected”, “effect”, “wait and see”, “ambiguous”, “dubious”, “precarious”, “undecided”, “undetermined”, “unresolved”, “unsettled”, “anxiety(ies)”, “have to see”, “worry(ies)”, “remains to be seen”, “no idea”

Note: The table shows the keywords used in the text analysis of Indian firms’ earnings call reports. The uncertainty- related key words are adapted from Sandile (2016) and Mathur et al. (2023).

Appendix B: Example of uncertainty mentions in the context of Russia Ukraine War

The following sentences were quoted from the Q4 FY22 earnings call transcripts (February–June 2022) of firms in the treatment group, i.e., those that made explicit references to the Russia–Ukraine conflict. These statements contain uncertainty-related language and were used to construct the binary uncertainty indicator.

“So we don’t know where that is going to lead us and you know that between Russia and Ukraine, they produce almost 100 million tons of wheat which might not get harvested.”

“In fact it is very difficult to answer because coal import in any case is there no doubt because the gas is so costly that is not possible to use gas for power generation”

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