

# Impact of G20 Summit and Chandrayaan-3 on Indian Stock Market-Event Study Analysis of NIFTY50 and Sectoral Indices

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## Abstract

*The study analyse two landmark developments of 2023 influenced the Indian equity market: the G20 summit hosted by India and the successful Chandrayaan-3 mission. Using a standard event study framework, the study computes abnormal returns (AR) and cumulative abnormal returns (CAR) to capture short-term price adjustments. For the benchmark index, NIFTY50, and selected sectoral indices. The empirical evidence indicates the absence of statistically significant broad-market reactions. However, short-term sectoral effects are observed. The findings suggest that diplomatic and technological advancements influence market behavior selectively, and also offer insights for sectoral forecasting and event-driven investment strategies in emerging markets.*

**Keywords:** Equity Market, Abnormal Returns (AR), Cummulative Abnormal Returns (CAR), Forecast, Event-Driven.

## 1. Introduction

Financial markets continuously integrate new information into asset prices, reflecting expectations about future economic and political developments. Global or domestic events generate signals that shape investors' expectations, which have a major influence on the stock market. The Indian stock market, represented by certain indices such as NIFTY50, NIFTYBANK, etc., reflects the macroeconomic direction, national competitiveness, and technological capability. Large-scale diplomatic gatherings and technological breakthroughs often function as informational shocks that may temporarily alter investor sentiment and sectoral allocation patterns.

Studies have suggested that a country's financial market is linked to both global and domestic events. Research also shows that policy changes, geopolitical events, or significant scientific or space advancements affect the financial markets. For example, geopolitical conflicts often bring volatility to the financial markets and also drive trade policies and economic growth (WTO | *The Impact of Geopolitical Conflicts on Trade, Growth, and Innovation*, n.d.). Space technologies and advancements in any country contribute to economic growth and trade and shipping, as such events impact innovation and industrial growth (Corrado et al., 2023).

The G20 Summit and Chandrayaan-3 were the two most vital events to take place in the country. The G20 Summit, 2023, was held in India on the 9<sup>th</sup> and 10<sup>th</sup> of September, 2023. This event brings global leaders together in one space, providing a platform to discuss economic policies, trade, and commerce. Also, the Chandrayaan-3 space mission, led by the Indian Space Research Organization (ISRO), which landed successfully on the moon's surface on 23<sup>rd</sup> August, 2023, had a productive impact on the market, specifically boosting the space industry. The successful lunar landing symbolized India's growing technological capability in space exploration and reinforced its position in the global scientific community. Both of these events have attracted the attention of different countries, which can be studied and analyzed to understand their impact on the market dynamics. The impact of space missions, such as the Chandrayaan-3 landing, and international events, such as the G20 Summit, on market movements was analyzed using event analysis, which

required examining the reactions of the Indian stock market to these events and their effect on market trends. Therefore, the study attempts to analyze the impact of the G20 Summit and Chandrayaan-3 on NIFTY50 and selected sectoral indices using an event study framework to examine abnormal returns and volatility patterns surrounding the event windows.

## 2. Literature Review

To comprehend and measure the impact of various events on stock prices, multiple studies have been attempted by different researchers. Researchers employ diverse approaches to assess the correlation between the occurrences & fluctuations in the stock prices. **(Raj G, 2024)** Studies the impact of major global events such as political developments, business news, and natural disasters on India's BSE and also the US's S&P500 indices over the last decade. This study doesn't find a significant impact of these events on subsequent events, which challenges the perception of the market as highly reactive during these events. **(Boubaker et al., 2015)** analysed the short-term overreactions in the Egyptian stock market (EGX). Events like terrorist attacks and tensions surrounding regions have a strong negative impact, followed by price reversals, while the formation of a new government shows no effect. The COVID-19 pandemic has had a substantial impact on the Indian stock market scenario (Maheshwari & Kumar, 2022), as their study highlights IPO activity and investor behaviour around that time. This study reveals increased participation by retail investors, leading to underpricing of IPOs. Also, **(Raj G & Selvan S.C.B, 2022)** demonstrates a crucial correlation between the performance of the Indian stock market (NSE and BSE) and COVID-19 metrics such as new cases, total existing cases, mortality rate etc. This uses methods such as ADF tests, regression analysis, and Granger causality tests to examine relationships between pandemic developments and market dynamics. **(Saimum, 2024)** study the effect of regulator-induced stock split on the Bangladesh stock market. This is an empirical study that found 117 mandatory stock splits exhibited an equal distribution of positive and negative excess returns during the event window. This tells the unique dynamics of regulatory-driven stock splits and their minimal effect on the market. In Indian economic history, demonetization is top-tier events that happened in our country on 8<sup>th</sup> of November,

2016. The demonetization had a lot of positive & negative impacts on the Indian economy and its stock market. **(Parab & Reddy, 2020)** In their study, they researched the cause & effect relationship pre- & post-demonetisation on Indian stock market returns and between Foreign Institutional Investment (FIIs) & Domestic Institutional Investment (DIIs). In the study, it was observed that FIIs & DIIs did not have a significant impact, but NIFTY50 returns had a strong negative impact during the post-demonetization period, mainly affecting the real estate sector. **(Verma et al., 2022)** carried out a study that focuses on the short-term effect of the Russia-Ukraine conflict on the stock market. An event-based analytical framework was employed to evaluate immediate volatility responses following the outbreak of conflict. The study mainly concentrates on the National Stock Exchange of India (NSE) with emphasis given on IT, Banking & Energy sectors. Similarly, **(Parab et al., 2020)** tracked how the NIFTY50 index's trend and returns were affected by both anticipated and unanticipated economic events. Both domestic and international economic developments frequently impact the stock market. The effects of economic events, whether favourable or unfavourable, on the Indian stock market are transient. The impact is swiftly recovered by the market. The performance of Indonesian Stock Market before, during and after the announcement of Covid-19 pandemic has been studied by **(Nugraha et al., n.d.)**. Event study analysis has been done using the stock prices data by considering different sectors of the company's stocks to check and evaluate the short-term effect on the stock prices. Stock market is often influenced by various economic & political events. **(Mohammad & Mahmud, 2019)** Analysed the performance of the Dhaka stock market pre- & post-parliamentary election of Bangladesh. The study covered five elections for the period of 1996-2018. The volatility during the post-1996 election has been observed as very high, whereas the volatility remains the same during the other elections of the pre- & post-period.

**(Arcuri et al., 2018)** explores the financial consequences of cybercrime, especially the security breaches on the implementation of the stock market. The study evaluates data from 1995 to 2015 to assess the market reaction to cyber-attacks. The findings highlight a noticeable surge in retail investor participation during the pandemic period. **(Liu, 2018)** Studies the effect of quarterly earnings announcements on stock

returns for a large sample of US-listed companies from 2008 to 2016. The study analyzes the relationship between earnings announcements and various factors, including growth, company size, trading volume, etc. It highlights the predictive value of earnings announcements and accruals in generating significant returns, providing insights for portfolio management and financial decision-making. **(Alfonso Perez, 2021)** Focuses on the equity market to provide a short-term event-driven analysis of the Southeast Asia financial crisis. This study guides investors and policymakers in understanding the immediate implications for the financial market during such a crisis. **(Purwoharsojo et al., 2023)** A unique study evaluates the development of tourism in Samarinda City with an aim to leverage the festival economy in three dimensions- event management, sustainable tourism, and destination branding. These were studied using multiple regression. These findings present valuable insights for policymakers and stakeholders aiming to boost tourism development in transitioning economies.

This literature review underscores a varied impact of events- from geopolitical to economic changes to natural disasters, global crises, and many more on stock market dynamics. While some studies challenge the notion of exaggerated market reactivity to events, others emphasize the short-term volatility, as seen in cases like terrorist attacks, pandemics, elections, and geopolitical conflicts. Sectoral disparities emerge prominently, demonstrating varying sensitivities to specific events, such as demonetization, the Russia-Ukraine war, and COVID-19.

### 3. Statement of the Problem

Accurate modelling of stock price behaviour requires incorporating prevailing market conditions, trading intensity, volatility patterns, and event-specific information. For example, the volume of trading, the stock's volatility, any events influencing stock prices, and the company's financial statements all need to be taken into account.

In the stock market, event analysis is crucial because it enables assessing how specific events affect stock prices and market indices. Determining whether there is a strong, unusual return or response to these occurrences is helpful. Macroeconomic, geopolitical, and institutional developments frequently trigger measurable adjustments in asset prices.

Space missions in India are conducted by ISRO (Indian Space Research Organisation), which sends craft into space to conduct scientific research and analysis. One such space event that significantly affects the Indian economy is Chandrayaan-3. The occasion strengthened India's economy and established relationships and trust with the world's leading economies, inspiring interest in future investments in India. The event has significantly impacted the country's stock market, as these nations have shown a strong desire to invest in India going forward.

International meets are always a huge affair for any country or state. The G20 summit was one of India's major events in 2023 and had a profound impact on India's economy and the stock market. The G20 nations serve as a forum for finance ministers and central bank governors to debate global economic and financial concerns. The European Union (EU) and the G20, a group of 19 countries, formed the organization in 1999. Collectively, the G20 economies account for a dominant share of global output, international trade, and population, making the forum highly influential in shaping global macroeconomic discourse. Every year, the G20 Summit is facilitated by a rotating presidency. India has hosted the G20 Leaders' Summit for the first time in 2023. Operational continuity is ensured through a three-member leadership structure comprising the previous, current, and incoming presidencies. The troika in 2023 consisted of India, Brazil, and Indonesia. There were almost 43 Heads of Delegation, the most ever at a G20 summit, who attended the last New Delhi Summit in September of this year (*Overview of G20 | Ministry of Earth Sciences, n.d.*).

This study will explore the broader relationship between such events and the market's volatility, specifically in the Indian stock market. This will be effective in a deeper understanding of market dynamics and sectoral indices surrounding these events. The study will be relevant especially for the investors, traders, and policymakers to understand the movements of the market and sectoral relationships better.

## **4. Methodology**

### **1. Chow test**

Time series models are used to analyze the relationship between variables measured over time. These models assume that the

relationship between variables remains consistent throughout the observation period. However, external factors can sometimes disrupt this stability, leading to shifts in the underlying relationships among variables (*Structural Breaks* | Aptech, n.d.).

Structural break models address this issue by accounting for abrupt, short-term, or lasting changes in the model's parameters, thereby providing a more accurate representation of these shifts. Shifts can happen for various reasons, such as changes in policy or economic shocks from events or news.

"The Chow (1960) test is a classical structural break test used to determine whether regression coefficients differ significantly across two sub-periods. It evaluates the null hypothesis of parameter stability against the alternative of a structural shift at a known breakpoint. The test statistic follows an F-distribution under standard assumptions. The test considers a linear model split into samples at a predetermined break point such that

$$y_t = x_t' \beta_1 + \mu_t$$

$$\text{for } t \leq T_b$$

and

$$y_t = x_t' \beta_2 + \mu_t$$

$$\text{for } t > T_b$$

The test estimates coefficients for each period and uses the out-of-sample forecast errors to compute an F-test comparing the stability of the estimated coefficients across the two periods." (*Structural Breaks* | Aptech, n.d.)

## 2. Event Analysis

"An event study is a quantitative technique used to assess whether a specific event generates statistically abnormal returns relative to expected market performance." (*Event Study*, n.d.)

Event study is conducted on a company to determine whether its stock price changes and how it is affected by a specific event or news. This is applied as a macroeconomic tool by evaluating the influence of an event on a particular industry, sector, or the overall market, and by understanding effect of changes in supply and demand. "In economics, as well as in finance, an event study refers to whether or not a statistical relationship

exists in the financial markets between a specific event and a public company's stock price or value." (*Event Study*, n.d.)

**Abnormal Returns (AR):** In this analysis, abnormal returns are calculated to compute the stock price movements driven by events.

"The formula for calculating abnormal returns (AR) for a specific stock on a given day is as follows: (Verma et al., 2022)

$$AR_i(t) = R_i(t) - [a_i + b_i (R_m(t) - R_f)]$$

Here, the variables represent:

- $AR_i(t)$  : The abnormal return for stock I on day t.
- $R_i(t)$  : The actual daily returns for stock i on day t.
- $a_i$  and  $b_i$  : Intercept and slope coefficients derived from the stock's historical returns.
- $R_m(t)$  : The return on the market portfolio on day t.
- $R_f$  : The risk-free rate, typically approximated by the yield on government bonds."

**Cumulative Abnormal Returns (CAR):** "The formula for calculating Cumulative Abnormal Returns (CAR) over the event window is as follows:

$$CAR_i = \sum_{t=1}^T AR_i(t)$$

Where:

- $CAR_i$  : Cumulative Abnormal Returns for Stock i.
- $AR_i(t)$  : Abnormal Returns for stock i on day t.
- $T$  : The total number of days in the event window." (Verma et al., 2022)

**T-statistics:** T-statistics are used to quantify the degree to which abnormal returns depart from zero and are used to evaluate the statistical significance of abnormal returns. The use of t-statistics in event analysis is highly significant for understanding market reactions to major events (Ahmed et al., 2023).

**Comparative Analysis:** This analysis compares market and sector reactions to these events. By analyzing both market trends and sector-specific movements, this will help uncover variations in how different segments of the economy respond to such events. This will provide an in-depth understanding of the market variations and patterns, specifically to the investors and traders.

## Data Source

The dataset for the Chow test consists of 825 daily observations of the NIFTY50 index collected from 1st September 2021 to 31st December 2024. The data is taken from the website of [www.nseindia.com](http://www.nseindia.com) (NSE - National Stock Exchange of India Ltd: Live Share/Stock Market News & Updates, Quotes- Nseindia.Com, n.d.).

The dataset for Event analysis of the G20 Summit consists of 62 daily observations of NIFTY50 and sectoral indices collected from 11<sup>th</sup> August, 2023, to 10<sup>th</sup> November, 2023. The data is collected from the website of [www.nseindia.com](http://www.nseindia.com) (NSE - National Stock Exchange of India Ltd: Live Share/Stock Market News & Updates, Quotes- Nseindia.Com, n.d.).

The dataset for Event analysis for Chandrayaan-3 consists of 63 daily observations of NIFTY50 and different sectoral indices collected from 24<sup>th</sup> July, 2023, to 23<sup>rd</sup> October, 2023. Data is taken from the website of [www.nseindia.com](http://www.nseindia.com) (NSE - National Stock Exchange of India Ltd: Live Share/Stock Market News & Updates, Quotes- Nseindia.Com, n.d.).

## 5. Result and Analysis

This section discusses structural breaks in the market due to the G20 Summit and Chandrayaan-3, and provides an event analysis of the market, represented by NIFTY50 and other important sectoral indices. A series of tables containing Abnormal Returns (AR) and Cumulative Abnormal Returns (CAR) for various time periods around the event has been computed that will help in understanding the immediate effect and the short-term impact of the event.

The Chow test has been performed to determine whether a structural break is present in the G20 Summit and Chandrayaan-3 data. The Null Hypothesis for the Chow test is no breaks at the specified point.

The Chow test is conducted to investigate whether there was a structural break in the NIFTY50 price index around the G20 summit and the Chandrayaan-3 launch day, which could indicate a change in market dynamics due to the events.

The F-statistic [ $F(2,821)$ ] for the G20 Summit is 158.6492, and the associated p-value of 0.00 strongly suggests the existence of a structural break at the summit. Specifically, the p-value is well below the commonly used significance level of 0.05, leading us

to reject the null hypothesis of no break. This indicates that the regression coefficients differ significantly before and after the G20 summit, suggesting that the market's response to the factors influencing the NIFTY50 index changed around the event. Therefore, we conclude that the G20 summit had a noticeable impact on the NIFTY50 index, whereas the Chandrayaan-3 suggests no structural breaks, which implies that the event has no significant impact on the overall market.

Different vital sectoral indices along with the NIFTY50 index have been considered for this study, which will enhance the analysis and also help in understanding the various market reactions during the event time period. Sectors considered for this analysis are NIFTY\_AUTO, NIFTY\_BANK, NIFTY\_ENERGY, NIFTY\_FINANCIALSERVICES, NIFTY\_FMCG, NIFTY\_IT, NIFTY\_MEDIA, NIFTY\_METAL, NIFTY\_OIL&GAS and NIFTY\_PHARMA. Abnormal Returns (AR) and Cumulative Abnormal Returns (CAR) are considered for their statistical significance.

Pre-event window spans 15 days prior to the event (-20,-5) for assessing the market behavior and reactions leading up to the event. In this study, event window is 3 days prior and post the event which helps in capturing the immediate market reactions. Post-event window or Short-term period extends from 5<sup>th</sup> day to the 35<sup>th</sup> day after the event, which will provide the insights on the impact of the event on the sectoral indices in a short run.

First, the AR table (Table No.1) for the event window i.e. -3 to +3 for G20 Summit provides findings on the performance of the various sectors of the Indian stock market surrounding the event. AR is a vital metrics for evaluating the impact of such geopolitical events on the market.

**Table No.1- Abnormal Returns (AR) for the event window for G20 Summit**

| Sectors            | -3    | -2    | -1    | 0     | +1    | +2    | +3    | t-test<br>(df=6) | p-value |
|--------------------|-------|-------|-------|-------|-------|-------|-------|------------------|---------|
| Auto               | -0.52 | -0.33 | -0.01 | 0.58  | -2.05 | -1.05 | 0.71  | -1.05            | 0.33    |
| Bank               | -0.46 | 0.49  | 0.16  | 0.08  | -0.14 | 0.50  | 0.02  | 0.72             | 0.49    |
| Energy             | -0.05 | -0.19 | 0.51  | -0.63 | -2.47 | 0.21  | 0.22  | -0.90            | 0.40    |
| Financial Services | -0.12 | 0.54  | 0.51  | 0.11  | 0.00  | 0.10  | -0.02 | 1.63             | 0.15    |

|           |       |       |       |       |       |       |       |       |      |
|-----------|-------|-------|-------|-------|-------|-------|-------|-------|------|
| FMCG      | 0.92  | -0.76 | -0.42 | 0.32  | -0.27 | 0.08  | -0.22 | -0.23 | 0.81 |
| IT        | -0.64 | -0.59 | -0.95 | -0.70 | 0.80  | -1.01 | 0.02  | -1.80 | 0.12 |
| Media     | -0.29 | 0.33  | -1.65 | -1.28 | -4.65 | 0.90  | -0.87 | -1.56 | 0.16 |
| Metal     | -1.42 | -1.52 | -1.28 | -0.30 | -2.88 | -0.63 | 0.89  | -2.29 | 0.06 |
| Oil & Gas | 0.71  | -0.28 | 0.73  | -0.31 | -2.64 | 0.67  | 1.06  | -0.01 | 0.98 |
| Pharma    | 0.95  | -0.47 | -0.45 | 0.08  | 0.27  | 0.73  | 0.32  | 1.00  | 0.35 |

In the above Table no.1, it is observed that Auto sector has negative ARs on most days except on the event day (Day 0). Bank does not show a clear trend as it is fluctuating throughout the event window. Like Auto, Energy and Metal also has mostly negative ARs but a significant negative return on Day 1. Media shows strong negative ARs, especially on Day 1. IT again has negatively dominating ARs but a slight positive return on Day 1. But there is no such significant impact due to the summit on the sectoral indices immediately on the event day.

**Table No.2- Cumulative Abnormal Returns (CAR) for the event window for G20 Summit**

| Sectors            | CAR(-3,+3) | t-test | p-value |
|--------------------|------------|--------|---------|
| Auto               | -2.68      | -1.05  | 0.33    |
| Bank               | 0.66       | 0.72   | 0.49    |
| Energy             | -2.40      | -0.90  | 0.40    |
| Financial Services | 1.13       | 1.63   | 0.15    |
| FMCG               | -0.34      | -0.23  | 0.81    |
| IT                 | -3.08      | -1.80  | 0.12    |
| Media              | -7.53      | -1.56  | 0.16    |
| Metal              | -7.14      | -2.29  | 0.06    |
| Oil & Gas          | -0.05      | -0.01  | 0.98    |
| Pharma             | 1.44       | 1.00   | 0.35    |

In the above table, Table No.2, it is seen that most of the CARs for the sectoral indices has a negative value which suggest that it experienced a cumulative loss. But all the p-value is greater than 0.05 which indicates that the result has no statistically significant abnormal values. Only, Metal sector shows some evidence of a negative impact as p-value is approximately 0.06.

**Table No.3- Cumulative Abnormal Returns (CAR) for the post-event window for G20 Summit**

| Sectors            | CAR(+5,+35) | t-test(df=30) | p-value |
|--------------------|-------------|---------------|---------|
| Auto               | -2.83       | -0.87         | 0.38    |
| Bank               | -3.03       | -1.79         | 0.08    |
| Energy             | 7.86        | 2.19          | 0.03    |
| Financial Services | -2.00       | -1.03         | 0.31    |
| FMCG               | 3.57        | 1.53          | 0.16    |
| IT                 | -8.30       | -2.40         | 0.02    |
| Media              | -13.04      | -1.84         | 0.07    |
| Metal              | -3.97       | -0.89         | 0.37    |
| Oil & Gas          | 5.78        | 2.4331        | 0.0219  |
| Pharma             | 1.70        | 0.43          | 0.66    |

From the above Table No.3, it is observed that Energy and Oil & Gas sectors have experienced significant positive cumulative abnormal returns post-event, i.e. 30days after the event window. This implies the Short-term positive impact of the event G20 summit on these two sectors, Energy and Oil & Gas. Also, IT has a significant p-value with a negative CAR value of -8.3 which signifies that this sector faced a negative effect of the event in this short term period.

**Table No.4- Abnormal Returns (AR) for the event window for Chandrayaan-3**

| Sectors            | -3    | -2    | -1    | 0     | +1    | +2    | +3    | t-test (df=6) | p-value |
|--------------------|-------|-------|-------|-------|-------|-------|-------|---------------|---------|
| Auto               | 0.30  | -0.13 | 0.57  | -0.24 | 0.11  | 0.08  | 0.58  | 1.51          | 0.18    |
| Bank               | 0.41  | 0.09  | 0.16  | 1.05  | 0.55  | 0.26  | 0.57  | 3.64          | 0.01    |
| Energy             | 0.24  | -0.06 | 0.00  | -1.04 | -0.62 | -0.23 | -0.29 | -1.77         | 0.12    |
| Financial Services | 0.18  | 0.27  | 0.12  | 0.91  | 0.46  | 0.52  | 0.58  | 4.22          | 0.00    |
| FMCG               | 0.40  | 0.40  | 0.67  | -0.61 | 0.48  | -0.62 | -0.33 | 0.26          | 0.79    |
| IT                 | -1.55 | 0.21  | -0.53 | -0.60 | 0.53  | -0.34 | -1.08 | -1.78         | 0.12    |
| Media              | -0.02 | -1.22 | -0.19 | -0.19 | -0.49 | -1.08 | -0.51 | -3.06         | 0.02    |
| Metal              | 0.54  | 0.82  | 0.84  | -0.40 | 0.00  | -0.53 | -0.01 | 0.84          | 0.42    |
| Oil & Gas          | 0.11  | -0.72 | -0.06 | -0.63 | -0.28 | 0.35  | -0.40 | -1.56         | 0.16    |
| Pharma             | -0.94 | -0.24 | -0.69 | -0.71 | -0.96 | -1.36 | 0.34  | -3.11         | 0.02    |

Table No.4 above, captures the daily ARs for the sectors during the event window of Chandrayaan-3. In Auto sector, the ARs fluctuates across the event window, mostly being positive. For Bank and Financial Services, the ARs are consistently positive with a positive spike particularly on the event day. Media and Pharma sectors experienced consistently negative ARs on most of the days throughout the event window.

**Table No.5- Cumulative Abnormal Returns (CAR) for the event window for Chandrayaan-3**

| Sectors            | CAR(-3,+3) | t-test | p-value |
|--------------------|------------|--------|---------|
| Auto               | 1.29       | 1.51   | 0.18    |
| Bank               | 3.12       | 3.64   | 0.01    |
| Energy             | -2.01      | -1.77  | 0.12    |
| Financial Services | 3.06       | 4.22   | 0.00    |
| FMCG               | 0.39       | 0.26   | 0.79    |
| IT                 | -3.37      | -1.78  | 0.12    |
| Media              | -3.74      | -3.06  | 0.02    |
| Metal              | 1.26       | 0.84   | 0.42    |
| Oil & Gas          | -1.64      | -1.56  | 0.16    |
| Pharma             | -4.57      | -3.11  | 0.02    |

In the Table No.5 above, the CAR values for Bank and Financial Services are statistically positively significant, which means these sectors has a strong positive impact due to the event during the event period. However, Media and Pharma sectors have significant p-value ( $<0.05$ ) with a negative CARs which implies a strong negative impact of the event during this period on these sectors.

**Table No.6- Cumulative Abnormal Returns (CAR) for the post-event window for Chandrayaan-3**

| Sectors            | CAR(+5,+35) | t-test(df=30) | p-value |
|--------------------|-------------|---------------|---------|
| Auto               | 3.44        | 0.95          | 0.35    |
| Bank               | 3.47        | 2.02          | 0.05    |
| Energy             | -4.78       | -1.24         | 0.22    |
| Financial Services | 5.26        | 3.13          | 0.00    |
| FMCG               | 1.11        | 0.39          | 0.69    |
| IT                 | -8.92       | -2.49         | 0.01    |

|           |        |       |      |
|-----------|--------|-------|------|
| Media     | -23.83 | -3.23 | 0.00 |
| Metal     | 0.68   | 0.13  | 0.89 |
| Oil & Gas | -4.35  | -1.14 | 0.26 |
| Pharma    | -14.59 | -3.50 | 0.00 |

CARs values for a short-term period are calculated above in the Table No.6, it is found that Bank and Financial Services has a strong positive impact during the event as well as the short-term. Whereas, Media and Pharma shows a strong negative impact on these sectors due to the event during the event window and short-term period. IT sector also have negative impact because of the event for the short-term period, which means it has a significant negative return on the short-term window.

### Conclusions

The study emphasizes that there is no significant p-value in any sectors for ARs and CARs over the event window. This suggests that the Indian Stock market reflected a relatively efficient and stable response to these high profile events.

However, short-term post event period indicate two sectors have positive significant p-value and one sector faced negative significant p-value, which signifies a delayed impact of the event suggest that market adjustments may not be instant but gradually unfold as investors interpret the policies and economic implications.

Overall, in this study for G20 Summit, Energy and Oil & Gas emerged as beneficiaries, most likely due to the discussions on policies associated with energy security, trade cooperation and infrastructure investments. IT sector experienced notable adverse effects, may be due to concerns over global macroeconomic uncertainties, outsourcing risk or shifts in international trade dynamics.

For Chandrayaan-3, the event analysis indicate that the Financial Services and Bank sectors consistently experienced positive impacts, suggesting that technological achievements may strengthen overall investor sentiment. Media and Pharma sectors suffered the most, indicating a temporary reallocation of investor interest or had sector-specific implications. However other sectors has a mixed reaction as they have fluctuations throughout and does not have a significant impact reinforce the notion that national achievements do not uniformly translate into broader market movements.

These findings contribute to the understanding that how these economic events such as diplomatic summits and scientific achievements of a country interact with financial market expectations. Such events generate huge amount of public attention, but their impact on the financial markets are selective and sector dependent.

Further, this study can be extended further by analysing individual stock performance within the sectors that showed significant impact during the event window or/and in the short-term period or post-event due to the event.

Overall, the study reflects that landmark national achievements and global events may gather international attention, their financial market impact is nuanced and selective within sectors rather than broad index level disruptions. This strengthen the notion of evolving maturity of the Indian Stock Market.

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