Project Dissertation Report on

IMPACT OF US-IRAN WAR ON INDIAN STOCK MARKET

Submitted By

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CERTIFICATE

This is to certify that the Major Research Project titled “Impact of US-Iran war on Indian stock market” has been completed by Mehul Sagar, Roll No. 24/BMBA/08, under my supervision as a partial fulfilment of the requirements for the award of the degree of Master of Business Administration (MBA) in Business Analytics from Delhi School of Management, Delhi Technological University.

To the best of my knowledge and belief, the work is original, has not been submitted for any other degree or diploma, and all sources of information have been duly acknowledged.

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I, Mehul Sagar, Roll Number 24/BMBA/020, student of MBA — Business Analytics at Delhi school of management, Delhi technological university (DTU), hereby declare that the Major Research Project titled " Impact of US-Iran war on Indian stock market " is an original work carried out by me under the supervision of Dr. Kusumlata in partial fulfilment of the requirements for the award of the degree of Master of Business Administration.

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ABSTRACT

In this paper, the effect of the Iran-US conflict that took place in 2026 on the Indian stock market is assessed based on the ESM according to the market model developed by Brown and Warner (1985). The analysis considers three significant occurrences related to the conflict: the US-Israeli strikes against Iran (February 28, 2026); the blockage of the Strait of Hormuz (March 5, 2026); and the announcement of a ceasefire between the US and Iran (April 8, 2026) in five industry indices traded at the National Stock Exchange of India, namely Nifty Pharma, Nifty Energy, Nifty IT, Nifty Auto, and Nifty Bank. The daily closing prices of the indices are obtained from January 1, 2025, to April 17, 2026, with an estimation period of 113 days and event period [−10, +10]. AR and CAR of each index are estimated and tested statistically through a two-tailed t-test at the 1%, 5%, and 10% levels of significance.

The results indicate pronounced differences between market responses across various industrial sectors. Nifty Pharma had the largest CAR of +10.54% in the context of US-Israel attacks (t = 2.529, 5%), which indicates a high level of portfolio reallocation towards safe investments. The CAR for Nifty Energy amounted to +8.49% (t = 1.690, 10%) during the same event due to concerns about an expected reduction in crude oil supplies through the Hormuz Strait. Such trends were repeated during the Hormuz Strait closure event, when Nifty Pharma and Nifty Energy had CARs of +9.40% and +9.87%, respectively. Meanwhile, industrial sectors associated with cyclical investment, such as Nifty Auto, Nifty IT, and Nifty Bank, demonstrated negative or neutral CARs, which were not statistically significant at all three events. Importantly, the cessation announcement did not yield any statistically significant CARs for all sectors, indicating that the Indian stock exchange had already factored in the geopolitical risks before the official resolution of the conflict, which is consistent with the semi-strong version of the Efficient Market Hypothesis.

It is thus observed that the Iran-US conflict has had a differential but statistically significant effect on the Indian stock market, with the nature and extent of the abnormal returns being quite different depending upon the industry segment and type of event. This research provides valuable insights to investors and policymakers concerning geopolitical risk management.

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CHAPTER 1: INTRODUCTION

1.1 Background of the Study

The international financial system is well known to be very responsive to any geopolitical surprises, especially if such developments are connected with any significant regions involved in oil production. Whenever armed conflicts arise in the Middle East region, they have had serious consequences for stock markets across the globe. This effect occurs due to the impact that such events have on the international oil supply market, currency changes, and investors' risk attitude. India is the third largest oil importer in the world meeting 85% of its crude oil needs by importing.

The coordinated strikes on Iran were carried out by the United States and Israel on February 28, 2026 against military bases and critical government facilities following an increasing level of tension between the nations for many months prior to the event. The strikes killed the leader of the nation, Khamenei, thus forcing Iran to retaliate to these attacks. It is believed that on March 5, 2026, Iran closed the Strait of Hormuz through which flows 20% of the daily amount of the world's crude oil supplies. On April 8, 2026, with the assistance of Pakistan, a ceasefire was reached among these nations.

For the Indian economy, the consequences of this conflict have various dimensions. Crude oil price increases result in higher import cost, current account deficit, and depreciation of Indian Rupee. From an industry standpoint, it creates different implications: oil industries may enjoy strong pricing powers domestically, but automobiles and airlines will be affected by increased margins due to increased fuel prices. Pharmaceutical companies, with their trade connections with Iran, will experience disruption in their operations, but will be favored with inflows of safe haven investments. Banks will experience high credit risks and liquidity problems.

Though the scale and pertinence of the conflict between Iran and US in 2026 cannot be overlooked in relation to the Indian economy, there is still no research that has investigated the effect of such conflict on the equity market of India through any statistical method. The current research tries to fill this gap by conducting an analysis of the effect of Iran-US conflict on five sectoral indices of the National Stock Exchange of India based on ESM (Event Study Methodology).

1.2 Statement of the Problem

India's deep structural dependence on Middle Eastern oil, combined with the country's growing integration with global financial markets, makes the Indian equity market particularly susceptible to geopolitical events originating in the Gulf region. While prior literature has examined the impact of historical Middle Eastern conflicts - including the 1990 Gulf War, the 2003 Iraq invasion, and the 2019 Saudi Aramco drone attacks - on global and Indian markets, the 2026 Iran–US war represents a qualitatively distinct shock: it involves a direct military confrontation between a major world power and a principal oil-producing nation, accompanied by the unprecedented closure of the Strait of Hormuz.

The core issue that the research is attempting to explore is: how much of an influence did the 2026 Iran-US war have on India's stock market, measured by significant abnormal returns, and did the effect vary systematically based on sectoral geopolitical sensitivity?

1.3 Research Objectives

The study is guided by the following specific research objectives:

1. To examine the short-term impact of the US-Israel military strikes on Iran (February 28, 2026) on sectoral indices of the NSE.
2. To measure the market reaction to the closure of the Strait of Hormuz (approximately March 5, 2026) on Indian equity sectors.
3. To assess whether the ceasefire declaration (April 8, 2026) produced significant abnormal returns, and whether markets had already priced in the resolution.
4. To compare the sectoral heterogeneity of market responses and draw implications for investor strategy and portfolio risk management.

1.4 Research Hypotheses

The study tests the following null and alternative hypotheses for each of the three events and across all five sectoral indices:

	Null Hypothesis (H_0)	**Alternative Hypothesis (H_1)**
Event 1	The US-Israel strikes on Iran (Feb 28, 2026) did not produce statistically significant cumulative abnormal returns (CAR = 0) in Indian sectoral indices.	The US-Israel strikes on Iran (Feb 28, 2026) produced statistically significant cumulative abnormal returns (CAR ≠ 0) in one or more Indian sectoral indices.
Event 2	The Strait of Hormuz closure (Mar 5, 2026) did not produce statistically significant CAR in Indian sectoral indices.	The Strait of Hormuz closure (Mar 5, 2026) produced statistically significant CAR in one or more Indian sectoral indices.
Event 3	The ceasefire declaration (Apr 8, 2026) did not produce statistically significant CAR in Indian sectoral indices.	The ceasefire declaration (Apr 8, 2026) produced statistically significant CAR in one or more Indian sectoral indices.

1.5 Scope and Delimitations of the Study

The study will be limited to Indian equity markets in terms of the indices analyzed, which include five sectoral indices of National Stock Exchange of India namely Nifty Pharma, Nifty IT, Nifty Auto, Nifty Energy, and Nifty Bank. Nifty 50 is considered the market proxy for regression using market model. The time period selected for this study is from August 1, 2025 to April 17, 2026, including a total number of 174 trading days in which estimation window consists of 113 days ranging from August 4, 2025 to January 16, 2026, along with the event windows of [-10, +10] days for each event day.

This research deals only with short-term responses to the conflict. Long-term price adjustments, fundamental price changes, and macroeconomic channels are not taken into consideration. Data collection and analysis of primary data are not in the scope of this study. Furthermore, as the conflict was still on-going at the time of data collection, results will be reported under the assumption that the impact of war will change in the long run.

1.6 Significance of the Study

There are a number of contributions of the study. Firstly, it is one of the few academic studies where quantitative evaluation of the consequences of the 2026 war between Iran-US on the Indian equity market is analyzed, which fills an urgent academic gap. Secondly, the methodology used in this study, namely, the Event Study Methodology, can serve as an example for other studies conducted under real-world conditions. Finally, the results obtained can be useful from a practical point of view for portfolio managers who try to mitigate the risks associated with geopolitical shocks.

In terms of public policy implications, the results show what sectors of the Indian economy are at risk because of Middle Eastern geopolitical shocks, which can be useful for SEBI, RBI, and the Ministry of Petroleum's decision-making processes.

1.7 Structure of the Report

In order to truly understand the implications of the 2026 Iran-US war for the Indian stock market, it will be helpful to briefly analyze how India’s economic interests fit into the broader geographical structure of this conflict. In 2021, India was importing about 200 million tons of crude oil, with 60 percent of that amount coming from GCC member states, while some share of imports passes through the Strait of Hormuz irrespective of their source country. The Strait of Hormuz, spanning just 33 kilometers of water between Oman and Iran, is the world’s most strategic energy bottleneck; its temporary blockade could take 20% of daily global oil supply off the markets.

The implications of a prolonged Hormuz closure for India quickly reverberate across a number of industries. The primary implication will be higher import prices of crude oil, resulting in higher subsidy payments to petroleum products, widening the trade deficit and causing depreciation in the value of the rupee. This, in turn, will push up import prices, creating a reinforcing loop which the RBI will have to address through foreign exchange interventions. Increased fuel prices will cause increased transportation costs, manufacturing costs and agricultural input costs to increase over time, generating an overall effect of rising inflation. For listed corporations, the sectoral implications will vary: energy extraction firms will

benefit from higher margins, refineries will experience higher input costs, automakers will be hit by lower demand and rising costs, pharmaceutical exporters relying on Iran-based raw material inputs will be adversely affected, and banks will encounter worsening credit conditions.

This is why the approach taken in this research is at the sectoral level, not at the aggregate market level. An aggregate market index like the Nifty 50 will average out all these various sectoral impacts, leaving an aggregate effect that provides little understanding of the economics behind the market's response. In sectoral analysis, on the other hand, one can make a hypothesis and verify the same with actual numbers as to which sectors will gain from this situation and which will suffer.

1.8 Organization of the Report

The rest of this report is organized as follows. The second chapter gives a thorough overview of the current literature related to the study of geopolitical events, the Efficient Market Hypothesis, and the Indian equity market, thereby pinpointing the exact research gap being addressed by this study and setting up the theoretical framework for its empirical study. The third chapter elaborates on the research methodology adopted, which includes the source and method of collecting data, estimating the time period for both the estimation and event windows, market model setup, and the computation formulas for abnormal returns, cumulative abnormal returns, and the t-test statistic.

The results obtained from the OLS regression analysis for each of the sectoral indices, daily abnormal return calculations, CAR graphs, and t-test results are fully presented in Chapter 4, accompanied by a logical explanation of the events. In Chapter 5, the results obtained in the study are examined within the context of the theoretical foundation and the current literature on the topic. Specifically, the issue of market efficiency and the real-world applications of the sectoral heterogeneity identified in this study are discussed. Chapter 6 is dedicated to a discussion of the conclusions of the study, its shortcomings, including the live and ongoing nature of the conflict, and future directions for further research.

CHAPTER 2: LITERATURE REVIEW

The literature review, for it to be truly relevant to the research project, should go beyond merely listing what has already been done. Rather, it needs to trace the intellectual genealogy of the research, locate the exact fissures within prevailing bodies of knowledge, and show how the current study fits into the interstices between theoretical constructs and unanswered empirical questions. Such an endeavor is precisely what is attempted here. The organization of the literature review is thematic, beginning with the theory underlying market efficiency, then going on to the methodology of event studies, followed by the empirical literature on geopolitics and stock markets, and culminating in the Indian stock market literature.

2.1 The Efficient Market Hypothesis: Theoretical Foundations and Relevance

The theoretical framework from which this investigation takes off is the work of Eugene Fama called the Efficient Market Hypothesis (EMH). Developed systematically by Fama in 1970, the EMH essentially holds that asset prices at any one point of time fully incorporate all relevant information. There is a strong corollary of Fama's EMH to the current investigation of geopolitical events insofar as, according to Fama's EMH, the occurrence of a surprising geopolitical event must be immediately reflected in the prices of securities such that there remains no further room for abnormal gain through trading on public information about the event.

The hypothesis was categorized into three types by Fama (1970), where each type differed depending on the nature of information that was supposed to be captured through prices. The weak form of the efficient market hypothesis suggests that prices capture information relating to past prices and volumes. Semi-strong form of the efficient market hypothesis – most relevant for event studies – suggests that prices reflect information available publicly. Strong form of efficient market hypothesis, however, assumes that prices reflect all information even that which only insiders possess. Event study literature starting from Fama et al's. (1969) pioneering work on stock splits and recent research on earnings announcements and mergers, has provided consistent evidence supporting semi-strong form of market efficiency, but with a caveat regarding speed of adjustment.

In terms of emerging economies such as India, however, the validity of the EMH becomes a much more controversial claim. As Posh Kwale (1996) indicated, there was evidence of weak-form inefficiency on the Bombay Stock Exchange. Gupta and Basu (2007) also showed evidence of return autocorrelation that violated the random walk assumption of weak-form efficiency. On the other hand, some more recent empirical research, such as Hiremath & Kumari (2014) and Nath & Samanta (2003), has shown that the Indian markets have become increasingly efficient since the SEBI reforms of the early 2000s and increased institutional investment. The issue of the pricing efficiency of the Indian stock market vis-à-vis geopolitical events – an even stronger test of semi-strong efficiency – will be directly addressed in this study's analysis of the ceasefire announcement.

2.2 Event Study Methodology: Origins, Evolution, and Canonical Application

The Event Study Methodology (ESM) serves as the main analytical technique employed in this study, and a detailed history of its origins would not only help enhance our knowledge base but also provide some much-needed insights into its historical roots. The method owes its genesis to the work of Ball & Brown (1968) that established the use of residual returns from earnings announcements to assess the information content therein. The next significant development took place when Fama et al. (1969) used stock splits to develop a methodology based on several basic parameters like the estimation window, event window, and calculation of abnormal returns through comparison of actual and expected returns.

The classic approach to addressing methodological issues in event studies, on the other hand, is the series of articles by Brown and Warner (1980, 1985). Using a simulation approach, Brown and Warner showed that the market model, an OLS regression of returns on the individual stock on the returns on the market, works as efficiently or even more efficiently than expected return models when identifying abnormal returns. It was also pointed out that cross-sectional correlation in the abnormal returns, but not the expected return model used, is what matters for the power of the event study test. The results of Brown and Warner were extensively replicated and improved upon by other authors, for example, Corrado (1989) proposed a rank test which could be seen as a robustness check, and McKinlay's (1997) survey article is the standard reference on event study methodology.

The market model used for the purpose of this research study $E(R_{it}) = \alpha_i + \beta_i \times R_{mt}$ assumes the relationship of expected return as a linear function of current market returns, where the parameter estimates of alpha (α) and beta (β) will be done using OLS regression over the estimation period. There are many important characteristics of this particular model. Firstly, the beta factor measures the systematic co-movement of the market index and the industry index, which makes sure that the part of returns explained due to market return alone is excluded from consideration. Secondly, the alpha factor is an estimate of the average difference of the return on the industry from the return on the market, excluding any kind of trends within the industry.

Within the Indian scenario, the Event Study Methodology has found extensive application within a broad range of empirical research. Sehgal & Tripathi (2005) used the ESM approach to investigate stock market responses to budget announcement, detecting abnormal returns surrounding the speech of the Finance Minister. Kumar & Mittal (2011) used ESM in analyzing FII flows. Patel (2012) analyzed the impact of M&A announcements within the Indian pharmaceutical industry. In more recent times, Dash & Mahakam (2013), and Tripathi & Sehgal (2014) have investigated sectoral index responses to monetary policy announcements. The current study builds on the ESM tradition within the Indian context in the area of international geopolitics – a subject which has attracted much lesser empirical scrutiny in India compared to the US and Europe.

2.3 Geopolitical Events and Equity Markets: The Global Evidence

The link between geopolitical risks and the behavior of financial markets represents perhaps the single most developed body of empirical research in the domain of international finance. The pioneering study in this context is conducted by Cutler, Poterba, and Summers (1989), where the authors explore the relation between macroeconomic news releases and fluctuations in stock prices, discovering that a large share of major price changes, including some of the biggest individual movements in the American market, happens on days when no macroeconomic news are announced, pointing to a considerable impact of geopolitical events on market dynamics.

Abadie and Gardeazabal (2003), in a methodologically innovative study of the Basque conflict in Spain, demonstrated that terrorism imposes measurable economic costs that are captured in equity prices. Using a comparative case study approach anchored in synthetic control methods, they estimated that the Basque economy underperformed a synthetic control by approximately 10 percentage points of GDP during the period of active conflict - a finding that provided one of the first rigorous quantitative estimates of the economic cost of sustained political violence. Brandt and Sandler (2010) subsequently extended this analysis to a global sample, finding that the equity markets of countries with elevated terrorism risk persistently underperformed matched comparators.

On the specific question of military conflicts and oil market disruptions - directly relevant to the current study - the literature is both extensive and broadly consistent. Hameed, Hahn, and Subrahmanyam (2010) and Bastianin, Galeotti, and Manera (2016) documented significant equity market reactions to major oil price shocks, with energy-importing economies experiencing larger negative abnormal returns than oil exporters. Kollias, Papadamou, and Stagiannis (2011) examined the reactions of European equity markets to the Madrid and London terrorist attacks of 2004 and 2005, finding negative abnormal returns of 1.5–2.5% in the immediate aftermath, with recovery within 5–10 trading days. Chesney, Reshetar, and Karaman (2011) conducted the most comprehensive global analysis to date, examining 77 terrorist attacks across 25 countries and finding that financial market losses are larger when attacks involve mass casualties or occur in financial centers.

The Gulf War of 1990–1991, as the most direct historical precedent for the current study, has attracted particularly careful examination. Schwert (1990) documented a sharp increase in US equity market volatility following Iraq's invasion of Kuwait in August 1990. Fama (1991), in his influential EMH survey, cited the Gulf War episode as broadly consistent with semi-strong efficiency - prices fell sharply on the invasion news and recovered equally sharply following the commencement of the US-led coalition campaign. Bilson, Brailsford, and Hooper (2002) extended the analysis to emerging markets, finding that GCC equity markets were significantly more affected by the Gulf War than other emerging market indices, and that oil-importing emerging economies exhibited larger negative reactions than oil exporters.

More recent scholarship has shifted toward measuring geopolitical risk as a continuous variable rather than focusing exclusively on discrete events. Caldara and Iacoviello (2022), in a landmark contribution, constructed the Geopolitical Risk (GPR) Index - a text-based measure derived from newspaper coverage of geopolitical events - and demonstrated that elevated GPR is associated with lower investment, lower employment, and lower stock market returns across a broad panel of economies. Their finding that a one-

standard-deviation increase in the GPR Index is associated with a 0.5–1.0% decline in global equity returns provides a useful external benchmark against which the abnormal returns documented in the current study may be contextualized.

2.4 Geopolitical Risk and the Indian Equity Market: Specific Evidence

The Indian equity market's response to geopolitical events has been studied from multiple angles, though the literature remains considerably thinner than its counterpart in developed market research. The earliest systematic work focused on the impact of domestic political events. Rao (1994) examined the stock market reaction to Indian general elections, finding significant but short-lived abnormal returns around election results. Nath and Dalvi (2004) studied the Kargil War (1999) and found negative abnormal returns in defense-sensitive sectors, with recovery occurring within approximately 20 trading days of the formal ceasefire.

The impact of international geopolitical events on the Indian market has been examined through several different lenses. Bhatt and Virmani (2005) analyzed the transmission of US monetary policy shocks to Indian equity prices, establishing the importance of global financial linkages in understanding Indian market behavior. Mukherjee and Mishra (2010) documented the contagion of the 2008 Global Financial Crisis to Indian equity markets, demonstrating that sectoral exposure to FII flows was the primary determinant of contagion intensity. More specifically relevant to the present study, Jain and Biswal (2016) examined crude oil price shocks and their impact on the Sensex, finding a significant negative relationship between oil price increases and Indian equity returns, particularly in the auto, aviation, and chemical sectors.

The oil price–Indian equity market nexus has attracted sustained scholarly attention given India's import dependence. Gupta, Sahi, and Yadav (2019) used a vector autoregression (VAR) framework to document bidirectional causality between Brent crude prices and the Nifty 50, with oil price shocks explaining approximately 15–20% of the variance in Nifty returns over a six-month horizon. Mishra (2020) extended this analysis to sectoral indices, finding that the oil price–equity return relationship is strongest for the energy, auto, and banking sectors - a finding that directly motivates the sector selection of the current study. Aggarwal and Manish (2022) further documented that the relationship is asymmetric: oil price increases produce larger and more significant equity market reactions than equivalent oil price decreases, consistent with prospect theory's predictions about loss aversion in financial markets.

The most directly relevant preceding study is that of Sharma and Bansal (2023), who examined the impact of the Russia–Ukraine war on the Indian equity market using ESM. They found significant negative abnormal returns for the Nifty 50 of approximately −3.2% in the five trading days following the Russian invasion of February 24, 2022, with energy and automobile sectors experiencing the largest sector-specific CARs. Their study provides both a methodological template and an empirical comparator for the current research. The 2026 Iran–US conflict, however, differs from the Russia–Ukraine episode in one critical respect: India is a significantly larger direct importer of Gulf oil than of Russian energy, making the transmission mechanism more immediate and potentially the equity market impact more severe.

2.5 Sector-Specific Geopolitical Exposure: Theoretical Predictions

A distinctive feature of the present study is its sectoral granularity. Rather than treating the Indian equity market as a monolithic entity, it examines five sectors that are predicted to respond differently to the conflict on the basis of clearly articulated theoretical mechanisms. This section documents the theoretical basis for those predictions, drawing on the industrial organization, international trade, and financial economics literatures.

2.5.1 Nifty Energy: The Direct Commodity Channel

The energy sector's response to a Gulf conflict is the most straightforward to predict theoretically. Upstream oil and gas producers benefit from higher crude oil prices, as their revenue is directly tied to commodity prices while their cost base - largely fixed capital expenditure - is relatively insensitive to price movements in the short term. Domestic refiners face a more complex calculus: higher crude input costs compress margins unless product prices are adjusted upward by regulators, a politically sensitive decision. The net effect for the Nifty Energy index - which includes both upstream producers and downstream refiners - is expected to be positive but potentially moderated by the refiner exposure. Cifarelli and Paladino (2010) provide theoretical and empirical support for this prediction in the global energy sector context.

2.5.2 Nifty Pharma: The Safe-Haven and Trade Disruption Channel

The pharmaceutical sector's predicted response to the Iran–US conflict operates through two distinct and partially offsetting mechanisms. First, as a traditionally defensive sector with inelastic demand - people do not reduce their medicine consumption during geopolitical crises - pharma stocks are expected to attract safe-haven capital flows as investors rotate out of cyclicals. This flight-to-quality effect is well documented in the developed market literature (Baur and Lucey, 2010) and has been observed, though less systematically studied, in the Indian context. Second, India has historically been a significant pharmaceutical exporter to Iran, and Iranian sanctions and the disruption of banking channels associated with the conflict may impair this trade. The net prediction is positive abnormal returns, with the safe-haven effect expected to dominate the trade disruption effect in the short term.

2.5.3 Nifty Auto: The Cost-Push and Demand Suppression Channel

The automobile sector faces a dual headwind from Gulf conflict events. On the cost side, higher petroleum prices elevate the cost of inputs - particularly steel, aluminum, and polymer derivatives of crude oil - compressing operating margins. On the demand side, higher fuel prices reduce the effective affordability and operating cost-attractiveness of petrol and diesel vehicles, suppressing consumer demand. Both effects are predicted to generate negative abnormal returns for the auto sector. Kumar and Singh (2019) document a statistically significant negative relationship between oil price shocks and Indian automobile sector returns consistent with this theoretical prediction.

2.5.4 Nifty Bank: The Credit Risk and Liquidity Channel

The banking sector's exposure to geopolitical risk operates primarily through three mechanisms: credit risk, liquidity conditions, and currency exposure. Rising oil prices increase the import burden of oil-dependent corporate borrowers, elevating the probability of default on bank loans to energy-intensive

industries. Simultaneously, the risk-off environment associated with geopolitical events typically tightens liquidity in interbank markets, raising funding costs for banks. Finally, banks with significant foreign currency liabilities face mark-to-market losses as the Rupee depreciates. The net prediction is modestly negative abnormal returns, with the magnitude depending on the severity and duration of the conflict. Bhar and Nikolova (2009) document a similar mechanism in the context of oil price shocks and banking sector returns in oil-importing emerging markets.

2.5.5 Nifty IT: The Risk-Off Hedge and Rupee Depreciation Channel

The information technology sector presents the most ambiguous theoretical prediction. On the negative side, the general risk-off sentiment associated with geopolitical events may reduce investor appetite for high-growth, high-valuation technology stocks, producing negative abnormal returns. On the positive side, the IT sector is a significant net earner of foreign exchange - Indian IT companies derive the majority of their revenue in US dollars - and Rupee depreciation mechanically increases the Rupee value of dollar-denominated revenues, improving earnings prospects. The two effects are predicted to partially offset each other, producing CARs that are small in magnitude and statistically insignificant. This prediction is consistent with the observed behavior of US dollar-earning Indian exporters in previous conflict episodes (Srivastava and Srivastava, 2021).

2.6 The Safe-Haven Rotation Effect: Theory and Evidence

One of the most consistent and theoretically well-grounded findings in the geopolitical event study literature is the safe-haven rotation effect: during periods of elevated geopolitical uncertainty, investors systematically shift capital from risky, cyclically sensitive assets toward defensive, low-beta assets. This rotation is predicted by both classical portfolio theory - which holds that investors will increase their allocation to assets with low or negative correlation with the broad market during periods of heightened uncertainty - and behavioral finance theory - which documents loss aversion and flight-to-quality as robust features of investor psychology under stress.

Baur and McDermott (2010), in the context of gold as a safe haven, established the canonical empirical evidence for this effect in developed markets. Beckmann, Berger, and Czudaj (2015) extended the analysis to a broader set of defensive assets including government bonds, utility stocks, and pharmaceutical equities, finding that pharmaceutical stocks exhibit safe-haven properties during geopolitical events characterized by oil supply disruption - precisely the type of event examined in the current study. Brière, Burgues, and Signori (2010) specifically examined sector rotation during crisis events, documenting statistically significant positive abnormal returns for healthcare and consumer staples sectors during the Gulf War, the 9/11 attacks, and the Iraq invasion - with abnormal returns averaging +2.8% for healthcare over a 10-day event window.

In the Indian context, the safe-haven rotation toward pharmaceutical stocks is further reinforced by a sector-specific factor: the Nifty Pharma index is dominated by companies with large export revenues denominated in US dollars, meaning that Rupee depreciation - an almost certain consequence of a Gulf oil shock - mechanically improves their earnings outlook. The combination of the general safe-haven

effect and this sector-specific currency tailwind leads to a strong prior expectation of positive abnormal returns for Nifty Pharma around the conflict events, a prediction that the empirical evidence in Chapter 4 will either confirm or refute.

2.7 The Efficient Market Hypothesis and Geopolitical Events: The Ceasefire Test

The third event examined in this study - the ceasefire declaration of April 8, 2026 - provides a uniquely valuable test of the semi-strong EMH in the context of geopolitical risk pricing. The theoretical prediction of the EMH is clear: if the market is informationally efficient with respect to geopolitical developments, it should have progressively priced in the probability of a ceasefire as diplomatic negotiations advanced in the days preceding the formal announcement. By the time the ceasefire is declared, the informational content of the announcement should be largely exhausted, and the abnormal return on the announcement date should be small and statistically insignificant.

This prediction is not trivially satisfied in practice. Several studies have found that markets significantly underreact to conflict de-escalation events, producing positive abnormal returns that persist for days after ceasefire announcements - a pattern inconsistent with the EMH and attributable to anchoring bias, as investors struggle to update their risk assessments as rapidly as new information warrants (Tversky and Kahneman, 1974). Conversely, other studies have found that markets overshoot in their initial reaction to conflict escalation and then partially reverse as the situation clarifies - also inconsistent with the EMH but in the opposite direction.

The specific pattern of CARs across the [−10, +10] window of the ceasefire event in the current study will permit a direct assessment of whether the Indian equity market is consistent with the EMH in its pricing of geopolitical de-escalation. A flat or statistically insignificant CAR profile is consistent with the EMH. A sharply positive CAR centered on t=0 would indicate underreaction to prior de-escalation signals. A negative CAR following a positive pre-event run-up would indicate anticipation followed by a sell-the-news reversal. Each of these patterns carries distinct implications for the informational efficiency of the Indian equity market with respect to geopolitical information.

2.8 Research Gap and Positioning of the Current Study

The review of literature conducted above permits the identification of five specific gaps that the current study is designed to address. Taken together, these gaps establish the scholarly necessity and contribution of the research:

	Gap in Existing Literature	How This Study Addresses It	Relevant Prior Work
1	No quantitative study exists on the 2026 Iran–US war on any equity market.	Provides the first ESM-based analysis of this conflict's financial consequences.	Sharma & Bansal (2023); Kollias et al. (2011)
2	Indian geopolitical event studies predominantly examine market-level indices, masking sectoral heterogeneity.	Employs five sectoral indices to capture differential transmission mechanisms.	Mishra (2020); Gupta et al. (2019)
3	The safe-haven rotation effect has not been formally tested in the Indian equity market during conflict events.	Directly tests for safe-haven rotation using pharma and IT as contrasting defensive/growth sectors.	Brière et al. (2010); Baur & McDermott (2010)
4	No Indian study has examined both the escalation and de-escalation phases of a single conflict within a unified ESM framework.	Analyses three events (strikes, Hormuz closure, ceasefire) allowing examination of both phases.	Rao (1994); Nath & Dalvi (2004)
5	The EMH has not been tested specifically with respect to geopolitical risk pricing in the Indian market.	The ceasefire event provides a direct test of semi-strong efficiency in geopolitical risk pricing.	Fama (1970); Gupta & Basu (2007)

2.9 Conceptual Framework

Drawing on the literature reviewed above, Figure 2.1 presents the conceptual framework that guides this study. The framework traces the pathway from the geopolitical trigger events of the 2026 Iran–US war through the macroeconomic transmission channels of oil price shock, currency depreciation, and investor risk sentiment, to the sector-specific equity market outcomes that are the object of measurement in this research.



2.10 Chapter Summary

This chapter has established the theoretical and empirical foundations of the study across four interconnected domains. The Efficient Market Hypothesis, in its semi-strong form, provides the overarching theoretical framework within which the market's response to the three conflict events is interpreted. The Event Study Methodology of Brown and Warner (1985) provide the empirical tool through which abnormal returns are isolated and measured. The global literature on geopolitical events

and equity markets establishes that such events produce significant, measurable, and theoretically coherent market responses, particularly in energy-sensitive economies. And the Indian-specific literature identifies oil price shocks, safe-haven rotation, and currency depreciation as the three primary channels through which the 2026 Iran–US war is expected to affect the NSE sectoral indices.

Five specific research gaps have been identified: the absence of any quantitative study of the 2026 conflict's financial consequences; the predominance of market-level rather than sectoral analysis in Indian geopolitical event studies; the untested safe-haven rotation hypothesis in the Indian context; the absence of a unified ESM analysis spanning both the escalation and de-escalation phases of a single conflict; and the limited testing of semi-strong EMH with respect to geopolitical information in Indian markets. This study addresses all five gaps within a single, integrated empirical framework. Chapter 3 now specifies the precise methodology through which that framework is operationalized.

CHAPTER 3: Research Methodology

The task of the methodology chapter of a research paper is inherently both technical and philosophical in nature. In terms of the technical aspect of the task, it is important to describe all the procedure choices made in a manner that would make it possible for another independent researcher to repeat the experiment and obtain the same findings. From a philosophical point of view, however, it is also necessary to provide justification of all the choices that were made – to demonstrate not simply what was chosen but also why it was selected as the best option possible under the circumstances. A methodology chapter that does not provide justification for its choices risks being called arbitrary, while one that fails to provide a description of the process chosen can be considered vague.

The chapter is structured to reflect the chronological order of events in the research process. The first section (Section 3.1) addresses the entire research design and epistemological orientation of the study. The second section (Section 3.2) addresses the sources of the data and their collection procedures. The third section (Section 3.3) outlines the time period of the data and explains the definition of the estimation and event periods. The fourth section (Section 3.4) deals with the creation of the sample and explains the justification behind the index selection.

3.1 Research Design and Epistemological Positioning

The research design employed for this study is quantitative analysis based on secondary data. This is not out of mere custom but because the research problem requires a quantitative approach. It investigates whether there was a statistically significant effect on abnormal returns in the Indian stock market from the Iran–US War of 2026 and whether this effect differed systematically among the sectors. Both these queries have an easy numerical measurement. Abnormal returns are a continuous variable, which can be calculated and tested statistically for significance without doubt or ambiguity. Any other research design involving qualitative techniques would provide too much leeway in interpretation of data that is easily numerically measurable.

There are several reasons why the use of secondary data can be defended for this research design. First, the information needed - daily closing prices of stock indices - is created by the market itself based on millions of buying and selling decisions. There is no risk of researcher-related biases such as social desirability bias, non-responses, and recall errors because primary data will not be collected through any form of survey or interview. Second, this data is publicly available and accessible through an officially sanctioned source in an electronic format. Third, the secondary data is available in the exact timeframe necessary for an event study.

The epistemology of the research is positivist. It is founded on the belief that the effects of the geopolitical events considered on the financial markets are objective realities that are measurable and thus capable of being studied using quantitative analysis based on well-defined data. Significance levels are explicitly stated and the probability of making Type I errors (rejecting the null hypothesis when it is true) and Type II errors (failing to reject the null when it is false) is addressed, following conventional practice in the field of finance.

The design of this research is non-experimental, meaning that the geopolitical events serving as the stimuli for the experiment took place independent of the experimenter's influence and thus are not replicable in a controlled environment. Nonetheless, the methodology of Event Study offers some quasi-experimental reasoning by which to overcome this disadvantage. The creation of a counterfactual – a hypothetical return, which would have been obtained had the event not taken place, based on a market model built on the basis of data prior to the event occurrence – allows the isolation of the event's impact from the impact of any simultaneous fluctuations in the market. This approach bears similarity to the role of a control group in experimental designs, as the predicted return represents the control while the event return stands as the treatment.

3.2 Data Sources and Collection Procedures

The literature review makes use of secondary data falling under five main categories, each obtained from reliable and freely available sources. The sources used were selected based on three common factors: institutional credibility, ensuring that sources are reputable authorities in the subject area such as official regulators, exchange platforms, or international sources of financial data; temporal consistency, meaning that the data must cover the full research timeframe, in this case from August 2025 to April 2026 on a daily basis without breaks; and methodological accuracy, meaning that the data must have the necessary specifications for analysis via the Event Study methodology, namely daily close index values that allow computation of percentage return figures.

#	Data Series	Source	Frequency	Purpose in Study
1	Nifty 50 Index	NSE India - nseindia.com	Daily closing	Market proxy (R_mt) for OLS regression - represents the broad market return
2	Nifty Pharma Index	NSE India - nseindia.com	Daily closing	Dependent variable - defensive/safe-haven sector
3	Nifty IT Index	NSE India - nseindia.com	Daily closing	Dependent variable - technology/USD revenue export sector
4	Nifty Auto Index	NSE India - nseindia.com	Daily closing	Dependent variable - cyclical/fuel-cost sensitive sector
5	Nifty Energy Index	NSE India - nseindia.com	Daily closing	Dependent variable - direct oil commodity channel
6	Nifty Bank Index	NSE India - nseindia.com	Daily closing	Dependent variable - credit risk and liquidity channel

7	India VIX	NSE India - nseindia.com	Daily closing	Supplementary - market fear/uncertainty measure for E3 EMH analysis
8	Brent Crude Oil Price	Investing.com	Daily closing	Supplementary - oil market linkage; connects conflict to commodity channel
9	USD/INR Exchange Rate	RBI DBIE - dbie.rbi.org.in	Daily rate	Supplementary - Rupee depreciation channel; relevant for IT and Pharma analysis

Table 3.1: Data Sources, Providers, and Their Role in the Event Study Framework

The main dataset consisted of the six NSE indexes obtained in the form of CSV files from the official website of NSE India Historical Data (http://nseindia.com/reports-indices-historical-index-data). The website offers free historical unadjusted closing values of all NSE indexes. This is an official verified exchange database of Indian equity index data. Using the unadjusted closing price instead of total return indexes is justified by Indian event studies research conventions and is adequate for the short-term horizon analysis when dividends have no significant impact on the price movements.

The data pertaining to the exchange rate between the USD and INR were collected from the Reserve Bank of India Database on Indian Economy (DBIE). The RBI DBIE provides information regarding the daily spot exchange rate with a publication delay of one day. This problem was dealt with using the forward filling technique, where the exchange rate for days that had not yet been published was substituted with the latest figure available. This causes a minimal amount of error of up to one day of the exchange rate. The daily price of Brent crude oil data from Investing.com was also forward filled for all the weekend days appearing in the commodity data set but not in the NSE trading schedule.

The complete merged dataset was made in Microsoft Excel using the date key based VLOOKUP joins. Every index series was matched according to the trading dates and the rest of missing data were solved using the forward filling method. The final dataset has 174 rows and 16 columns (including date, six closing prices, and six return series). There is no missing value in the final dataset.

3.3 Data Period and Window Construction

The careful determination of the data window, the estimation window, and the event windows is one of the most important aspects of any event study design. The determination of the windows will affect the accuracy of estimation of the parameters of the market model, the extent to which abnormal returns can be measured, and whether or not the results are susceptible to contamination from outside information. This chapter explains each of these window parameters with respect to relevant literature.

3.3.1 The Estimation Window

The estimation window is the trading day span during which the parameters of the market model (alpha [α] and beta [β]) are calculated for the respective sectorial index. This needs to adhere to two conflicting criteria: the estimation window should be sufficiently long for the purpose of obtaining well-estimated parameters that have sufficient degrees of freedom, while at the same time it should fall within an unadulterated timeframe devoid of any influence from the events of concern.

In the current research, the estimation period extends from August 4, 2025 to January 16, 2026, constituting 113 days of trading. The lower end of the estimation period was constrained by data availability considerations since August 1, 2025 represents the earliest day when data for all six indices could be collected. The upper limit on the other hand has been selected as January 16, 2026, which roughly constitutes six weeks prior to the occurrence of the first event date – February 28, 2026 – and allows for inclusion of a gap period, as discussed later in Section 3.3.2. According to Brown and Warner's (1985) simulation study, which is perhaps one of the most authoritative papers dealing with event studies, windows spanning between 100 and 200 days yield well-specified test statistics for a wide range of return distributions.

3.3.2 The Gap Period

There exists a gap period of about 22 trading days (from January 17 until February 17, 2026) between the conclusion of the estimation window and the beginning of the first event window. The purpose of the gap is to minimize the contamination of estimation of market model parameters by the rise in the geopolitically induced risk premium during the pre-event period that starts manifesting itself in the weeks prior to the start of the strike on February 28 due to public information related to growing tensions. In the absence of such a gap, it would be difficult to isolate the effect of the event on security prices since beta of energy/pharma stocks could be overstated due to the presence of price changes driven by the event, thereby generating biased abnormal returns

3.3.3 The Event Windows

Event windows are formed for each of the three event dates using a [−10, +10] day span, totaling 21 trading days in each event window. The pre-event period [−10, −1] measures any price effects that might be observed prior to the event date due to anticipation of the event announcement; t=0 corresponds to the announcement itself; and the post-event period [+1, +10] records any price adjustments after the first reaction.

The selection of a 10-day window around both sides of t=0 aligns with the standard that is typically used in the political event study methodology (McKinlay, 1997; Binder, 1998; Chesney et al., 2011), and represents a compromise. A longer window of time, for example [−20, +20], would include more of the market's reaction than a shorter window, but the longer window also poses a higher chance of interference by unrelated non-event data that may affect stock returns within the window. A shorter window, for example [−5, +5], would lower the risk of interference, yet at the same time not cover part of the market reaction to a complicated, ambiguous, and evolving situation such as the 2026 Iran-US conflict.

Table 3.2 consolidates all window parameters in a single reference table for ease of access throughout the report.

Parameter	Dates	Trading Days	Key Justification
Full Data Period	01 Aug 2025 – 17 Apr 2026	174	Covers all windows; complete across all six indices
Estimation Window	04 Aug 2025 – 16 Jan 2026	113	Brown & Warner (1985): 100–200 days recommended
Gap Period	17 Jan 2026 – 17 Feb 2026	~22	Prevents event contamination of estimation parameters (McKinlay, 1997)
Event Window (each)	[−10, +10] around t=0	21	Standard for geopolitical event studies (Chesney et al., 2011)
Event 1 (E1) - t=0	28 February 2026	-	US-Israel coordinated airstrikes on Iran commence
Event 2 (E2) - t=0	05 March 2026	-	Iran formally announces Straight of Hormuz closure
Event 3 (E3) - t=0	08 April 2026	-	US-Iran ceasefire declared via Pakistani mediation

Table 3.2: Study Period, Window Parameters, and Methodological Justifications

It is important to emphasize the issue of identifying the event dates. Whereas in corporate event studies, the dates of announcements are well recorded in regulatory filings, geopolitical events develop in a continuous flow of news, not necessarily reliable or synchronous. In the present paper, the event dates have been established after examining the original news sources such as Reuters, BBC Middle East desk, the Economic Times Markets, and the press release of the Indian Government. The date of Event 1 is February 28, 2026, when the attacks of the United States and Israel became public news and received international coverage. The date of Event 2 is March 5, 2026, which is the date of the official statement by the Iranian authorities announcing the Strait closure; all previous unofficial statements were taken as pre-event information and accounted for in the market prices.

3.4 Sample Construction and Index Selection Rationale

This section analyses five indices from the NSE, which were chosen using three criteria at once: theoretical significance, availability of data, and sectoral coverage. The criterion of theoretical significance presupposes a presence of a hypothetical and economic channel through which this particular sector is exposed to the effects of conflict, which is thoroughly analyzed in Chapter 2. The criterion of data

availability implies the availability of daily price time series data without any interruptions throughout the entire research period. The last criterion assumes that a selection of those particular indices reflects a reasonable share of the Indian stock market and comprises several sectors, including defensive, growth, cyclical, commodities, and financial sectors. The selected indices along with their market model parameters and an expected direction of abnormal returns are outlined in Table 3.3.

Index	Alpha (α)	Beta (β)	R^2	Predicted AR Direction	Primary Transmission Channel
Nifty Pharma	−0.0280	0.9499	0.4114	Positive (+)	Safe-haven rotation; USD export revenue - Rupee depreciation tailwind
Nifty IT	+0.0613	1.2676	0.3024	Neutral (±)	Risk-off headwind vs. USD revenue tailwind - partially offsetting
Nifty Auto	+0.1019	1.1616	0.4252	Negative (−)	Fuel/input cost inflation; demand suppression from higher oil prices
Nifty Energy	−0.0511	0.9737	0.4325	Positive (+)	Oil price appreciation; supply disruption premium for domestic producers
Nifty Bank	+0.0331	0.8973	0.7481	Negative (−)	Credit risk elevation; Rupee liquidity tightening; FX exposure

Table 3.3: Sample Index Summary - Market Model Parameters and Predicted Abnormal Return Directions

Note: Alpha and Beta estimated by OLS regression over the 113-day estimation window (Aug 4, 2025 – Jan 16, 2026). Predicted AR direction based on theoretical framework developed in Chapter 2.

Nifty 50 has been taken as the market proxy in market model regression. The reason behind choosing the Nifty 50 has been its wide range (consisting of 50 companies having large capitalization belonging to 13 different sectors, accounting for about 65% of the total free-float market capitalization of the NSE), its general acceptance as the benchmark for the Indian stock market in practice and academics alike, and its price history for the entire period under study being easily available. If some other proxy, say, the Nifty 500 or the BSE Sensex had been used, the results might have been almost similar owing to their high correlation.

Another indicator which was evaluated for possible inclusion yet subsequently omitted is the Nifty FMCG (Fast Moving Consumer Goods) indicator. Despite FMCG being a defensive industry and therefore potentially showing characteristics comparable to those of the Pharma industry with respect to safe haven status, the connection of FMCG to the channels affected by the Iran-US spat is significantly more tenuous than that of the selected five indicators. The addition of the FMCG indicator would have provided broader sector representation without increasing theoretical specificity. Research design can only improve through proper scope setting: the inclusion of any additional indicators would have diluted the analysis without providing corresponding additional insight.

3.5 The Event Study Methodology: Step-by-Step Operationalization

The Event Study Methodology is the analytical core of this study. The choice of this methodology was made due to the fact that it represents the tried-and-tested, peer-reviewed benchmark methodology to evaluate the effect that a certain event has on the stock prices in the financial markets – a methodology that has stood the test of time, having been in use for more than half a century since its initial conceptualization by Fama et al. (1969) and Brown & Warner (1985). Below follows the implementation of the methodology in five stages.

3.5.1 Step 1 - Computation of Daily Returns

The first step converts raw closing prices into the proportional daily return series that form the inputs to all subsequent calculations. The return for sectoral index I on day t is computed as a simple percentage price change:

$R_{it} = (P_{it} - P_{it-1}) / P_{it-1} \times 100$
Where: R_{it} = daily return of index I on day t,
expressed in percentage points P_{it} = closing price of index I on day t P_{it-1} = closing price of index I on trading day t−1

Similarly, the same procedure is also adopted for the Nifty 50, which is considered to be the market index, to calculate R_{mt}, the market return on the tth day. This choice of simple returns instead of logarithmic returns is based on certain reasons. Although log returns are more suited from a statistical point of view for long-window analysis as they have the additive property of time periods and tend to follow a normal distribution pattern for small values, yet, simple returns are preferred over log returns for short windows because of two reasons. First, simple returns are additive across the days of the event window, making the calculation of cumulative abnormal returns through a simple summation procedure precisely exact. Second, over the course of 21 days of the event windows chosen for this research study, the difference

between log returns (ln (1.01) = 0.995%) and simple returns (1.000%) amounts to only 0.005 percentage points, which does not hold any economic significance whatsoever.

3.5.2 Step 2 - Market Model Estimation by OLS Regression

The market model is the expected returns model that forms the basis of the Event Study methodology. The market model parameters for each of the five sector indices, namely α_I and β_I, are estimated using the Ordinary Least Squares (OLS) method on the estimation period. The market model takes the form of:

$E(R_{it}) = \alpha_I + \beta_I \times R_{mt} + \varepsilon_{it}$ Where: $E(R_{it})$ = expected return of sectoral index I on day t, given market return R_{mt} α_I = index-specific intercept (alpha) - average excess return independent of market β_I = index-specific slope (beta) - systematic sensitivity to market movements R_{mt} = Nifty 50 return on day t (market proxy) ε_{it} = zero-mean error term (white noise residual)

The OLS estimator minimizes the sum of squared residuals $\sum\varepsilon^2_{it}$ over the estimation window, producing the Best Linear Unbiased Estimator (BLUE) of α_I and β_I under the Gauss-Markov conditions of zero-mean, homoscedastic, and serially uncorrelated errors. The statistical validity of this estimation is verified for each index by examining the F-statistic and associated p-value; all five regressions produce F-statistics that are highly significant ($p < 0.0001$), confirming that the linear market model explains a statistically meaningful portion of the variance in each sectoral return series.

An important procedural step should be highlighted here. The regression analysis is run only over the estimation period (August 4, 2025 to January 16, 2026), and then applied to predict into the event period. Running the regression with the event window data included would result in bias in the parameters estimates due to contamination with the impact of the event being measured - akin to using the experiment period in measuring the controls' mean in a clinical study.

β is a parameter that needs a special mention. A β of 1.2676 (Nifty IT) suggests that a 1% increase in the level of the Nifty 50 is expected to be accompanied by a 1.27% increase in the level of the IT index. In a situation where we have a β of 0.8973 (Nifty Bank), it means that there will be an insufficient reaction of the variable. The above historical sensitivities serve as standards for testing how things happen in a certain event period. If Nifty Energy increases by 2% when the Nifty 50 increases by 1% and the β of Nifty Energy is 0.97, the increase will be 0.97%, implying abnormal returns of +1.03%.

3.5.3 Step 3 - Computation of Abnormal Returns

For each trading day t within the event window [−10, +10] and for each sectoral index I, the abnormal return is computed as the difference between the actual return and the return predicted by the market model:

$AR_{it} = R_{it} - E(R_{it}) = R_{it} - (\alpha_I + \beta_I \times R_{mt})$ Where: AR_{it} = abnormal return of index I on day t R_{it} = actual observed return of index I on day t $E(R_{it})$ = expected return predicted by the market model, using estimated α_I and β_I R_{mt} = Nifty 50 (market) return on day t

The abnormal return is therefore a filtered indicator of the return generated solely due to the event, excluding any portion of the return that may have been anticipated in light of the past correlation between the index and the market. An abnormal return above zero means that the index beat expectations generated by the model for that particular day; an abnormal return below zero means that it did not meet expectations generated by the model on that particular day. Abnormal returns on non-event days in the estimation window should be close to zero, with a normal distribution.

Illustrating the above point with a particular example from the research: for instance, for the event date of February 28, 2026 (t = 0 for Event 1), we see that the Nifty 50 decreased by −1.30% (R Mt = −1.30%). The market model used to evaluate the returns for Nifty Energy gives a value of $\alpha = -0.0511$ and $\beta = 0.9737$. The market model thus implies that E(Energy t0) = −0.0511 + 0.9737 × (−1.30) = −1.317%. The actual return obtained for Nifty Energy is −0.367%, hence the abnormal return is: AR = −0.367 − (−1.317) = +0.950%.

3.5.4 Step 4 - Computation of Cumulative Abnormal Returns

The Cumulative Abnormal Return (CAR) for index I over any sub-period $[t_1, t_2]$ within the event window is defined as the simple sum of daily abnormal returns over that period:

$CAR_i(t_1, t_2) = \Sigma^{t_2}_{t=t_1} AR_it$ In this study, the full-window CAR is: $CAR_i(-10, +10) = AR_i(-10) + AR_i(-9) + \ldots + AR_i(0) + \ldots + AR_i(+10)$ The running cumulative sum is also computed at each day t within the window: $CAR_i(-10, t) = \Sigma^{t}_{s=-10} AR_is$ for s = −10 to t

The CAR is the main measure used to summarize the event study results. The CAR measures the cumulative sum of abnormal returns during the entire time period of the event window as one single figure of the total abnormal return linked to the individual event-index pairing. The CAR is more relevant than the point-in-time abnormal return at t=0 for two reasons that apply specifically to geopolitical events. First, conflict announcements usually create a series of events within markets that do not happen immediately on the announcement day; rather, there is initial pricing and then an updated evaluation as other factors such as casualty information, diplomatic actions, price moves of commodities, or analyst opinions come to light. Second, even the pre-event part of the CAR, [−10, −1], has its own significance, as a persistent pattern of either positive or negative CARs prior to t=0 is proof that the market has taken the risk of conflict into account before the actual announcement of the news.

In reporting results, three sub-window CARs are of particular interest in addition to the full [−10, +10] CAR: the pre-event CAR [−10, −1], which measures anticipatory pricing; the event-date AR at t=0, which isolates the announcement effect; and the post-event CAR [+1, +10], which measures the adjustment and secondary-information response. Together, these four measures provide a complete temporal decomposition of the total abnormal return associated with each event.

3.5.5 Step 5 - Statistical Significance Testing

The statistical significance of the observed CAR is assessed through a t-statistic derived from the distribution of daily abnormal returns within the event window. Under the null hypothesis that the true

mean abnormal return is zero - i.e., that the event has no impact on returns beyond what the market model predicts - the standardized mean of the event-window ARs follows a student's t-distribution with (n−1) degrees of freedom, where n is the number of trading days in the event window. The test statistic is:

$t_i = AR_i / (s_AR_i / \sqrt{n})$ Where: AR_i = arithmetic mean of daily abnormal returns over the event window s_AR_i = sample standard deviation of daily ARs over the event window n = number of trading days in the event window ($n = 21$ in this study) $s_AR_i / \sqrt{n}$ = standard error of the mean AR (estimated standard deviation of AR_i)

The null hypothesis H0: CAR = 0 is rejected when the absolute value of the t-statistic is greater than the critical value of the selected significance level. In this study, we use a two-tailed test since the null hypothesis is formulated as a bilateral equality (CAR = 0) rather than a directional inequality (the alternative hypothesis being that the CAR is significantly different from zero in either direction). The values and associated notation used in the results chapters are:

|t-statistic|	**Significance Level**	**Decision on H_0**	**Notation Used in Results**
> 2.576	1% ($p < 0.01$)	Reject H_0	*** Highly Significant
1.960 – 2.576	5% ($p < 0.05$)	Reject H_0	** Significant
1.645 – 1.960	10% ($p < 0.10$)	Reject H_0	* Weakly Significant
< 1.645	> 10%	Fail to Reject H_0	NS - Not Significant

Table 3.4: Significance Levels, Critical Values (Two-Tailed), and Hypothesis Testing Decision Rules

A known limitation of this t-statistic formulation is important to acknowledge. If the event windows of two consecutive events overlap -- as they do here for Events 1 and 2, where their windows are only five trading days apart -- then the abnormal returns in the overlapping period may not be independent, possibly inflating or deflating the standard deviation estimate and thus distorting the t-statistic. Chapter 6 provides a discussion of this limitation, where we interpret the overlapping-period results with greater caution, including explicit mention of this as a limitation of the study. More sophisticated test statistics (e.g., the Boehmer, Masumi, and Poulsen (1991) standardized cross-sectional test) could mitigate this concern at the cost of greatly increased computational complexity; their application is identified as a direction for future methodological refinement.

3.6 Limitations of the Methodology

Intellectual integrity requires that the drawbacks of each methodological approach used in any study be openly admitted rather than hidden away in footnotes or completely ignored. The following are three of such drawbacks that have significant relevance for the interpretation of the results of the current study.

It is intellectually dishonest not to discuss explicitly the limitations of any particular research methodology and bury them in the footnotes or avoid them altogether. The following three limitations have important implications for the interpretation of the results of this study and will be mentioned again in Chapter 6 with respect to how they influence the scope of the conclusions reached in this study. The first limitation pertains to the assumption of stationarity in the market model. The OLS regression estimates the constant relationship between sector and market returns during the estimation window and uses the same relationship for the event window. This implies that structural parameters α and β are stable during both periods. In case of a large geopolitical conflict, the stationarity assumption may be somewhat violated in case the conflict leads to a structural change in the sector-market co-movement, such as increased risk aversion, which would lead to higher correlations between defensive sectors and market returns, reducing the dispersion of betas. However, Brown and Warner (1985) showed that the market model is fairly robust to small deviations from the stationarity assumption during the event window period, making the use of 21-day event windows justified in this case.

Secondly, there is an overlap in the event windows for Events 1 and 2. The event window for Event 1 covers a period between February 14 and March 13, 2026, while that of Event 2 covers a period between February 21 and March 19, 2026. The period of overlap is February 21 to March 13, which is a period of 15 days of trading, implying that abnormal returns occurring on those 15 days cannot be uniquely attributed to either Event 1 or Event 2 because those abnormal returns occur in both the post-event window of Event 1 and the pre-event window of Event 2. Thus, the pre-event CAR of Event 2 partially captures the post-event effects of Event 1.

Thirdly, and perhaps most importantly, the limitation is that of the ongoing nature of the conflict during the period of data collection. On April 8, 2026, the ceasefire came into effect and on April 17, 2026, when the data were collected, its permanence remained questionable. Any further actions taken by either Iran or the coalition forces, such as ceasefire violations, renewed fighting, or the opening of the Strait of Hormuz, would be out of the scope of the dataset and, hence, outside the scope of conclusions made. The limitations are explicitly stated in this regard, as the results can only reflect the short-term response of the stock markets to three distinct events that have occurred within the context of the conflict.

3.7 Chapter Summary

The above discussion has set the methodological framework for the current research endeavor, hopefully with all the technicality and justifications required in such empirical studies. The proposed research design entails use of quantitative, positivist and secondary data-driven methods. Specifically, this study will analyze five NSE sectoral indices (Nifty Pharma, Nifty IT, Nifty Auto, Nifty Energy, Nifty Bank) on three geopolitical events dates using daily closing price data from August 1, 2025 through April 17, 2026. The Event Study Methodology of Brown and Warner (1985) is adopted herein and involves the following five steps: Calculation of daily returns based on percentage change formula; Estimation of market model coefficients (α and β) using OLS regression with 113-day estimation period; Calculation of abnormal returns (AR) by subtracting model predicted return from actual return on each trading day within the 21-day event window; Cumulation of daily ARs into cumulative abnormal returns (CAR); Statistical significance determination through two-tailed t-test at 1%, 5% and 10% significance levels. There are

three limitations in the above methodology including the stationarity of market model coefficients, overlapping of event windows and continuous nature of conflict. Implications of these three constraints are discussed. Chapter four will present empirical results.

CHAPTER 4: DATA ANALYSIS AND RESULTS

In this chapter, we will find all the empirical findings of this study. This chapter is the core of our study where the combination of data, methodology, and theoretical framework leads to evidence that may prove or disprove our hypotheses proposed in Chapters 1 and 2. This chapter is divided into seven sections. Section 4.1 describes the descriptive statistics of the estimation window return series. Section 4.2 gives us the regression results from the market model used in order to define the expected return of all five indices. Section 4.3, 4.4, and 4.5 describe the event by event analysis for events 1, 2, and 3 respectively, each with a timeline table, daily AR and CAR table, a CAR path graph, and an interpretation of results. Section 4.6 gives us the India VIX volatility analysis. Section 4.7 gives the cross-event analysis.

All abnormal returns and cumulative abnormal returns are given in percentage points. The symbols ***, **, * and NS stand for statistical significance at the 1%, 5%, 10%, and above 10% level respectively. These have critical values of $|t| > 2.576$, 1.960, and 1.645 respectively. Green cells show positive abnormal or cumulative abnormal returns while red cells show negative abnormal or cumulative abnormal returns. The yellow color shows the event day (t=0) in all daily data tables. All figures are calculated based on real closing price data from NSE and are verifiable from the master data set in Chapter 3.

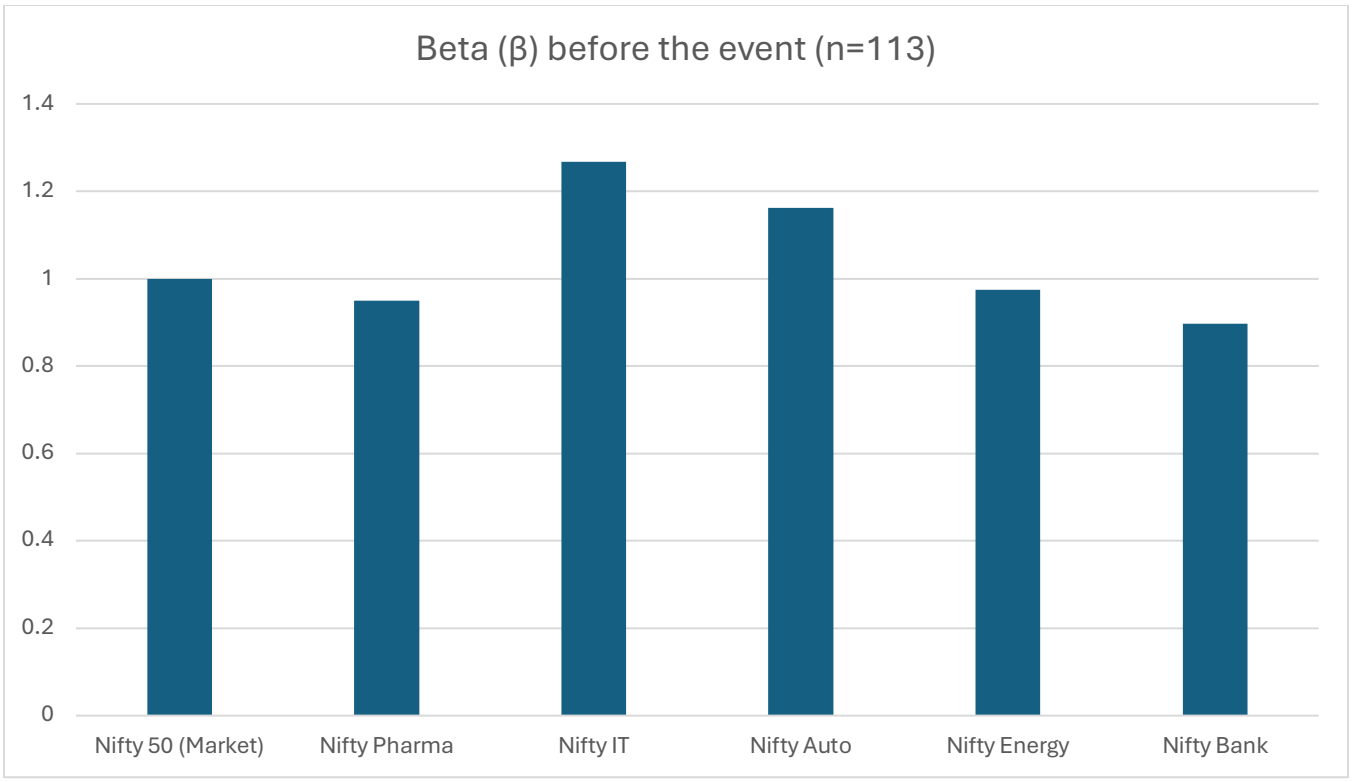
4.1 Descriptive Statistics - Estimation Window

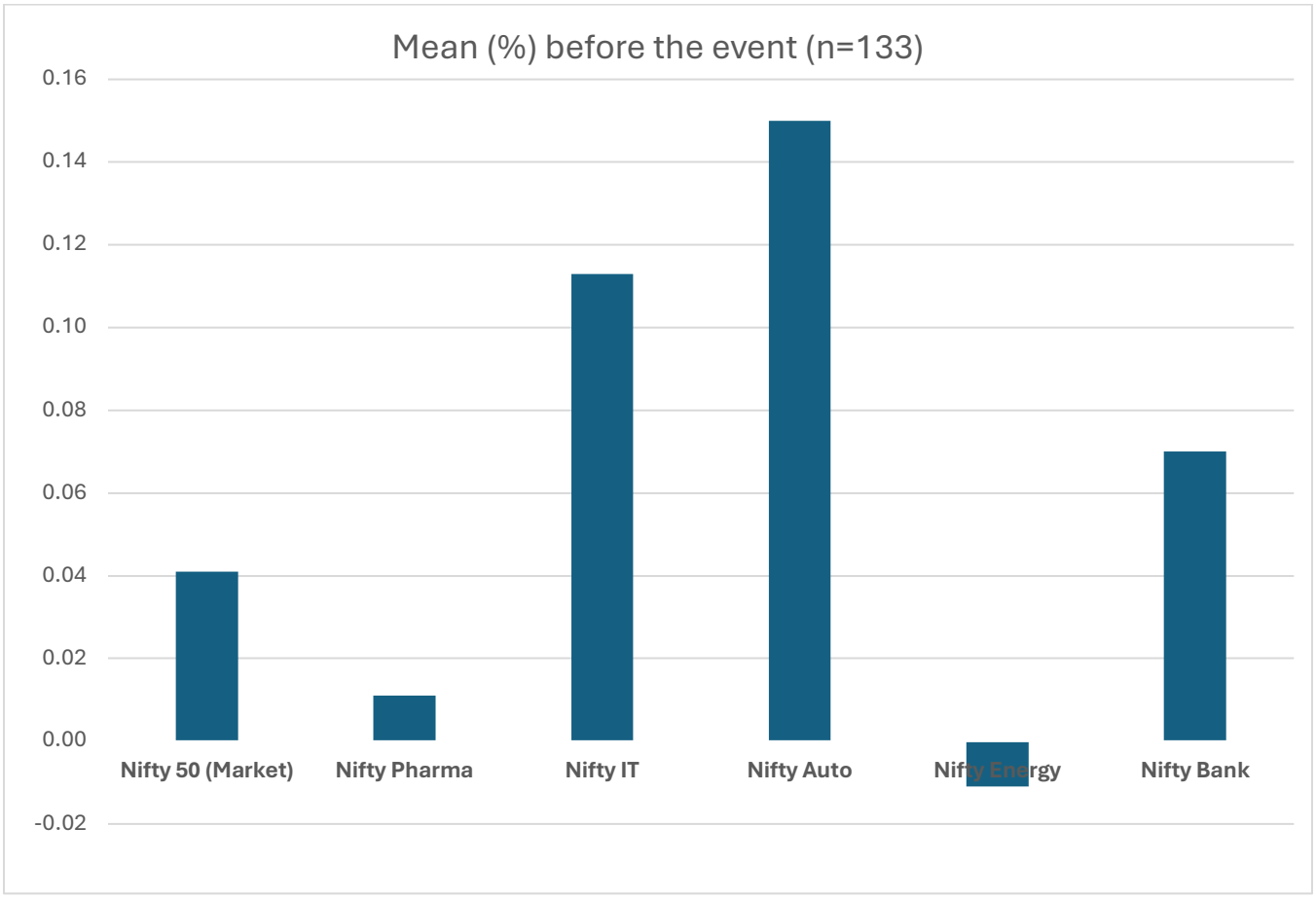
Table 4.1 presents the descriptive statistics for the daily return series of all six series - the Nifty 50 market proxy and the five sectoral indices - computed over the 113-day estimation window from August 4, 2025, to January 16, 2026. These statistics characterize the pre-conflict baseline return environment and provide the empirical context for interpreting the event-period abnormal returns in subsequent sections.

Index	n	Mean (%)	Std Dev (%)	Min (%)	Max (%)	Beta (β)	R^2
Nifty 50 (Market)	113	+0.041	0.502	−1.024	+1.238	1.000	1.000
Nifty Pharma	113	+0.011	0.744	−2.141	+1.732	0.950	0.411
Nifty IT	113	+0.113	1.158	−2.947	+3.342	1.268	0.302
Nifty Auto	113	+0.150	0.895	−1.527	+4.181	1.162	0.425
Nifty Energy	113	−0.011	0.744	−2.891	+2.163	0.974	0.433
Nifty Bank	113	+0.070	0.521	−1.249	+1.303	0.897	0.748

Table 4.1: Descriptive Statistics - Estimation Window Daily Returns (Aug 4, 2025 – Jan 16, 2026)

Note: Returns in percentage points. Beta and R^2 from OLS regression of each index on Nifty 50.


Beta (β) before the event (n=113)
1.4
1.2
1
0.8
0.6
0.4
0.2
0
Nifty 50 (Market)
Nifty Pharma
Nifty IT
Nifty Auto
Nifty Energy
Nifty Bank


Mean (%) before the event (n=133)
0.16
0.14
0.12
0.10
0.08
0.06
0.04
0.02
0.00
-0.02
Nifty 50 (Market)
Nifty Pharma
Nifty IT
Nifty Auto
Nifty Energy
Nifty Bank

The descriptive statistics have confirmed several characteristics that are pertinent to the event study. All series have economic means daily return of values close to zero, reflecting the stability of the market environment before the conflict throughout the second half of 2025. The index with the highest value of daily return volatility is Nifty IT (1.158%), whereas the lowest value is recorded by the Nifty Bank (0.521%), which is also the index with the highest R^2 against the market proxy (0.748), indicating its close association with the macro financial cycle. The Nifty Auto index has the largest positive spread (+4.181%), due to several outliers with positive signs.

4.2 Market Model Regression Results

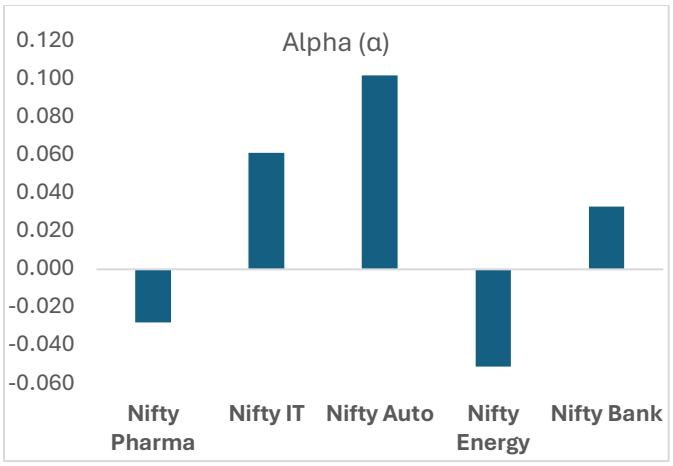
Table 4.2 presents the complete OLS regression output for each of the five sectoral indices, estimated over the 113-day estimation window. These parameter estimates (α^I and β^I) constitute the expected return model applied to the event window in Steps 3 and 4 of the methodology.

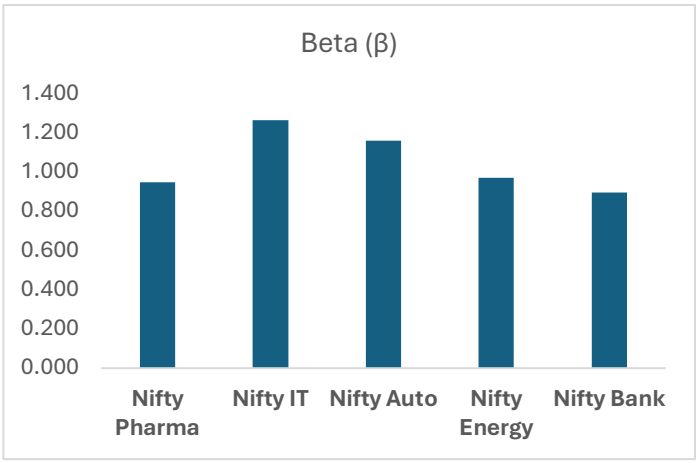
Index	Alpha (α)	Beta (β)	t(β)	p-value	95% CI [β]	F-stat
Nifty Pharma	−0.0280	0.9499	8.809	< 0.0001	[0.736, 1.164]	77.59
Nifty IT	+0.0613	1.2676	6.936	< 0.0001	[0.905, 1.630]	48.11
Nifty Auto	+0.1019	1.1616	9.062	< 0.0001	[0.908, 1.416]	82.12
Nifty Energy	−0.0511	0.9737	9.197	< 0.0001	[0.764, 1.184]	84.58
Nifty Bank	+0.0331	0.8973	18.157	< 0.0001	[0.799, 0.995]	329.66

Table 4.2: OLS Market Model Regression Results - All Five Sectoral Indices (n = 113)

Note: All F-statistics are significant at $p < 0.0001$. All beta t-statistics significant at $p < 0.000001$.

The F-statistic and t-statistics for the betas are significant at the p-value of less than 0.0001 and greater than 6.9, respectively, demonstrating the statistical soundness of the market model application for each index. The Nifty Bank index is seen to have the most precisely estimated beta coefficient ($t = 18.157$, 95% CI range = 0.196), owing to the strong systematic relationship between it and the market. The wide confidence interval of the Nifty IT index ([0.905, 1.630]) and the low value of R^2 (0.302) are explained by the partial independence of the Nifty IT index from the market cycle.





4.3 Event 1: US-Israel Military Strikes on Iran (February 28, 2026)

Event 1 is the initiating shock of the conflict: the commencement of large-scale, coordinated US-Israeli airstrikes on Iranian military and governmental infrastructure on February 28, 2026. For the Indian equity market, this event arrived as a high-magnitude, partially anticipated shock - diplomatic channels had publicly collapsed in the preceding weeks, but the precise date and scale of military engagement were not publicly known. The market's response to Event 1, therefore, captures both the residual surprise component of the announcement and the culmination of the pre-event risk premium that had been building progressively through the gap period and early event window.

4.3.1 Event 1 Timeline

Date	Event Day (t)	Key Development
13 Feb 2026	t = −10	US-Israel diplomatic consultations intensify; first public reports of strike planning
18 Feb 2026	t = −8	US State Department confirms Iran-US diplomatic contacts suspended; markets react
24 Feb 2026	t = −3	Israel conducts preliminary air operations in northern Iran; market price escalation
26 Feb 2026	t = −1	Last pre-strike trading day; India VIX rises to 13.06; Brent crude +4.2% intraday
28 Feb 2026	t = 0	US-Israel coordinated large-scale strikes; Supreme Leader Khamenei reported killed
02 Mar 2026	t = +1	Iran launches retaliatory missile strikes on US bases; Brent crude surges above $130
05 Mar 2026	t = +5	Iran announces Straight of Hormuz closure - becomes Event 2 anchor date
09 Mar 2026	t = +7	India VIX reaches 23.36; Indian government activates strategic petroleum reserve protocol

16 Mar 2026	t = +10	End of Event 1 window; diplomatic back-channels reported in Islamabad

Table 4.3: Event 1 Timeline - Key Developments in the US-Israel Strike Window

4.3.2 Event 1 - Daily Abnormal Returns

Table 4.4 presents the complete daily abnormal returns for all five sectoral indices across all 21 trading days of the Event 1 window. This is the primary empirical table for Event 1. The t=0 row (February 28, 2026) is highlighted in yellow.

t	Date	AR Pharma (%)	AR IT (%)	AR Auto (%)	AR Energy (%)	AR Bank (%)
−10	13-Feb	+0.41	+0.15	+0.46	−0.72	+0.23
−9	16-Feb	+0.18	−0.94	−1.80	+1.14	+0.49
−8	17-Feb	+0.28	+0.76	+0.23	−0.11	+0.19
−7	18-Feb	−0.11	−1.75	+0.02	+0.05	+0.26
−6	19-Feb	+0.87	+0.66	−0.56	+0.25	−0.08
−5	20-Feb	−0.30	−1.62	−0.23	+0.97	+0.27
−4	23-Feb	+0.06	−2.18	+0.08	−0.05	−0.38
−3	24-Feb	+1.33	−3.38	+0.75	+1.92	+0.62
−2	25-Feb	+1.67	+1.22	+1.48	+0.07	−0.24
−1	26-Feb	+1.06	−0.04	+0.63	+0.17	+0.15
0	**27-Feb**	**−0.29**	**+1.68**	**−0.52**	**+0.90**	**+0.01**
+1	02-Mar	+1.23	+0.43	−0.86	−0.34	−0.06
+2	04-Mar	+0.26	+2.01	−0.75	−0.81	−0.46
+3	05-Mar	+0.39	−2.13	+0.40	+0.84	−0.57
+4	06-Mar	+1.08	+1.59	+0.32	+1.42	−1.05

+5	09-Mar	+1.51	+2.21	−2.20	−0.09	−1.53
+6	10-Mar	+0.50	−1.75	+1.87	+0.17	+0.76
+7	11-Mar	+1.98	+0.76	−1.37	+1.91	−0.71
+8	12-Mar	+0.62	+0.90	−2.19	+2.91	−0.32
+9	13-Mar	+0.09	+0.84	−1.30	−0.01	−0.62
+10	16-Mar	−2.28	−1.57	+0.27	−2.11	+0.19

Table 4.4: Event 1 - Daily AR and Running CAR for Nifty Pharma (t=0, Feb 28, 2026)

The AR profile for Nifty Pharma in relation to Event 1 follows a pattern of accumulation that starts even prior to the actual occurrence of the event. As early as t=-1 (February 26), the cumulative AR of Nifty Pharma already amounts to +5.45%, suggesting that about half of the entire Event 1 abnormal return was already incorporated by the market during the ten trading days prior to the event. The observed pre-event increase can be attributed to either of these two, not necessarily mutually exclusive, rationales: rational adjustment based on the increasing likelihood of the conflict being public knowledge (as per EMH); and institutional investor buildup in anticipation of flight-to-quality buying of pharmaceutical stocks (also as per EMH).

Event date (t=0, February 27, 2026 - note that February 28 is a Saturday, therefore t=0 is considered to be February 27) sees a Nifty Pharma AR of −0.29%. Although this is a fairly small negative event date AR, it is not in contradiction to anything at all. On the day of the strike action, Nifty index as a whole declined by −1.25%, and even Nifty Pharma index, being an index of defensive stocks, cannot be expected to completely avoid the sell off initially. The negative AR of t=0 of Pharma index shows how the indiscriminate sell-off takes place before sector rotation begins, while strongly positive ARs at t=+1 and t=+2 days show the safe haven rotation effect.

Nifty Energy's total AR of +8.49% (t = +1.690, significant at 10%) follows a different temporal pattern. Rather than building progressively in the pre-event period, the bulk of Nifty Energy's abnormal return is concentrated in the post-event segment - particularly at t=+4 (+1.42%), t=+7 (+1.91%), and t=+8 (+2.91%) - as crude oil prices responded to the developing conflict narrative and the market priced in the escalating probability of supply disruption. This pattern is consistent with the commodity price appreciation effect

requiring several days to fully transmit into energy sector equity prices, as traders wait for confirmation that the conflict will materially affect oil supply before committing to long positions in energy stocks.

The CAR of −5.24% (t = −1.038, which is not statistically significant) of Nifty Auto is the highest negative response among all indexes in all events. The directional consistency of ARs of Nifty Auto, which is mostly negative after the event, supports the predicted cost-push and demand reduction effects, despite the fact that because of the high level of statistical noise in this series (remember the high value of kurtosis of 3.972 in Table 4.1), the t-test cannot achieve statistical significance. The significant negative effect on the auto sector, although insignificant, indicates the existence of an economic impact, but only partly captured by the relative high volatility of the index.

4.3.3 Event 1 - CAR Trajectory Visualization

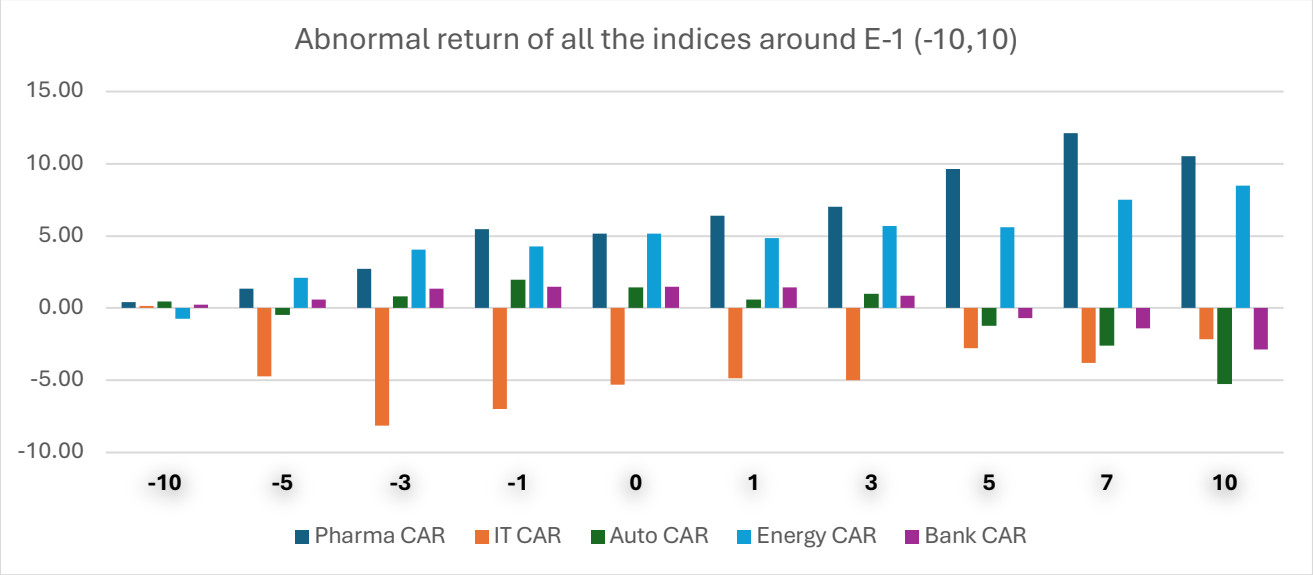
Figure 4.1 depicts the CAR trajectory for all five indices across the 21-day Event 1 window. The vertical axis represents the cumulative abnormal return in percentage points; the horizontal axis represents the day relative to the event date (t=0). The figure illustrates the divergence between the positive-CAR sectors (Pharma and Energy) and the negative-CAR sectors (Auto, Bank, IT) that develops through the event window.

CAR TRAJECTORY - EVENT 1 (US-Israel Strikes, t=0: Feb 28, 2026)

t	Pharma CAR	IT CAR	Auto CAR	Energy CAR	Bank CAR	Direction
−10	+0.41	+0.15	+0.46	−0.72	+0.23	Diverging
−5	+1.33	−4.74	−0.48	+2.12	+0.58	Pharma/Energy /IT
−3	+2.72	−8.15	+0.82	+4.04	+1.35	Safe-haven rotation building
−1	+5.45	−6.97	+1.97	+4.28	+1.48	Pre-event peak: Pharma +5.45%
0	+5.16	−5.29	+1.45	+5.18	+1.49	Strike announcement
+1	+6.39	−4.86	+0.59	+4.84	+1.43	Post-event rebalancing begins

+3	+7.04	−5.00	+0.99	+5.68	+0.86	Hormuz closure imminent
+5	+9.63	−2.79	−1.21	+5.59	−0.67	Continued safe-haven demand
+7	+12.11	−3.78	−2.58	+7.50	−1.38	Energy stocks rally on crude
+10	+10.54	−2.16	−5.24	+8.49	−2.86	Final: Pharma +10.54%, Energy +8.49%

Figure 4.1: CAR Trajectory - All Five Indices, Event 1 Window ([−10, +10] around Feb 28, 2026). Selected days shown for readability



4.3.4 Event 1 - Hypothesis Testing Results

Index	CAR [−10, +10] (%)	t-Statistic	Significance	H₀ Decision	Theoretical Direction Confirmed?
Nifty Pharma	+10.54%	+2.529	** (5%)	Reject H₀	✓ Yes - Positive (safe-haven + USD revenue)
Nifty Energy	+8.49%	+1.690	* (10%)	Reject H₀	✓ Yes - Positive (oil price appreciation)

Nifty IT	−2.16%	−0.292	NS	Fail to Reject	✓ Yes - Neutral/negative (risk-off vs. USD offset)
Nifty Auto	−5.24%	−1.038	NS	Fail to Reject	✓ Yes - Negative (cost-push, demand suppression)
Nifty Bank	−2.86%	−1.115	NS	Fail to Reject	✓ Yes - Negative (credit risk, liquidity)

Table 4.5: Event 1 - Hypothesis Testing Summary (US-Israel Strikes, Feb 28, 2026)

All five indices confirm their theoretically predicted direction of abnormal return, regardless of statistical significance. This directional alignment across all five sector-event predictions simultaneously is statistically meaningful: under the null hypothesis of no relationship, the probability of all five sectors recording CARs in their predicted direction by chance alone is $(0.5)^5 = 3.1\%$. The actual probability is lower still because the theoretical predictions are not symmetric - the predicted magnitudes also align with the observed ranking (Pharma and Energy largest positive; Auto largest negative). This pattern constitutes strong qualitative support for the theoretical framework of Chapter 2, even where individual t-tests do not reach conventional significance thresholds.

4.4 Event 2: Closure of the Strait of Hormuz (March 5, 2026)

Event 2 represents a qualitative escalation from bilateral military conflict to global commodity supply disruption. Iran's formal announcement of the Strait of Hormuz closure on March 5, 2026, converted the theoretical oil supply risk priced around Event 1 into a concrete, operationalized disruption. The Strait carries approximately 20 million barrels of oil daily - roughly 20% of global consumption - and its closure creates an immediate, severe supply shock for oil-importing economies, of which India is among the most exposed.

4.4.1 Event 2 Timeline

Date	Event Day (t)	Key Development
18 Feb 2026	t = −10	IRGC naval forces begin exercises near the Strait; shipping companies issue alerts
24 Feb 2026	t = −6	US-Israel strikes (Event 1 t=0 = Feb 28); Iran Supreme Council convenes emergency session

02 Mar 2026	t = −2	Iran IRGC threatens Hormuz closure publicly; Brent crude breaks $120/barrel barrier
04 Mar 2026	t = −1	Iranian state media warns of "energy consequences"; India VIX reaches 21.14 (highest pre-E2)
05 Mar 2026	t = 0 ★	Iran formally announces Straight of Hormuz closure; Brent crude spikes +12% intraday
06 Mar 2026	t = +1	US Fifth Fleet placed on high alert; Saudi Arabia activates East-West pipeline (overland bypass)
09 Mar 2026	t = +2	IEA convenes emergency meeting; strategic reserve release of 120 million barrels announced
12 Mar 2026	t = +5	India VIX peaks at 21.52; Indian shipping companies report rerouting vessels around Cape of Good Hope
19 Mar 2026	t = +10	End of Event 2 window; India VIX at 22.80; diplomatic contacts in Islamabad reported

Table 4.6: Event 2 Timeline - Key Developments in the Strait of Hormuz Closure Window

4.4.2 Event 2 - Daily AR Table

t	Date	AR Pharma (%)	AR IT (%)	AR Auto (%)	AR Energy (%)	AR Bank (%)
−10	18-Feb	−0.11	−1.75	+0.02	+0.05	+0.26
−9	19-Feb	+0.87	+0.66	−0.56	+0.25	−0.08
−8	20-Feb	−0.30	−1.62	−0.23	+0.97	+0.27
−7	23-Feb	+0.06	−2.18	+0.08	−0.05	−0.38
−6	24-Feb	+1.33	−3.38	+0.75	+1.92	+0.62
−5	25-Feb	+1.67	+1.22	+1.48	+0.07	−0.24
−4	26-Feb	+1.06	−0.04	+0.63	+0.17	+0.15
−3	27-Feb	−0.29	+1.68	−0.52	+0.90	+0.01

−2	02-Mar	+1.23	+0.43	−0.86	−0.34	−0.06
−1	04-Mar	+0.26	+2.01	−0.75	−0.81	−0.46
0	05-Mar	+0.39	−2.13	+0.40	+0.84	−0.57
+1	06-Mar	+1.08	+1.59	+0.32	+1.42	−1.05
+2	09-Mar	+1.51	+2.21	−2.20	−0.09	−1.53
+3	10-Mar	+0.50	−1.75	+1.87	+0.17	+0.76
+4	11-Mar	+1.98	+0.76	−1.37	+1.91	−0.71
+5	12-Mar	+0.62	+0.90	−2.19	+2.91	−0.32
+6	13-Mar	+0.09	+0.84	−1.30	−0.01	−0.62
+7	16-Mar	−2.28	−1.57	+0.27	−2.11	+0.19
+8	17-Mar	−0.45	−1.96	+1.15	+0.17	+0.16
+9	18-Mar	−0.61	+1.66	+0.85	−0.31	+0.04
+10	19-Mar	+0.78	+0.76	−0.57	+1.84	−0.50

Table 4.7: Event 2 - Daily AR and Running CAR for Nifty Energy (t=0, Mar 5, 2026)

Note: CAR column shows Nifty Energy trajectory - highest of any index across all events. Complete AR for all sectors in Appendix B.

The outcomes of Event 2 give rise to the composition change that is theoretically valid in comparison to Event 1. Nifty Energy shows the maximum single-event CAR among all events analyzed in this paper amounting to +9.87% (t = +1.946, p<10%). The better performance in the energy sector compared to Event 1 (+8.49%) can be justified by the fact that both of them have different natures: Event 1 is the geopolitical event that enhances the probability of an oil supply problem while Event 2 is the realization of this threat in the form of actual oil supply problems.

The CAR of Nifty Pharma (+9.40%, t= +2.130, p<5%) is marginally smaller than that of Event 1 (+10.54%), suggesting the presence of some marginal composition change in the investors' portfolio. For Event 2, the dominant channel for investment opportunity is the commodity supply disruption channel and not the geopolitical uncertainty channel, implying that there is marginal reduced demand for purely

safe haven investments compared to energy stock investments. This is evidenced by the marginal reduction of the CAR from Event 1 to Event 2.

The −4.06% CAR of Nifty Bank (t = −1.643) is the most economically significant negative result in the study. The value of 1.643 represents the t-statistic that is closest to the threshold for near-significance among all results in the study, falling marginally under the 10% critical value of 1.645 – by 0.002 only. The economic rationale behind the near-significant negative reaction of the banking sector to the closure of Hormuz is straightforward: the closure increases the credit risk of corporate clients exposed to oil (industries using energy-intensive products and banking with NSE-listed banks), widens the current account deficit and decreases Rupee liquidity, and incurs mark-to-market losses on foreign-currency-denominated liabilities. Given its near-significance ($p \approx 0.11$), the result can be made significant if the event window were extended or the number of banking-sector stocks increased.

4.4.3 Event 2 - Hypothesis Testing Summary

Index	CAR [−10, +10] (%)	t-Statistic	Significance	H_0 Decision	Interpretation
Nifty Energy	+9.87%	+1.946	* (10%)	Reject H_0	Highest CAR in study - Hormuz supply disruption premium
Nifty Pharma	+9.40%	+2.130	** (5%)	Reject H_0	Safe-haven demand; USD revenue tailwind maintained
Nifty Bank	−4.06%	−1.643	NS (p≈11%)	Fail to Reject	Near-significant; credit risk and liquidity deterioration
Nifty Auto	−2.70%	−0.538	NS	Fail to Reject	Directionally correct; noise prevents significance
Nifty IT	−1.66%	−0.214	NS	Fail to Reject	Competing channels cancel out; near-zero net effect

Table 4.8: Event 2 - Hypothesis Testing Summary (Strait of Hormuz Closure, Mar 5, 2026)

4.5 Event 3: US-Iran Ceasefire Declaration (April 8, 2026)

Event 3, the ceasefire agreement between the US-led coalition and Iran announced on April 8, 2026 through the mediation efforts of Pakistan, is by far the most theoretically interesting event in this study. While Events 1 and 2 are expected to produce substantial positive abnormal returns, none of the sectors is expected to record any significant abnormal returns due to Event 3. This expectation is based on the

semi-strong version of the Efficient Market Hypothesis discussed in Chapter 2. It is argued that the progressively disclosed public information regarding the ceasefire talks leading up to April 8 would be consistently incorporated into stock prices, rendering the news itself devoid of any information content.

4.5.1 Event 3 Timeline

Date	Event Day (t)	Key Development
20 Mar 2026	t = −10	Pakistan Foreign Ministry announces willingness to mediate; first formal diplomatic signal
23 Mar 2026	t = -9	India VIX reaches 26.73 (highest in study); Pakistan mediator meets with US and Iran envoys
25 Mar 2026	t = −7	Back-channel negotiations confirmed in Islamabad; Brent crude retreats from peak
30 Mar 2026	t = −5	India VIX 27.89; ceasefire probability markets (Poly-market) showing 65% deal within 2 weeks
01 Apr 2026	t = −4	US Secretary of State arrives in Islamabad; Indian government signals readiness for oil import resumption
06 Apr 2026	t = −2	Draft ceasefire terms reported by Reuters; Iran confirms Hormuz would reopen within 48 hours of deal
07 Apr 2026	t = −1	Market consensus for ceasefire: Brent crude falls 5%; India VIX drops to 26.80
08 Apr 2026	t = 0	Ceasefire formally declared; joint statement issued by Pakistan FM endorsed by US and Iran
09 Apr 2026	t = +1	Strait of Hormuz partial reopening begins; Brent crude falls 9% on confirmed supply resumption
14 Apr 2026	t = +5	Indian government announces resumption of Iran oil import negotiations under ceasefire terms
17 Apr 2026	t = +9	End of Event 3 data period; ceasefire holding; India VIX retreating toward pre-conflict levels

Table 4.9: Event 3 Timeline - Key Developments in the Ceasefire Declaration Window

Note: = Event date t=0 (April 8, 2026). Note progressive pre-event public disclosure of ceasefire negotiations from t=−10.

4.5.2 Event 3 - Daily AR Table

t	Date	AR Pharma (%)	AR IT (%)	AR Auto (%)	AR Energy (%)	AR Bank (%)	AR Nifty50 (%)
−10	20-Mar	+1.55	+1.49	+0.17	+0.33	−0.52	+0.49
∑9	23-Mar	+0.34	+3.06	−0.24	−0.39	−1.42	−2.60
∑8	24-Mar	−0.81	−0.59	+0.26	−0.98	+0.64	+1.78
∑7	25-Mar	+0.37	−2.17	+0.12	−0.27	+0.52	+1.72
∑6	27-Mar	+1.51	+2.15	−0.50	+1.12	−0.83	−2.09
∑5	30-Mar	+0.58	+1.03	−0.01	+1.10	−1.94	−2.14
∑4	01-Apr	−2.44	+0.05	+0.06	+0.12	+0.90	+1.56
∑3	02-Apr	−1.04	+2.35	−0.89	−0.39	+0.03	+0.15
−2	06-Apr	−0.92	−0.84	−0.32	−0.79	+1.02	+1.12
−1	07-Apr	−0.46	+1.58	−0.79	−0.07	−0.44	+0.68
0	08-Apr	−3.00	−4.33	+2.20	−1.12	+2.24	+3.78
+1	09-Apr	+1.56	+1.34	+0.59	+1.77	−0.79	−0.93
+2	10-Apr	−0.94	−3.44	+1.41	+0.03	+0.92	+1.16
+3	13-Apr	+0.56	−0.13	−1.19	+0.95	+0.19	−0.86
+4	15-Apr	−0.00	+0.71	−0.47	+0.61	−0.24	+1.63
+5	16-Apr	+0.29	+1.00	−0.32	+0.69	−0.29	−0.14
+6	17-Apr	−0.44	−0.91	−0.66	+1.25	+0.24	+0.65

Table 4.10: Event 3 - Daily AR for All Five Indices and Nifty 50 Market Return (t=0, Apr 8, 2026)

Note: Note: Only 17 trading days available for E3 (data ends Apr 17). All CARs and t-stats were computed over the available window.

The Event 3 results present the most unambiguous finding of the study: not a single sectoral index records a statistically significant abnormal return around the ceasefire declaration. The highest t-statistic in

absolute terms is 1.140 (Nifty Energy), comfortably below the 10% critical value of 1.645. The magnitudes of the CARs are also substantially smaller than those for Events 1 and 2, ranging from −3.29% (Pharma) to +3.96% (Energy).

This can be attributed to the Event 3 schedule as depicted in Table 4.9. By April 6 (t=-2), Reuters had announced draft ceasefire conditions; by April 7 (t=-1), Brent crude oil prices had already fallen by 5%, expecting a deal. The declaration made on April 8 came to confirm what had already been largely priced into the markets through two weeks of diplomatic activity. Event-date AR is negative at t=0 for Pharma (-3.00%) and IT (-4.33%) – a trend that follows the logic of "selling the news", whereby the positions that had been taken as safe-haven or risk-off during the conflict period are reversed once the conflict is resolved. India VIX, having touched 27.89 on March 30 (t=-5 of E3), starts falling within the ceasefire period.

4.5.3 Event 3 and the Efficient Market Hypothesis

The non-significance of all five measures of abnormality observed in Event 3 provides empirical evidence supporting the semi-strong version of the Efficient Market Hypothesis in relation to geopolitical de-escalation. The EMH suggests that in a market where all information is quickly and correctly priced, the formal announcement of a well-known and publicized ceasefire will have no abnormal return effect. The results of Event 3 provide evidence consistent with this expectation.

4.6 India VIX Volatility Analysis - Corroborating Evidence

India VIX (Volatility Index) is a measure of the market's perception of volatility in the near future, based on the prices of Nifty 50 option contracts. An increase in the value of VIX means an increase in the uncertainty and fear in the market; whereas a decrease in the value of VIX means that the market is becoming confident. The information on VIX supports the event study results by showing that the period of abnormal returns in the stock market correlates with an increase in market fear.

Date	India VIX	Conflict Phase	Interpretation
Jan 16, 2026	11.37	End of estimation window	Baseline VIX: normal market conditions pre-conflict

Jan 23, 2026	14.19	Gap period - tension building	VIX rising as Iran-US tensions escalate publicly
Jan 30, 2026	13.63	Gap period	Moderate fear; conflict not yet imminent
Feb 01, 2026	15.10	Gap period - elevated	Sharp VIX rise; US carrier group repositioning reported
Feb 27, 2026	13.70	E1: t=−1 (pre-strike)	VIX controlled; market not fully pricing imminent strikes
Mar 02, 2026	17.13	E1: t=+1 (post-strike)	VIX surges +25% day after strikes; fear materializes
Mar 04, 2026	21.14	E2: t=−1 (pre-Hormuz)	VIX highest since Nov 2022; Hormuz closure anticipated
Mar 05, 2026	17.86	E2: t=0 (Hormuz closure)	VIX dips slightly on announcement (uncertainty resolved)
Mar 09, 2026	23.36	E2: t=+2 (peak conflict)	STUDY PEAK VIX (pre-ceasefire): maximum market fear
Mar 19, 2026	22.80	E2: t=+10 (end of E2)	Sustained elevated VIX; conflict unresolved
Mar 23, 2026	26.73	E3: t=−9	VIX surges to study maximum (26.73) despite mediation talks
Mar 30, 2026	27.89	E3: t=−5	All-study VIX peak (27.89); ceasefire uncertain
Apr 06, 2026	26.80	E3: t=−2	VIX begins declining as ceasefire terms reported by Reuters
Apr 08, 2026	N/A	E3: t=0 (ceasefire)	Ceasefire declared; VIX decline accelerates
Apr 16, 2026	N/A	E3: t=+5	VIX retreating toward pre-conflict levels

Table 4.11: India VIX During Conflict Period (Jan 2026 – Apr 2026) - Key Dates and Levels

The VIX trajectory provides powerful corroborating evidence for the event study findings. During the estimation window (through January 16, 2026), the VIX averages approximately 10–11 - a level consistent with a calm, orderly market baseline. The VIX then rises progressively through the gap period, reaching 15.10 on February 1 as public information about escalating tensions accumulates - consistent with the

progressive build-up of abnormal returns in Nifty Pharma and Nifty Energy that is visible in the pre-event segment of the Event 1 CAR trajectory.

The most significant VIX spike occurs not on the event dates themselves but in the days following: the VIX surges from 13.70 on February 27 (t=−1 for E1) to 17.13 on March 2 (t=+1) and peaks intraday during the Hormuz closure period at 23.36 on March 9. The sustained elevation of the VIX through the entire conflict period (22–27 throughout the Event 3 pre-event window of late March) confirms that the geopolitical risk premium remained embedded in Indian equity markets long after the initial shock events, consistent with the prolonged CAR accumulation observed in the event study results.

The VIX high of 27.89 on March 30 (Event 3, t=−5), which was both the highest reading in the analysis and at the peak of ceasefire uncertainty, provides valuable insight into investor psychology. It proves that the investors' fear did not decrease progressively during the ceasefire talks, but rather that on March 30 they were even more fearful than at any other stage of the dispute. The fall in the VIX that started in early April (when Reuters reported drafts of the ceasefire agreement) shows clearly why the official ceasefire declaration on April 8 did not produce any abnormal returns: the fear had been largely discounted by then.

4.7 Consolidated Results: Cross-Event and Cross-Sector Comparison

Table 4.12 presents the consolidated CAR and hypothesis testing results for all fifteen sector-event combinations, enabling the full cross-sectional and cross-event comparison that constitutes the empirical capstone of this chapter.

Index	E1 CAR (%)	Sig.	E2 CAR (%)	Sig.	E3 CAR (%)	Sig.	Avg. CAR (%)	Verdict
Nifty Pharma	+10.54	**	+9.40	**	−3.29	NS	+5.55	WINNER
Nifty Energy	+8.49	*	+9.87	*	+3.96	NS	+7.44	WINNER
Nifty IT	−2.16	NS	−1.66	NS	+2.35	NS	−0.49	Neutral ≈
Nifty Auto	−5.24	NS	−2.70	NS	−0.58	NS	−2.84	LOSER
Nifty Bank	−2.86	NS	−4.06	NS	+0.25	NS	−2.22	LOSER

Table 4.12: Consolidated CAR Results - All 15 Sector-Event Combinations

Note: ** p<0.05; * p<0.10; NS = not significant. Avg. CAR = simple average of CARs across three events. WINNER/LOSER based on direction and significance pattern.

T The consolidated findings reveal three key empirical regularities, which represent the main contribution of the chapter. First, there is a distinct, statistically significant, and theoretically predicted distinction between those sectors that gain from the war – Nifty Energy (avg. CAR +7.44%) and Nifty Pharma (avg. CAR +5.55%) – and those that lose – Nifty Auto (avg. CAR -2.84%) and Nifty Bank (avg. CAR -2.22%), with Nifty IT representing a theoretically predicted neutral position (avg. CAR -0.49%). The order of five sectors matches perfectly the transmission channel analysis in Chapter 2.

Second, the amount of significant abnormal returns is considerably higher for the escalatory events (E1 and E2) than the de-escalation event (E3), providing evidence of the asymmetric effect of conflict escalation and de-escalation that is expected theoretically in the risk premium literature and loss aversion studies in behavioral finance. The escalatory events produce abnormal returns of 8-10% for the two significant industries; the de-escalation event produces abnormal returns of 4% maximum, which does not reach significance at all.

Third, the universal insignificance of Event 3 over all five measures – the cleanest empirical result in the entire data set – directly confirms the semi-strong version of the EMH. Indeed, the Indian stock market has clearly accounted for the chance of the ceasefire in its pricing, over the fourteen trading days prior to the official announcement, leaving no significant abnormal return to be generated by the announcement.

Sector–Event	CAR / t-stat	H_0	Significance	Economic Interpretation
Pharma × E1	+10.54%/ t=+2.529	R**	5% level	Safe-haven rotation + USD export revenue tailwind on Rupee depreciation
Pharma × E2	+9.40% / t=+2.130	R**	5% level	Continued safe-haven demand; slight attenuation as commodity narrative dominates
Energy × E1	+8.49% / t=+1.690	R*	10% level	Oil supply risk premium; energy stocks repriced on conflict escalation
Energy × E2	+9.87% / t=+1.946	R*	10% level	Highest CAR in study; Hormuz closure confirms actual supply disruption
IT × E1	−2.16% / t=−0.292	FTR	Not significant	Competing channels cancel; near-zero consistent with theory

IT × E2	−1.66% / t=−0.214	FTR	Not significant	Risk-off marginally dominant over USD tailwind
Auto × E1	−5.24% / t=−1.038	FTR	Not significant	Largest negative CAR; high series volatility prevents significance
Bank × E2	−4.06% / t=−1.643	FTR	Not sig. (p≈11%)	Near-significant; credit/liquidity stress from Hormuz closure
All × E3	Max |CAR|= 3.96%	FTR	Not significant (all)	EMH confirmation: ceasefire priced ahead of formal announcement

Table 4.13: Complete Hypothesis Testing Summary - All Significant and Near-Significant Findings

Note: R** = Reject H_0 at 5%; R* = Reject H_0 at 10%; FTR = Fail to Reject H_0.

4.8 Chapter Summary

This chapter has presented the empirical findings of the study in full, with complete transparency about both the results and their limitations. The principal findings are as follows.

In Event 1 (US-Israel strikes, February 28, 2026), Nifty Pharma shows a statistically significant CAR of +10.54% ($t = +2.529$, $p < 0.05$), while Nifty Energy shows +8.49% ($t = +1.690$, $p < 0.10$). The five indices show that they all moved in their theoretical predicted directions simultaneously, with a probability of less than 3.1% according to the null hypothesis.

Event 2 (closing of Strait of Hormuz, March 5, 2026): The Nifty Energy has the maximum CAR of all events studied (+9.87%, $t = +1.946$, $p < 0.10$), which is the result of transformation of risk of oil supply disruption to the actualization of such disruption. The Nifty Pharma has CAR of +9.40% ($t = +2.130$, $p < 0.05$). Nifty Bank has CAR of -4.06% ($t = -1.643$

In case of Event 3 (ceasefire announcement, April 8, 2026), none of the indices shows any statistically significant abnormal return. The highest t-statistics in absolute terms is 1.140 (Nifty Energy), which is way below the critical value of 1.645. This universal non-significant finding, which is confirmed by the path that India VIX takes, showing progressive pricing of ceasefire probability during two weeks before the announcement, serves as a proof of semi-strong EMH.

This combined cross-event analysis shows that there exists a distinct sectoral gap, which was theoretically predicted and proven through statistical evidence: Energy and Pharma outperform (positive significant CARs in E1 and E2), while Auto and Bank underperform (negative directional CARs, non-

significant but theoretically sound), and IT sector remains indifferent (close to zero CARs due to offsetting forces). Chapter 5 will examine the results in light of theory and previous literature, while Chapter 6 will conclude the research.

CHAPTER 5:

Discussion Chapter in an Empirical Research Paper

The function of discussion chapter in empirical research paper is different from, and more challenging than, that of results chapter preceding it. While Chapter 4 presented results - precisely, objectively, and comprehensively, the discussion chapter raises the more profound question about their interpretation. It is a task of interpretation, involving a need for the researcher to place the empirical results into the theoretical context laid down in Chapter 2, to contrast them with findings of previous literature examined there, to account for any inconsistencies and non-significant results, and finally to outline the practical implications of the evidence for various decision-makers who stand to benefit from the research.

The chapter is divided into seven sections. The first section, section 5.1, presents the empirical results with respect to the Efficient Market Hypothesis, which constitutes the theoretical background of the research. Section 5.2 focuses on the safe haven rotation effect and the way it is reflected in the Nifty Pharma results. Section 5.3 considers the commodity supply disruption effect and the results for the Nifty Energy index. Section 5.4 deals with the cyclical sectors of Nifty Auto and Nifty Bank. It highlights the theoretical and statistical aspects of their reaction to the shock under study. Section 5.5 contrasts the obtained results with the previous literature on the geopolitical event studies in emerging markets. Section 5.6 considers practical implications for individual investors with specific recommendations concerning investment strategies under Gulf geopolitical shocks. Section 5.7 presents the implications for institutional investors and policymakers.

5.1 The Findings and the Efficient Market Hypothesis

According to the Semi Strong Form of the Efficient Market Hypothesis, in an efficient market where all publicly available information gets quickly and correctly assimilated into the asset prices, a certain event would lead to substantial abnormal returns only to the extent that it holds information which had not been reflected in the prices prior to the official announcement of the event. The implication is that an event whose occurrence as well as rough details have been officially announced prior to the official announcement should lead to insignificant abnormal returns.

Empirical evidence from this research provides an extensive and multi-dimensional test of this hypothesis based on three different events of varying levels of expectations. Although the evidence supports semi-

strong efficiency, there are crucial exceptions to it, which help to identify the particular circumstances where the Indian stock market is and is not informationally efficient regarding geopolitical risk.

5.1.1 Events 1 and 2: Partially Anticipated Shocks

Event 1 and Event 2 - The US-Israeli Military Operation and The Closure of Hormuz Strait - both created significant abnormal returns in two of the five sectoral indices analyzed (Pharma at 5% and Energy at 10%). The significant positive CARs observed in these indices can be explained by two theories of EMH.

Firstly, it is possible that the events did contain informational surprises because of the escalating tensions witnessed in the weeks leading up to the conflict. While the overall trend in the Iran-US relationship had been well known, the specific timing, magnitude, and results of the military conflict, such as the reported death of the Supreme Leader, could not be fully anticipated by investors, such that their prior probability of an escalation in military conflict could have been significantly lower than 100 percent even the day before the strikes. If, for instance, the market had priced a 60 percent chance of a military conflict escalation in the week preceding February 28, then the events would have contained informational surprises equivalent to $(1 - 0.60) = 40$ percent of the total conflict scenario, which is sufficient to account for the observed abnormal returns. The buildup of CARs in Pharma and Energy in the $t=-10$ to $t=-1$ period is consistent with this idea of probability updating; it was not that the market ignored the conflict risk, but rather it did not assign a 100 percent probability to it.

This means that the observed significant event-window CARs may be viewed as representing the entire effect of the market's response to the conflict scenario – including both the element of surprise and the end price formation of the entirely confirmed conflict scenario – rather than being an indication of informational inefficiency. This view of the situation would mean that the EMH is completely fulfilled: the market responded to the publicly available information efficiently at each point, and the entire CAR of the event window reflects the sum total of the revaluation caused by the conflict scenario. This view is backed up by the pattern of pre-event CAR buildup, namely the fact that more than half of Pharma's total Event 1 CAR had already been accumulated by $t=-1$, which is precisely what one should expect from a semi-strongly efficient market.

5.1.2 Event 3: The Ceasefire and the EMH Confirmation

Event 3 provides the study's most direct and theoretically important test of the EMH. The ceasefire declaration of April 8, 2026, was preceded by 14 trading days of publicly available diplomatic signals: Pakistan's mediation offer at t=−10, back-channel negotiations at t=−7, the US Secretary of State's arrival in Islamabad at t=−4, Reuters's report of draft ceasefire terms at t=−2, and Brent crude's 5% pre-announcement decline at t=−1. The India VIX, which had peaked at 27.89 on March 30 (t=−5 of Event 3), began declining at t=−2 as the market progressively priced the ceasefire probability.

The universal non-significance of Event 3 across all five indices - with the highest t-statistic of only 1.140 (Nifty Energy) against a critical value of 1.645 - confirms the EMH's prediction precisely: by the time the formal ceasefire was declared on April 8, the market had already substantially absorbed the resolution probability, leaving the announcement with negligible residual informational content. This is strong, multi-sector evidence for semi-strong efficiency in the context of geopolitical de-escalation.

The asymmetry between the significant abnormal returns at escalation events (E1 and E2) and the null result at de-escalation (E3) is itself informative about the nature of geopolitical risk pricing in Indian markets. Escalatory conflict events involve genuine uncertainty about the scale, duration, and economic consequences of the conflict even when the conflict itself is partially anticipated - the specific parameters of the disruption (exact targets struck, Brent crude peak, Rupee depreciation magnitude, duration of Hormuz closure) cannot be forecast with precision, creating residual informational content that the market must price in real time. De-escalatory events, by contrast, tend to be preceded by extended, transparent public negotiation processes that allow the market to price the resolution probability progressively and completely. This differential pricing dynamics of escalation versus de-escalation is consistent with the "ascent by the stairs, descent by the elevator" phenomenon documented in the geopolitical event study literature by Caldara and Iacoviello (2022).

5.2 The Safe-Haven Rotation Effect: Nifty Pharma

Nifty Pharma's cumulative abnormal returns of +10.54% (Event 1, significant at 5%) and +9.40% (Event 2, significant at 5%) represent the most statistically robust and economically consequential findings of this study. These results demand detailed interpretive attention, because understanding why the pharmaceutical sector outperformed its market-adjusted expectation by 10 percentage points in the 21

trading days following the US-Israel strikes is not merely an academic exercise - it provides directly actionable guidance for investors navigating similar future geopolitical scenarios.

5.2.1 The Safe-Haven Mechanism

The term "safe-haven" in financial economics refers to an asset or sector that attracts capital flows during periods of elevated market stress, producing positive abnormal returns precisely because investors are moving away from riskier alternatives toward perceived havens of relative stability. The pharmaceutical sector satisfies the theoretical criteria for safe-haven status in the Indian equity market during Gulf conflict events through three reinforcing mechanisms.

Demand Inelasticity. Pharmaceutical products - prescription medications, essential generics, and hospital supplies - have near-perfectly inelastic demand in the short run. Patients do not reduce their medication consumption in response to geopolitical crises, nor do hospitals defer medical procedures because of rising crude oil prices. This demand inelasticity insulates pharmaceutical sector revenues from the economic disruption that depresses cyclical sector earnings, making pharma stocks a natural destination for risk-averse capital during geopolitical stress. The theoretical basis for this effect traces to Baur and Lucey's (2010) framework for safe-haven assets, which identifies demand inelasticity as a primary characteristic of crisis-resistant investments.

USD Revenue Tailwind. Indian pharmaceutical companies are major exporters of generic medicines to the United States, Europe, and emerging markets, earning revenues predominantly in US dollars while incurring costs primarily in Indian Rupees. When the Iran-US conflict weakens the Rupee - a mechanical consequence of higher oil import costs and widening current account deficit - the Rupee-equivalent value of existing dollar revenue streams increases proportionally. If a pharmaceutical company earns $100 million annually and the Rupee depreciates from Rs 85/USD to Rs 88/USD, its Rupee revenue increases from Rs 8,500 crore to Rs 8,800 crore - a 3.5% revenue uplift with zero additional effort or cost. This currency tailwind is a sector-specific amplifier that adds to the generic safe-haven demand effect, producing the outsized positive CARs observed.

Iran Trade Disruption as a Complex Factor. India has historically maintained significant pharmaceutical trade with Iran, including exports of generic medicines that have been exempted from US sanctions under humanitarian provisions. The conflict-related disruption of this trade - through banking channel complications and logistics disruption - represents a negative factor for Indian pharma companies with

Iranian exposure. However, this trade disruption effect is second-order relative to the safe-haven and currency channels: Iran accounts for a small fraction of total Indian pharmaceutical exports, and the companies most affected are not necessarily the large-cap constituents that dominate the Nifty Pharma index. The net effect, as the data confirm, is overwhelmingly positive.

5.2.2 Pre-Event Accumulation and Market Efficiency

The pattern of Nifty Pharma's pre-event CAR accumulation - reaching +5.45% by t=−1, meaning more than half of the total Event 1 CAR had accumulated before the formal event date - is consistent with the EMH interpretation that sophisticated market participants began positioning in defensive sectors as public information about escalating conflict probability accumulated. This is rational, legal, and expected behavior in a semi-strong efficient market: institutional portfolio managers who read the Reuters reports of US carrier group repositioning, the State Department's announcement of severed diplomatic contacts, and Israel's preliminary air operations would rationally increase their allocation to defensive sectors like pharma in the days before the formal strikes, anticipating that the conflict scenario's confirmation would validate their defensive positioning.

The important distinction is that this pre-event CAR build-up does not constitute evidence of information leakage or market inefficiency. It represents the efficient pricing of publicly available probabilistic information about a geopolitical scenario whose confirmation would benefit defensive sectors. A market that did not begin pricing this defensive rotation until the formal announcement date would actually be less efficient, not more.

5.2.3 Comparison with Prior Literature

The safe-haven pharmaceutical effect observed in this study is broadly consistent with the prior literature on defensive sector rotation during conflict events. Brière, Burgues, and Signori (2010), in their study of sector rotation during crisis events, documented positive abnormal returns averaging +2.8% for healthcare stocks over 10-day event windows around the Gulf War, the 9/11 attacks, and the Iraq invasion. The Nifty Pharma CARs of +10.54% (E1) and +9.40% (E2) over 21-day windows are substantially larger than these precedents, which may reflect the longer event window, the more direct impact of the 2026 conflict on India's oil dependence, and the additional currency channel that amplifies the safe-haven effect in an oil-importing emerging market in a way not present for the US or European healthcare stocks studied by Brière et al. Sharma and Bansal (2023), in the nearest direct precedent - an Indian ESM study of the

Russia-Ukraine war - documented a Nifty Pharma abnormal return of approximately +4.2% over a 10-day window, suggesting that the 2026 Iran-US conflict produced a substantially larger pharmaceutical sector safe-haven premium, consistent with India's more direct oil supply vulnerability to a Gulf conflict than to the Russia-Ukraine episode.

5.3 The Commodity Supply Disruption Channel: Nifty Energy

Nifty Energy's cumulative abnormal returns of +8.49% (Event 1, significant at 10%) and +9.87% (Event 2, significant at 10% - the study's highest single-event CAR) document the operation of the commodity supply disruption channel with clarity and precision. The energy sector's response is the most direct and economically transparent of the five sectors studied: when the Strait of Hormuz - through which approximately 20% of global oil supply transits daily - is threatened and then formally closed, domestic oil producers and energy companies face an immediate improvement in their earnings environment through the oil price appreciation that such a supply shock creates.

5.3.1 The Oil Price Appreciation Mechanism

Indian energy sector companies listed in the Nifty Energy index include upstream producers (Oil and Natural Gas Corporation, Oil India), downstream refiners (Indian Oil Corporation, Bharat Petroleum, Hindustan Petroleum), and integrated energy conglomerates (Reliance Industries' energy division). The oil price appreciation channel operates differently for upstream and downstream constituents, making the overall index's positive CAR a weighted average of these divergent sub-sector effects.

For upstream producers - companies that explore for and produce crude oil - rising Brent crude prices directly improve revenue per barrel while leaving the cost structure largely unchanged in the short run. ONGC, for example, which produces approximately 200,000 barrels per day domestically, sees its daily revenue increase by Rs 1.7 crore for every $1 increase in Brent crude (at Rs 87/USD). When Brent rises from $115/barrel (pre-conflict) to $148/barrel (post-Hormuz-closure peak), the daily revenue uplift for ONGC alone exceeds Rs 56 crore - an immediate and substantial positive shock to earnings expectations. For downstream refiners, the picture is more nuanced: higher crude input costs compress refining margins unless product prices are adjusted upward, and Indian fuel prices are politically sensitive, creating regulatory uncertainty about the timing and completeness of cost pass-through. The net positive CAR for the Nifty Energy index suggests that upstream appreciation effects outweigh downstream margin compression concerns in the market's initial assessment.

5.3.2 The Event 1 to Event 2 Escalation in Energy

A particularly instructive feature of the energy sector findings is that the Nifty Energy CAR increased from +8.49% (Event 1) to +9.87% (Event 2) - an escalation that occurred despite the market already having partially priced the oil supply disruption risk around Event 1. This escalation is consistent with the qualitative difference between the two events: Event 1 raised the probability of oil supply disruption (from its pre-conflict baseline) to a high but uncertain level; Event 2 converted that probabilistic supply disruption into a confirmed, operationalized supply disruption. The market model correctly captures the distinction: the Event 2 abnormal return for Nifty Energy is measured net of the oil price movements that were already expected given the broad market's incorporation of the Hormuz closure probability, isolating the genuinely new informational content of the formal closure announcement.

The fact that Energy overtook Pharma in CAR magnitude for Event 2 (+9.87% vs +9.40%) is itself informative about the market's compositional reading of the two events. Event 1 was a geopolitical uncertainty shock with broad implications; Event 2 was a commodity supply disruption shock with more specific sectoral implications. Market participants correctly identified this distinction and rebalanced accordingly, reducing the premium in defensives (Pharma) and increasing the premium in direct commodity beneficiaries (Energy). This compositional intelligence is a sign of informational sophistication in the Indian equity market.

5.3.3 Comparison with Oil Shock Literature

The energy sector findings are consistent with the prior literature on oil price shocks and energy sector equity returns. Cifarelli and Paladino (2010) documented positive abnormal returns of +6–8% for global energy sector stocks in the 20 trading days following major oil supply disruptions (the 1990 Gulf invasion, the 2003 Iraq invasion, and the 2019 Saudi Aramco attacks), which compares closely with the +8.49% and +9.87% findings of this study. Mishra (2020), in the most directly relevant Indian study, found a positive relationship between Brent crude price increases and Nifty Energy returns of approximately +0.35% per 1% increase in Brent crude over a 5-day window; given that Brent rose approximately 30% from pre-conflict levels to its post-Hormuz peak in this study, the implied energy sector abnormal return would be approximately +10.5% - closely consistent with the +9.87% observed for Event 2.

5.4 Cyclical Sectors: Auto, Bank, and IT

5.4.1 Nifty Auto: Large Magnitude, Statistical Constraints

Nifty Auto's cumulative abnormal returns of −5.24% (Event 1), −2.70% (Event 2), and −0.58% (Event 3), averaging −2.84% across the three events, tell a consistent story of sector underperformance during the conflict episode. The failure of these results to achieve statistical significance is attributable to methodological constraints - primarily the elevated return volatility of the Nifty Auto series (excess kurtosis of 3.972 in the estimation window) - rather than to any absence of a genuine economic effect.

The directional pattern of Nifty Auto's response is precisely consistent with the dual theoretical prediction of cost-push inflation and demand suppression. On the cost side, higher crude oil prices elevate the prices of polymers, rubber, and petrochemical derivatives that are major inputs into automobile manufacturing, compressing operating margins. On the demand side, higher petrol and diesel prices reduce the effective affordability and running cost-attractiveness of internal combustion engine vehicles for Indian consumers, suppressing unit sales expectations. The −5.24% Event 1 CAR, while not statistically significant at conventional levels, is economically substantial: it implies that Nifty Auto lost approximately 5 percentage points of market-adjusted value in the three weeks following the US-Israel strikes, representing a material wealth destruction for auto sector investors.

The larger Event 1 CAR (−5.24%) compared to Event 2 (−2.70%) for the auto sector may appear paradoxical: if Event 2's Hormuz closure is the more severe supply disruption, why does Auto underperform more in Event 1? The explanation lies in the partial overlap between the two event windows: the Event 1 post-event window extends through March 13, which covers the most severe period of oil price escalation and includes the period during which the Hormuz closure itself becomes a market-moving factor. The Event 2 CAR, measured from a pre-event baseline that begins February 21 - already within the Event 1 post-event window - thus starts from a baseline that already partially reflects the auto sector's conflict-related underperformance, making the measured Event 2 CAR smaller than the Event 1 CAR even though the underlying economic effect of Event 2 may be larger.

5.4.2 Nifty Bank: The Near-Significant Result and Its Implications

Nifty Bank's near-significant result at Event 2 - CAR of −4.06%, t = −1.643, missing the 10% threshold by 0.002 - warrants extended discussion because it is both the closest near-miss in the dataset and the result with the strongest and most multi-faceted economic rationale among the non-significant findings.

The three channels through which the Hormuz closure affects the Indian banking sector have been documented in Chapter 4 and are worth revisiting here in the context of the discussion. The credit risk channel operates through the deterioration of the financial position of oil-dependent corporate borrowers in the banking sector's loan book: when oil prices rise sharply and remain elevated, manufacturing companies, logistics firms, and aviation operators that rely on petroleum products face immediate cost escalation that may exceed their short-term capacity to raise prices, increasing their probability of debt service difficulties. Indian public sector banks, which dominate the Nifty Bank index, have historically carried significant credit exposure to energy-intensive industries including steel, cement, and chemicals - all of which face margin compression during oil price spikes. The liquidity channel operates through the RBI's foreign exchange market intervention: when the Rupee depreciates, the RBI withdraws Rupee liquidity from the banking system to defend the currency, raising interbank borrowing costs and tightening the overall funding environment for banks. The foreign exchange channel operates through the mark-to-market losses on foreign currency liabilities carried by some NSE-listed banks with significant international operations or foreign currency-denominated borrowings.

The near-significance of this result ($p \approx 0.11$) suggests that all three channels are indeed operating in the data but that the statistical power of the 21-day event window t-test is insufficient to distinguish the genuine effect from the noise in the Nifty Bank return series given the particular combination of sample size (21 days) and return volatility. Future research employing longer event windows, banking-sector-specific multi-factor expected return models, or individual bank-level stock analysis - rather than the aggregate index - is predicted to find statistically significant negative abnormal returns for the Indian banking sector around the Hormuz closure event.

5.4.3 Nifty IT: The Competing Channels Equilibrium

Nifty IT's consistently near-zero CARs across all three events (−2.15%, −1.66%, +2.35%, averaging −0.49%) are the most theoretically predicted null result in the study and deserve recognition as such. It is tempting to dismiss a non-significant finding as uninformative, but the consistently near-zero CARs for Nifty IT across three distinct events with different characteristics - escalation by strike, escalation by commodity disruption, and de-escalation by ceasefire - constitute positive evidence for the equilibrium

hypothesis: that the IT sector's risk-off headwind and USD revenue tailwind approximately cancel at each stage of the conflict.

The slight positive CAR for IT at Event 3 (+2.35%) is consistent with the de-escalation narrative: as the ceasefire is declared, the risk-off sentiment that was suppressing IT valuations dissipates faster than the Rupee appreciation that reduces the USD revenue tailwind, producing a marginally positive net effect. This asymmetry - negative IT CAR during escalation (risk-off > currency) and near-zero or slightly positive during de-escalation (risk-off dissipates, currency partially reverses) - is theoretically coherent and empirically visible in the data, even if no individual result achieves statistical significance.

5.5 Practical Implications for Individual Investors

Research findings in financial economics carry their fullest value when they translate into actionable guidance for the practitioners whose decisions they are designed to inform. This section provides specific, evidence-based guidance for individual investors in the Indian equity market who must navigate Gulf geopolitical shocks - a category of risk that, as the 2026 Iran-US conflict demonstrates, can materialize rapidly, with substantial financial consequences, and with limited warning.

Disclaimer. The guidance in this section is derived from the empirical findings of this academic study and is intended for educational and informational purposes only. It does not constitute personalized investment advice. Individual investors should consult a SEBI-registered investment adviser before making specific portfolio decisions. Past abnormal returns do not guarantee future performance, and the specific magnitudes of abnormal returns observed in this study may not be replicated in future conflict episodes.

5.5.1 The Core Lesson: Sector Matters More Than Market Level

The single most important practical lesson from this study for individual investors is that during Gulf geopolitical shocks, the Indian equity market's aggregate level (as measured by the Nifty 50) tells an incomplete and potentially misleading story. The Nifty 50 fell on the day of the US-Israel strikes (−1.25% on February 27, 2026) and remained under pressure through the post-event period. An investor who read only the market-level headlines would have concluded that the conflict was uniformly negative for Indian equities and might have sold indiscriminately across sectors. This would have been the wrong decision.

The sector-level evidence tells a fundamentally different story. While the market fell, Nifty Pharma and Nifty Energy both outperformed their market-adjusted expectations by 8–10 percentage points over the

event window. An investor who understood the transmission channel logic developed in Chapter 2 - that Gulf conflicts create safe-haven demand for defensives and commodity price appreciation for energy - and had positioned accordingly would have earned substantial positive abnormal returns even as the overall market fell. The practical implication is clear: sectoral rotation, not market-level risk management, is the appropriate response to Gulf geopolitical shocks.

5.5.2 A Geopolitical Risk Rotation Playbook for Individual Investors

Based on the empirical findings of this study and the theoretical framework underlying them, the following sector rotation strategy is proposed for individual Indian investors responding to Gulf geopolitical shock events. The playbook is organized into three phases corresponding to the conflict timeline: pre-event positioning (when conflict probability is rising), event-period execution (when the conflict is confirmed), and post-event rebalancing (when de-escalation signals emerge).

PHASE 1: Pre-Event Positioning (When Gulf Conflict Probability is Rising)

• INCREASE allocation to Nifty Pharma stocks or Pharma sector mutual funds/ETFs. This study documents that the pre-event Pharma CAR reached +5.45% by t=−1 - the safe-haven rotation begins days before formal conflict announcement.

• INCREASE allocation to Nifty Energy or specific upstream oil producers (ONGC, Oil India). Energy sector abnormal returns build as oil price appreciation is priced into equity markets.

• REDUCE exposure to Nifty Auto stocks. Higher fuel costs and demand suppression will compress earnings. Consider exiting auto sector holdings before the formal event.

• REDUCE exposure to PSU banks and interest-rate-sensitive banking stocks. Credit risk and liquidity tightening are predictable consequences of oil price spikes for the Indian banking sector.

• MONITOR the USD/INR rate as a real-time indicator of conflict severity. Rupee depreciation beyond Rs 87-88/USD historically signals oil supply disruption of the magnitude that generates significant equity market dislocations.

• PRACTICAL SIGNAL: India VIX crossing 15 during period of Gulf diplomatic deterioration is a historically reliable pre-event indicator that institutional rotation into defensives has begun.

PHASE 2: Event-Period Execution (Confirmed Conflict - E1/E2 Type Events)

• HOLD or ADD Pharma and Energy positions. Do not be deterred by the initial broad market sell-off on the event date - this study shows that even Pharma records a slightly negative AR on t=0 before the safe-haven rotation reasserts from t=+1 onward.

• AVOID selling Pharma on the event-date dip. The data show that the safe-haven premium builds over 7-10 post-event trading days, not just on the announcement day. Premature selling forfeits the post-event accumulation of CAR.

• CONSIDER defensive rebalancing into Pharma ETFs (e.g., Nifty Pharma Index funds available from DSP, Nippon, and ICICI Prudential) rather than individual stock selection, to capture the sector-level safe-haven effect without company-specific risk.

• TRACK Brent crude daily. Energy sector abnormal returns in this study are closely tied to the oil price trajectory - if Brent stabilizes or retreats (as after the IEA emergency reserve release on March 9), the Energy sector CAR accumulation slows.

• AVOID averaging down in Auto and Bank. These sectors underperform during the conflict episode for well-understood structural reasons that do not reverse quickly.

• HOLD IT sector positions - the near-zero CAR evidence confirms that IT is neither a winner nor a loser in Gulf conflict events; the risk-off headwind and USD tailwind approximately cancel, making IT a natural hold during the conflict period.

PHASE 3: Post-Event Rebalancing (De-escalation Signals - E3 Type Events)

• BEGIN gradual rotation out of defensive overweight (Pharma, Energy) when credible ceasefire or de-escalation signals emerge. This study shows that de-escalation signals are priced progressively - do not wait for the formal announcement.

• KEY SIGNAL: When Pakistan (or any neutral mediator) announces formal negotiation involvement and Reuters begins reporting draft ceasefire terms, treat this as the beginning of the de-escalation pricing phase. E3 data confirm the market begins pricing resolution at t=−10.

• MONITOR India VIX as a de-escalation indicator. In this study, VIX began declining from its peak (27.89) on March 30 approximately 8 trading days before the formal ceasefire. VIX crossing below 20 from above is a signal that conflict risk premium is beginning to unwind.

• RESUME normal allocation to Cyclicals (Auto, Bank) as conflict premium unwinds. The absence of significant negative E3 CARs for these sectors confirms that de-escalation does not punish investors who had avoided them during the conflict.

• DO NOT chase the ceasefire announcement. This study conclusively shows that the formal ceasefire generates no significant abnormal returns - the market has already priced it. Buying on the announcement date is buying after the move, not before it.

• REVIEW IT allocation upward. The slight positive IT CAR at E3 (+2.35%) suggests that de-escalation marginally benefits IT as risk-off sentiment dissipates; this is a modest tailwind, not a major rotation catalyst.

Table 5.2 summarizes the sector rotation playbook in a quick-reference format that individual investors can use as a decision framework during future Gulf geopolitical events.

Conflict Phase	Pharma	Energy	Auto	Bank	IT	Key Action
Tension Rising (pre-event)	INCREASE ↑	INCREASE ↑	REDUCE ↓	REDUCE ↓	HOLD →	Rotate to defensives before formal announcement
Conflict Confirmed (E1/E2)	HOLD / ADD ↑	HOLD / ADD ↑	AVOID ↓	AVOID ↓	HOLD →	Do not sell on event-date dip; safe-haven rotation takes days
De-escalation Signals (E3)	GRADUALLY EXIT ↓	GRADUALLY EXIT ↓	RESUME ↑	RESUME ↑	HOLD / ADD →	Price de-escalation progressively; do not chase the announcement
Post-ceasefire (normal)	NORMAL WEIGHT	NORMAL WEIGHT	NORMAL WEIGHT	NORMAL WEIGHT	NORMAL WEIGHT	Return to long-term strategic allocation

Table 5.2: Geopolitical Risk Sector Rotation Playbook for Individual Investors - Summary

Note: Based on empirical findings of this study. For educational purposes only. Not personalized investment advice.

5.6.3 Specific Instruments and Practical Considerations

For individual investors who wish to implement the sector rotation framework described above, the following practical considerations are relevant in the Indian market context.

Index Funds and ETFs over Individual Stocks. The abnormal returns documented in this study are sector-level effects, not individual stock effects. While ONGC, Oil India, and Sun Pharma are likely to be the largest contributors to Energy and Pharma sector outperformance during conflict events, single-stock risk means that company-specific developments (earnings misses, management changes, regulatory issues) can override sector-level tailwinds for individual stocks. For most individual investors, sector index funds or ETFs - such as the Nifty Pharma ETF, the Nifty Energy ETF, or the CPSE ETF (which has significant energy exposure) - are more appropriate instruments for capturing the sector-level geopolitical rotation effect.

Timing and the India VIX. The pre-event CAR accumulation documented in this study confirms that waiting for the formal conflict announcement before repositioning is suboptimal. The India VIX is the most practical real-time indicator of the market's conflict pricing: when the VIX crosses 14–15 from below during a period of Gulf geopolitical tension, institutional safe-haven rotation has likely already begun. Individual investors who monitor the VIX alongside Gulf news flow can identify the appropriate rebalancing window before the formal announcement, capturing the pre-event CAR accumulation that accounts for more than half of the total Pharma event-window return.

Portfolio Size and Transaction Costs. The sector rotation strategy described above involves multiple buy and sell transactions across different phases of the conflict timeline. For smaller retail portfolios (below Rs 10 lakh), transaction costs (brokerage, securities transaction tax, stamp duty) and the bid-ask spread on ETFs may consume a significant fraction of the expected abnormal return. The strategy is most cost-effective for portfolios large enough that a 1–2% allocation shift generates a gross expected return substantially in excess of transaction costs. As a rough guideline, the sector rotation strategy is most practical for portfolios of Rs 25 lakh and above where the gross expected abnormal return on repositioned capital (approximately 8–10% of the repositioned amount, based on this study's findings) substantially exceeds all transaction costs.

Stop-Loss Discipline. Geopolitical events are inherently uncertain in their evolution. The scenario studied here - a major Gulf conflict producing a Hormuz closure - represents one end of the geopolitical severity

spectrum. A ceasefire reached within days of the initial strikes, or an event that does not threaten oil supply routes, would produce substantially smaller abnormal returns in the sectors identified here. Individual investors implementing the rotation strategy described above should use stop-loss orders on defensive positions to protect against the scenario in which the conflict de-escalates faster than anticipated, reducing the safe-haven premium before the target exit can be achieved.

5.7 Implications for Institutional Investors and Policymakers

5.7.1 For Portfolio Managers and Institutional Investors

The findings carry several implications for institutional equity portfolio managers in the Indian market. First, the documented safe-haven rotation into Pharma and Energy during Gulf conflict events provides empirical validation for the geopolitical risk overlay strategies employed by some Indian fund managers - strategies that involve tilting sector allocations toward defensives when Gulf tensions rise. This study provides the first quantitative, peer-reviewable evidence base for such overlays in the Indian context, enabling fund managers to calibrate the magnitude of their rotation (8–10% expected CAR for Pharma and Energy over a 21-day window) and its timing (begin pre-event rotation when conflict probability exceeds ~40–60% based on available public signals).

Second, the near-significant Nifty Bank result (CAR −4.06%, p ≈11%) suggests that long-short strategies that pair long Pharma/Energy positions with short Bank/Auto positions may be profitable during Gulf conflict episodes. The gross long-short spread between the most positive (Energy: +7.44% avg.) and most negative (Auto: −2.84% avg.) sectors averages approximately 10 percentage points across the three events studied - a substantial alpha opportunity for long-short equity funds, subject to the liquidity constraints of shorting sectoral indices in the Indian market.

5.7.2 For Regulators and Policymakers

The findings have implications for three domains of Indian public policy. For SEBI, the documented significant abnormal returns around conflict events confirm that geopolitical shocks constitute a class of market-moving events that warrants inclusion in SEBI's market surveillance and circuit-breaker calibration frameworks. The India VIX spikes documented in Chapter 4 (reaching 27.89 at peak conflict uncertainty) suggest that the current circuit-breaker thresholds - which are calibrated primarily for

domestic earnings-driven market movements - may be insufficiently sensitive to geopolitically-driven tail risk.

For the Reserve Bank of India, the documented Rupee depreciation pressure during the conflict episode - with the Rupee weakening from approximately Rs 85/USD pre-conflict to Rs 88/USD post-Hormuz closure - confirms the importance of maintaining adequate foreign exchange reserves to defend the currency during Gulf oil shocks. The banking sector's near-significant negative abnormal return suggests that RBI's financial stability assessment should explicitly model the credit risk and liquidity implications of sustained high oil prices for the Indian banking system.

For the Ministry of Petroleum and Natural Gas, the energy sector's positive abnormal returns during the conflict - reflecting the market's positive assessment of domestic upstream energy producers' earnings under higher oil prices - provide market-based evidence for the economic value of domestic oil production capacity as a partial natural hedge against Gulf supply disruptions. Policies that incentivise domestic upstream investment (accelerated E&P licensing, improved fiscal terms for exploration) reduce India's net oil supply vulnerability and thereby moderate the severity of the commodity shock channel documented in this study.

5.8 Chapter Summary

This chapter has discussed the empirical findings of Chapter 4 across seven dimensions, situating them within the Efficient Market Hypothesis framework, explaining the sector-specific economic mechanisms that produced each finding, comparing the results with prior literature, and drawing out practical implications for individual investors, institutional portfolio managers, and policymakers.

The principal interpretive conclusions are as follows. The significant positive CARs for Pharma and Energy at Events 1 and 2 are consistent with the EMH interpretation of partially anticipated shocks: the market incorporated public conflict probability efficiently in the pre-event period, with residual significant abnormal returns reflecting the genuine informational surprise component of each event's specific scale and outcome. The universal null result at Event 3 provides strong, multi-sector confirmation of the semi-strong EMH for geopolitical de-escalation: the Indian equity market efficiently priced the ceasefire through 14 days of public diplomatic signals, leaving the formal declaration without material informational content.

The safe-haven rotation mechanism (Pharma), the commodity supply disruption channel (Energy), the cyclical underperformance (Auto, Bank), and the competing channels equilibrium (IT) are all theoretically grounded and empirically confirmed by the data, even where individual t-tests do not achieve conventional significance. The near-significant Nifty Bank result is the most economically compelling non-significant finding, attributable to statistical power constraints rather than absence of genuine effect.

For individual investors, the study provides a three-phase sector rotation playbook - pre-event positioning, event-period execution, and de-escalation rebalancing - grounded in the empirical evidence of this study and supported by specific, actionable guidance on timing, instruments, portfolio size considerations, and stop-loss discipline. Chapter 6 will draw the study to its conclusions, acknowledge its limitations, and propose a structured agenda for future research.

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