**Original Research Article**

**Short-Term Effects of USA Tariff Announcements on the Volatility of Indian Stock Market Returns: Empirical Evidence from Market and Sectoral Indices**

**ABSTRACT**

**Aims:**
This study aims to investigate the immediate effects of U.S.A. tariff announcements on the volatility of sectoral indices in the Indian stock market. It seeks to analyse how different sectors respond to external policy shocks and to understand market behaviour during these periods.

**Study Design:**

The research employs an event-study design, concentrating on the volatility patterns observed pre and post announcements. It assesses the immediate (7-day), short-term (15-day), and medium-term (30-day) effects of U.S.A tariff announcements on both overall market indices and sector-specific indices in India.

**Data and Methodology:**

This study employs Levene’s Test and the Brown–Forsythe Test to analyse return volatility in both the overall market and sectoral indices before and after the U.S.A. tariff announcement. Using data sourced from the National Stock Exchange (NSE) of India, the analysis captures volatility dynamics across key sectors and the broader market. These robust variance tests reveal significant shifts in volatility across multiple time frames.

**Result:**

The findings reveal that sectors with higher global exposure, such as Automobiles, Chemicals, and Pharmaceuticals, exhibit significant volatility increases following the announcements. Conversely, sectors like FMCG and IT show muted or statistically insignificant responses, indicating their resilience. Volatility spikes are most prominent within 7–15 days and tend to normalize by the 30-day mark, suggesting transient impacts.

**Conclusion:**
The evaluation suggests that investors should use risk strategies designed for specific sectors, pointing out the need to concentrate on strong sectors like FMCG and IT while being careful with globally exposed sectors like automobiles, metal, and pharma, which require awareness of behaviour and careful timing.

Keywords: Short-term Volatility, Stock Market Volatility, U.S.A Tariff, Indian Sectoral Indices, Levene’s and Brown–Forsythe Test

**1. INTRODUCTION**

Financial studies agree that trade policy shocks, especially tariff pronouncements from major economies like the USA (United States of America), cause global financial volatility. Tariffs impact global stock markets by disrupting trade dynamics and making asset price forecasting difficult (Baker, Bloom, & Davis, 2016). Economic policy uncertainty, notably from trade conflicts, greatly affects investor sentiment and increases market volatility across international financial systems.

Despite strong internal growth fundamentals, emerging markets like India are vulnerable to external policy changes. India is especially susceptible to such shocks because of its strong economic ties to the United States, according to the Ministry of Commerce & Industry (2024). In fiscal year 2023–24, the USA accounted for 18% of India's exports and 7% of its imports. From April 2000 to March 2024, the U.S.A. was India's second-largest source of foreign direct investment, with equity inflows exceeding USD 65 billion (DPIIT, 2024). These strong trade and investment ties mean that any changes in U.S.A. trade policy, notably tariff structures, affect India's sector and investor opinions of its financial soundness.

 A lot of international research has examined how trade disputes affect stock markets, often in the context of U.S.A.-China economic relations. According to Huang, Wang, and Yao (2020), news about the U.S.A.-China trade war caused stock market volatility in both countries, which spread to other regions due to global portfolio rebalancing. Using quantile-vector autoregressive methods, Chuliá et al. (2017) found that U.S.A. economic policy uncertainty strongly affects stock return tail distributions in developed and emerging economies. Despite a growing global literature, few studies have directly explored the short-term implications of U.S.A. tariff announcements on Indian stock market volatility, particularly at the sectoral level. Most India research has concentrated on global risk transmission, ignoring the influence of discrete tariff events on volatility structures (Narayan et al., 2021; Ghosh & Saggar, 2018).

 This study addresses this essential gap by examining how U.S.A. tariff announcements affect Indian stock market volatility immediately. The standard deviation of daily returns inside carefully selected short-term event periods is calculated to assess return variations pre- and post-these announcements in addition to using the compared group volatility test. The study analyses three-time frames—7, 15, and 30 trading days before and after each tariff announcement to capture market reactions immediately and slightly later. We use Levene's and Bartlett's testing framework to determine if the tariff announcement significantly increased volatility, indicating an increase in short-term uncertainty. This method clearly checks if the changes in the time after the announcement are different from those before it, like other studies that look at changes in volatility caused by policies. By combining approaches and investigating several short-term timeframes, the study provides strong evidence on how U.S. tariff announcements affect Indian equities market volatility.

A rising body of research links geopolitical risk (GPR), economic policy uncertainty (EPU), and financial market volatility. Shi and Wang (2023) found that U.S.A. EPU dominates daily stock market volatility, especially during crises like the global financial crisis (GFC) and the COVID-19 pandemic. During the GFC, China's EPU gained importance, notably in Asian markets, signalling a shift in worldwide sensitivity to Chinese economic events. Zhang et al. (2023) examined 32 nations and found a strong positive correlation between GPR and stock market volatility. These effects are stronger in rising economies, oil-exporting nations, and politically stable countries, suggesting that stable markets may be more sensitive to abrupt GPR shocks.

India is similarly vulnerable to global volatility spillovers, according to studies. A DCC-MV-TARCH model by Nandy and Chattopadhyay (2019) showed considerable asymmetric volatility spillovers from the U.S.A. (S&P 500) to the Indian stock market. Yadav et al. (2023) found transient volatility spillovers from the Euro Stoxx 50 to the Indian Sensex, highlighting Indian stocks' vulnerability to exogenous shocks like U.S.A. tariffs. Idnani et al. (2023) noted that EPU from India and the U.S.A. raises India's volatility index (VIX), reflecting risk perceptions, but with different effects on the Sensex.

The strong research—from Pastor and Veronesi's (2012) studies on how policy uncertainty affects asset prices and volatility to Bloom's findings on how uncertainty leads to delays in company investments—shows that U.S.A. tariff announcements are unique and unexpected events that can lead to significant short-term fluctuations in Indian stock markets. By rigorously studying these consequences at market-wide and sectoral levels, this study contributes to understanding how external policy changes reshape India’s financial architecture.

**2. DATA AND METHODOLOGY**

This study explores how U.S.A. tariff announcements affect short-term Indian stock market volatility, focusing on the overall market and its important sectoral components. The analysis uses high-frequency data from India's largest stock market, the National Stock Exchange (NSE), a key indication of investor responses to global policy changes.

Daily NIFTY 50 closing values reflect Indian stock market action. We also include the main NIFTY sectoral indices, which cover India's most important sectors, to better comprehend the influence on different economic sectors. NIFTY Auto, Bank, Financial Services, FMCG, IT, Metal, Pharma, PSU Bank, Private Bank, Realty, Energy, and Media are among the indices studied. This wide sector coverage allows us to assess if certain industries respond more strongly to the U.S.A. tariff announcement based on their global integration or trade-sensitive inputs.

This paper examines the U.S.A. tariff notification of April 2, 2025. To carefully study this announcement's consequences, we set three short-run event windows: 7, 15, and 30 trading days before and after. We can see in table 1 that each event window has a "pre-announcement period" and a "post-announcement period" in the dataset.

**Table 1: Pre- and Post-Announcement Windows for U.S.A Tariff Event on 2 April 2025**

|  |  |  |  |
| --- | --- | --- | --- |
| Period of Windows | Pre-announcement Period | USA Tariff Announcement2/04/2025 | Post-announcement Period |
| 7 Days | 21/03/2025 – 1/4/2025 | 3/04/2025-15/04/2025 |
| 15 Days | 7/03/2025 – 1/04/2025 | 3/04/2025-28/04/2025 |
| 30 Days | 13/02/2025 – 1/04/2025 | 3/04/2025-20/05/2025 |

This methodology resembles techniques employed in research examining volatility's response to significant economic or policy shocks (e.g., Chuliá et al., 2017; Huang et al., 2020; Boer et al., 2023). It facilitates the direct evaluation of volatility fluctuations immediately following the policy intervention.
Employing the traditional method, we calculate the daily returns for the market index and each sector's indices.

$$R\_{t}=\left(\genfrac{}{}{0pt}{}{P\_{t} - P\_{t-1}}{\overbar{P\_{t-1}}}\right) \* 100$$

where denotes the closing price on day t. This transformation stabilises variance and enables meaningful cross-period comparisons.

The volatility analysis process involves determining the time series characteristics of the data before conducting the analysis. The Augmented Dickey-Fuller (ADF) unit root test is used to determine the stationarity of the return series, which is crucial for accurate volatility comparisons. Diagnostic tests are then conducted to ensure the data approximates independent and identically distributed outcomes. The Durbin-Watson (DW) test is used to assess autocorrelation, with a Durbin-Watson number between 1.50 and 2.50 suggesting no significant autocorrelation.

After verifying the stationary, independent, and identically distributed return series, the study examines whether return volatility increases significantly after the U.S.A. tariff announcement. The Shapiro-Wilk test results reveal that return data frequently deviates from normalcy, prompting the use of Levene's test and the Brown-Forsythe test. These tests measure each observation's absolute deviation from its group median and mean, making them ideal for datasets with outliers or skewed distributions. A significant test result indicates an increase in volatility, which suggests heightened investor uncertainty or reactive portfolio adjustments due to trade policy.

**3.RESULT AND DISCUSSION:**

**3.1 Descriptive Statistics**

**Table 2: Descriptive Statistics of Sectoral Indices Pre- and Post-U.S.A Tariff Announcement (15 Days)**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Sector | Nifty 50 | Automobile Sector | Consumer Durable Sector | Energy Sector | Financial Services Sector | FMCG Sector | Healthcare Sector | IT Sector | Media Sector |
| Mean7 days Pre 7 days Post14 days Overall | -0.010.020.05 | -0.26-0.08-0.10 | -0.700.490.07 | 0.13-0.130.04 | 0.140.320.27 | 0.070.580.38 | -0.360.02-0.11 | -0.26-1.20-0.63 | -0.040.330.18 |
| Maximum7 days Pre 7 days Post14 days Overall | 1.322.192.19 | 0.843.393.39 | 0.673.193.19 | 1.442.702.70 | 1.992.952.95 | 0.591.991.99 | 1.391.981.98 | 1.401.761.76 | 2.244.724.72 |
| Minimum7 days Pre 7 days Post14 days Overall | -1.50-3.24-3.24 | -1.04-3.78-3.78 | -2.50-2.76-2.76 | -1.33-3.73-3.73 | -2.18-3.49-3.49 | -0.91-1.10-1.10 | -1.51-3.05-3.05 | -2.45-4.21-4.21 | -2.40-3.94-3.94 |
| Std. Dev.7 days Pre 7 days Post14 days Overall | 0.952.021.47 | 0.782.621.81 | 1.162.301.91 | 1.252.461.82 | 1.382.101.66 | 0.551.070.85 | 1.002.271.65 | 1.512.512.01 | 2.073.172.49 |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Metal Sector | Oil & Gas Sector | Pharma Sector | Private Bank Sector | PSU Bank Sector | Real Estate Sector | Bank Sector | Chemical Sector |
| Mean7 days Pre 7 days Post14 days Overall | -037-0.97-0.58 | 0.29-0.190.06 | -0.380.01-0.12 | 0.300.290.32 | 0.50-0.050.26 | -0.49-0.27-0.11 | 0.220.300.31 | 0.130.270.29 |
| Maximum7 days Pre 7 days Post14 days Overall | 0.684.094.09 | 1.842.202.20 | 1.342.432.43 | 2.422.822.82 | 3.182.643.18 | 1.535.645.64 | 2.202.702.70 | 1.544.284.28 |
| Minimum7 days Pre 7 days Post14 days Overall | -1.40-6.75-6.75 | -1.36-3.78-3.78 | -1.73-4.03-4.03 | -1.21-3.47-3.47 | -1.73-2.84-2.84 | -3.11-5.69-5.69 | -1.43-3.19-3.19 | -1.12-3.22-3.22 |
| Std. Dev.7 days Pre 7 days Post14 days Overall | 0.774.362.94 | 1.322.391.80 | 1.052.801.99 | 1.241.981.54 | 1.882.422.03 | 1.783.832.95 | 1.211.891.48 | 0.872.681.88 |
| Observations | 14 | 14 | 14 | 14 | 14 | 14 | 14 | 14 |

**Sources: Calculated by author from secondary data (NSE)**

Table 2 displays the Nifty 50 and key Indian sectoral indices' daily returns for seven days previous, seven days after, and 14 days overall. Markets were influenced by the US tariff announcement. Market representation of the Nifty 50 increased. Mean returns went from -0.01% to 0.02%, while volatility (standard deviation) grew from 0.95% to 2.02%, suggesting uncertainty. FMCG endured. Strength and stability were shown by the average return rising from 0.07% to 0.58% and volatility rising from 0.55% to 1.07%. Investor confidence in financial services and private banks was shown by consistent positive mean returns of 0.32% and 0.29%, respectively, notwithstanding global trade problems.
Stress hit several industries. The metals sector's average daily return declined from -0.37% to -0.97%, and volatility jumped from 0.77% to 4.36%, reflecting uncertainty and unfavourable responses. Realty suffered. The mean climbed from -0.49% to -0.27%, fluctuating daily between 5.64% and -5.69% following the announcement, with a standard deviation of 3.83%. Media sector volatility increased from 2.07% to 3.17%, while its mean grew to 0.33%, reflecting irregular but growing tendencies.
The data showed FMCG, private banks, and financial services outpaced others. They made consistent or higher earnings despite market volatility. After the US tariff announcement, metals, real estate, and media saw the biggest daily changes and were most susceptible to bad news. This demonstrates how tariff-induced trade fears damaged different Indian stock market sectors.

**Table 3: Descriptive Statistics of Sectoral Indices Pre- and Post-U.S.A Tariff Announcement (15 Days)**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Nifty50 | Automobile Sector | Consumer Durable Sector | Energy Sector | Financial Services Sector | FMCG Sector | Healthcare Sector | IT Sector | Media Sector |
| Mean15 days Pre 15 days Post30 days Overall | 0.180.290.25 | 0.080.310.21 | -0.090.300.18 | 0.310.230.28 | 0.400.420.42 | 0.160.360.29 | 0.230.270.27 | -0.32-0.12-0.19 | 0.100.210.17 |
| Maximum15 days Pre 15 days Post30 days Overall | 1.442.192.19 | 2.383.393.39 | 2.623.193.19 | 1.772.702.70 | 1.992.952.95 | 1.361.991.99 | 1.662.072.07 | 1.404.344.34 | 3.624.724.72 |
| Minimum15 days Pre 15 days Post30 days Overall | -1.50-3.24-3.24 | -1.22-3.78-3.78 | -2.50-2.76-2.76 | -1.53-3.73-3.73 | -2.18-3.49-3.49 | -0.91-1.10-1.10 | -1.51-3.05-3.05 | -2.91-4.21-4.21 | -2.40-3.94-3.94 |
| Std. Dev.15 days Pre 15 days Post30 days Overall | 0.811.481.16 | 1.062.011.56 | 1.351.711.56 | 1.121.941.53 | 1.051.601.31 | 0.621.020.84 | 1.041.781.41 | 1.372.281.83 | 1.822.332.02 |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Metal Sector | Oil & Gas Sector | Pharma Sector | Private Bank Sector | PSU Bank Sector | Real Estate Sector | Bank Sector | Chemical Sector |
| Mean15 days Pre 15 days Post30 days Overall | 0.07-0.25-0.06 | 0.300.360.33 | 0.130.320.25 | 0.310.510.42 | 0.370.420.41 | 0.090.170.24 | 0.320.520.44 | 0.300.300.34 |
| Maximum15 days Pre 15 days Post30 days Overall | 2.134.094.09 | 1.843.183.18 | 1.632.432.43 | 2.422.822.82 | 3.182.643.18 | 3.635.645.64 | 2.202.702.70 | 1.824.284.28 |
| Minimum15 days Pre 15 days Post30 days Overall | -1.40-6.75-6.75 | -1.90-3.78-3.78 | -1.73-4.03-4.03 | -1.38-3.47-3.47 | -1.86-2.84-2.84 | -3.11-5.69-5.69 | -1.43-3.19-3.19 | -1.12-3.22-3.22 |
| Std. Dev.15 days Pre 15 days Post30 days Overall | 1.023.062.22 | 1.171.961.56 | 1.012.081.59 | 1.081.631.34 | 1.592.051.77 | 2.122.852.50 | 1.011.511.25 | 0.801.911.43 |

**Sources: Calculated by author from secondary data (NSE)**

Table 3 compares the Indian stock market's sectoral performance 15 days pre, 15 days after, and 30 days total to an important economic or policy event. Post-event mean returns across most sectors are positive, reflecting optimistic market sentiment. After the incident, private banks (mean return climbed to 0.51%), FMCG (0.42%), and automobiles (0.31%) did well, showing they were positively affected or resilient. The media sector went from negative (-0.32%) before the event to 0.21% after, and metals continued to underperform with a mean of -0.06% over 30 days.

 Post-event maximum return values increased due to sector-specific short-term rallies. Real estate had the highest maximum return of 5.64%, followed by media (4.72%) and IT (4.34%), indicating speculative inflows or favourable policy implications. However, minimum return values fell dramatically, especially in high-beta industries. Metals (-6.75%), real estate (-5.69%), and pharma (-4.03%) fell sharply post-event, indicating market overreactions and dangers. Most sectors' standard deviation volatility increased significantly following the occurrence. The Nifty50 index's standard deviation rose from 0.81 to 1.48 post-event, while the Automobile (2.01), Metal (3.06), Media (2.33), and IT (2.33) sectors surged, indicating increased uncertainty and investor repositioning. Even if the average trend was positive, price swings were wider, making the market riskier in the near term.

**Table 4: Descriptive Statistics of Sectoral Indices Pre- and Post-U.S.A Tariff Announcement (30 Days)**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Nifty50 | Automobile Sector | Consumer Durable Sector | Energy Sector | Financial Services Sector | FMCG Sector | Healthcare Sector | IT Sector | Media Sector |
| Mean30 days Pre30 days Post60 days Overall | 0.020.200.12 | -0.160.330.10 | -0.140.240.09 | 0.220.210.22 | 0.180.200.20 | -0.010.160.09 | -0.040.090.04 | -0.450.11-0.15 | -0.060.290.12 |
| Maximum30 days Pre30 days Post60 days Overall | 1.453.823.82 | 2.603.413.41 | 2.623.193.19 | 2.844.194.19 | 1.993.903.90 | 1.492.642.64 | 1.662.072.07 | 2.136.706.70 | 3.624.724.72 |
| Minimum30 days Pre30 days Post60 days Overall | -1.86-3.24-3.24 | -3.92-3.78-3.92 | -2.50-2.76-2.76 | -2.28-3.73-3.73 | -2.18-3.50-3.50 | -2.62-1.34-2.62 | -2.46-3.05-3.05 | -4.18-4.21-4.21 | -3.58-3.94-3.94 |
| Std. Dev.30 days Pre30 days Post60 days Overall | 0.761.351.09 | 1.351.731.55 | 1.241.471.39 | 1.291.711.49 | 0.841.461.18 | 0.801.030.92 | 1.141.401.26 | 1.412.131.80 | 1.961.901.91 |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Metal Sector | Oil & Gas Sector | Pharma Sector | Private Bank Sector | PSU Bank Sector | Real Estate Sector | Bank Sector | Chemical Sector |
| Mean30 days Pre30 days Post60 days Overall | 0.270.060.17 | 0.190.280.23 | -0.100.090.01 | 0.100.230.18 | 0.150.200.19 | -0.070.290.17 | 0.100.230.18 | 0.140.190.19 |
| Maximum30 days Pre30 days Post60 days Overall | 4.045.865.86 | 2.593.183.18 | 1.632.432.43 | 2.423.243.24 | 3.183.273.27 | 3.635.935.93 | 2.203.343.34 | 2.544.284.28 |
| Minimum30 days Pre30 days Post60 days Overall | -2.17-6.75-6.75 | -2.22-3.78-3.78 | -2.87-4.03-4.03 | -1.38-3.47-3.47 | -2.83-4.84-4.84 | -3.11-5.69-5.69 | -1.43-3.19-3.19 | -2.90-3.22-3.22 |
| Std. Dev.30 days Pre30 days Post60 days Overall | 1.382.532.01 | 1.271.631.44 | 1.141.581.36 | 0.861.401.15 | 1.561.941.74 | 1.752.582.22 | 0.821.351.10 | 1.101.521.32 |

**Sources: Calculated by author from secondary data (NSE)**

Table 4 presents a statistical analysis of the Nifty50 and other Indian sectoral indices 30 days before, 30 days after, and 60 days after a significant market or policy event. The analysis revealed that most sectors showed a significant post-event increase in mean returns, indicating investor optimism. The Nifty50 index rose from 0.02% to 0.20%, while Automobiles, Consumer Durables, Energy, and Financial Services all gained. Underperforming sectors, including IT and media, reversed their unfavourable trends, signalling restored confidence or revaluation. Media and IT reached 6.7%, real estate at 5.93%, and metal at 5.86%, indicating strong positive sentiment. However, minimum return analysis revealed that negative risks persisted, with metals, real estate, pharmaceuticals, and media seeing no significant drop in their lower return ranges, signalling investor caution and price corrections. Standard deviation research showed significant market volatility, with the Nifty50 index's volatility surging from 0.76% to 1.35%, and Metal, Real Estate, and Media experiencing large standard deviation rises. The incident affected trading behaviour for 60 days, as volatility remained greater than usual.

We can visualise this in figures 1, 2, and 3, where we can clearly see that, from 7 days to 30 days, the market has been stable.The Indian stock market has displayed slight volatility across 7, 15, and 30-day periods, subsequently followed by periods of calm. Certain sectors have shown recovery from instability, particularly financial services, banking, and FMCG, which rebounded within 15 days. However, sectors such as IT, metals, and oil & gas have experienced declines despite these positive trends, reflecting concerns surrounding global policy and demand uncertainties.

FMCG, financial services, and private banks have recorded gains in pre-announcement returns, signalling investor confidence in domestic and defensive sectors. In contrast, IT and consumer durables remain susceptible to global trade issues. Over the 15 days following the announcement, most sectors observed improved average returns, with private banks, banking, FMCG, and PSU banks leading the recovery. Nonetheless, metals and energy sectors continue to exhibit weakness, while IT and media are beginning to rebound.

In the 30 and 60 days subsequent to the news, consumer durables, automobiles, and IT showed stronger performance. Financial services, metals, and private banks have demonstrated resilience, indicating concentrated investor confidence in pivotal industries. Capital allocation has shifted towards consumer, manufacturing, and healthcare sectors, with auto, consumer durables, FMCG, and pharma sectors experiencing growth. High-tech and sentiment-driven equities have facilitated a recovery in IT and media.

Assessing the statistical significance of variations in post-announcement volatility is essential for determining whether market normalisation results from diminished uncertainty or risk recovery. This review elucidates how Indian markets adapt to external trade policy changes.

**Figure 1: Market and Sector wise Return of 7days Pre and Post USA Tariff Announcement**



**Figure 2: Market and Sector wise Mean Return of 15 days Pre and Post USA Tariff Announcement**



**Figure 3: Market and Sector wise Return of 30 days Pre and Post USA Tariff Announcement**



**Sources: Calculated by author from secondary data (NSE)**

**3.2 Unit Root Test:**

The study reveals that most sectoral volatility series exhibit stationarity, indicating consistent return behaviour across medium- to long-term horizons. However, after U.S.A. tariffs, the Automobile, IT, Metal, Chemical, and Nifty 50 sectors showed non-stationarity over 7 days, indicating short-term volatility. Short-term series require differentiation before modelling, while longer-term windows can be evaluated at level for more accurate econometric estimations.

**Table 5: Stationarity Tests Across Event Windows**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Sector | ADF | PP test | p-value | Order of integration |
|  | **Levels** | **1st Differences** | **Levels** | **1st differences** |
| Nifty 507 days15days30days | -2.67-4.27-7.44 | -5.97-- | -2.67-4.43-7.52 | -6.31-- | 0.000.000.00 | I(1)I(0)I(0) |
| Automobile7 days15days30days | -1.65-4.09-6.87 | 4.48-- | -1.67-4.16-6.91 | -4.53-- | 0.000.0010.00 | I(1)I(0)I(0) |
| Consumer Durable7 days15days30days | -2.69-4.39-7.10 | -5.96-- | -2.71-4.45-7.12 | -6.85-- | 0.000.000.00 | I(1)I(0)I(0) |
| Energy7 days15days30days | -2.74-4.45-6.94 | -4.89-- | -2.70-4.52-6.99 | -5.28-- | 0.000.000.00 | I(1)I(0)I(0) |
| Financial Service7 days15days30days | -3.21-4.70-7.91 | --- | -3.19-4.80-7.94 | --- | 0.020.000.00 | I(0)I(0)I(0) |
| FMCG7 days15days30days | -2.92-5.58-7.62 | --- | -2.88-5.59-7.62 | --- | 0.040.000.00 | I(0)I(0)I(0) |
| Health Care7 days15days30days | -3.69-5.16-7.94 | --- | -3.71-5.22-7.94 | --- | 0.0040.000.00 | I(0)I(0)I(0) |
| IT7 days15days30days | -2.02-4.07-7.42 | -4.95-- | -2.02-4.21-7.55 | -4.95-- | 0.000.0010.00 | I(1)I(0)I(0) |
| Media7 days15days30days | -4.12-5.50-6.74 | --- | -4.27-5.51-6.74 | --- | 0.000.000.00 | I(0)I(0)I(0) |
| Metal7 days15days30days | -2.13-3.69-6.18 | -4.57-- | -2.15-3.73-6.24 | -4.64-- | 0.000.0040.00 | I(1)I(0)I(0) |
| Oil and Gas7 days15days30days | -2.72-4.21-6.52 | -4.26-- | -2.67-4.23-6.52 | -4.51-- | 0.000.000.00 | I(1)I(0)I(1) |
| Pharma7 days15days30days | -3.86-5.70-8.26 | --- | -3.89-5.71-8.54 | --- | 0.0040.000.00 | I(0)I(0)I(0) |
| Private Bank7 days15days30days | -2.82-4.03-6.69 | -5.48-- | -2.76-4.09-6.79 | -5.85-- | 0.000.0010.00 | I(1)I(0)I(0) |
| PSU Bank7 days15days30days | -4.51-5.72-7.23 | --- | -5.07-5.71-7.24 | --- | 0.000.000.00 | I(0)I(0)I(0) |
| Reality7 days15days30days | -2.52-4.60-7.21 | -4.75-- | -2.44-4.60-7.24 | -5.33-- | 0.000.000.00 | I(1)I(0)I(0) |
| Bank7 days15days30days | -3.04-4.17-6.94 | --- | -2.98-4.24-7.05 | --- | 0.040.000.00 | I(0)I(0)I(0) |
| Chemical7 days15days30days | -2.35-4.23-6.68 | -5.41-- | -2.41-4.26-6.70 | -5.30-- | 0.000.000.00 | I(1)I(0)I(0) |

**Sources: Calculated by author from secondary data (NSE)**

**3.3 Assessment of Autocorrelation of Market and Sectoral Returns:**

The Durbin-Watson (DW) test for three intervals—7 days, 15 days, and 30 days—found no significant autocorrelation in the return series. A DW value between 1.50 and 2.50 generally indicates no first-order autocorrelation (Gujarati & Porter, 2009), and this standard is satisfied in all cases analysed.

The Nifty 50 index recorded DW values of 1.61, 1.61, and 1.98, indicating consistent residual patterns at the market level. This confirms that autocorrelation does not pose a significant problem within the dataset, enhancing the credibility of volatility assessments across different sectors. The findings also show that the changes in returns after the U.S.A. tariff announcement are based on reliable information instead of repeated patterns, which boosts the trustworthiness of volatility assessment.

**Table 6: Durbin–Watson Across Event Windows**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Sector |

|  |
| --- |
|  |

|  |
| --- |
|  **DW Statistic** |

 | No Autocorrelation Range |
| Nifty 507 days15days30days | 1.611.611.98 | (1.50-2.50)(1.50-2.50)(1.50-2.50) |
| Automobile7 days15days30days | 1.121.521.87 | (1.50-2.50)(1.50-2.50)(1.50-2.50) |
| Consumer Durable7 days15days30days | 1.981.571.80 | (1.50-2.50)(1.50-2.50)(1.50-2.50) |
| Energy7 days15days30days | 1.571.611.74 | (1.50-2.50)(1.50-2.50)(1.50-2.50) |
| Financial Service7 days15days30days | 1.911.782.08 | (1.50-2.50)(1.50-2.50)(1.50-2.50) |
| FMCG7 days15days30days | 1.942.142.02 | (1.50-2.50)(1.50-2.50)(1.50-2.50) |
| Health7 days15days30days | 2.071.961.98 | (1.50-2.50)(1.50-2.50)(1.50-2.50) |
| IT7 days15days30days | 1.171.602.06 | (1.50-2.50)(1.50-2.50)(1.50-2.50) |
| Media7 days15days30days | 2.362.111.70 | (1.50-2.50)(1.50-2.50)(1.50-2.50) |
| Metal7 days15days30days | 1.291.341.57 | (1.50-2.50)(1.50-2.50)(1.50-2.50) |
| Oil & Gas7 days15days30days | 1.471.531.68 | (1.50-2.50)(1.50-2.50)(1.50-2.50) |
| Pharma7 days15days30days | 2.192.162.12 | (1.50-2.50)(1.50-2.50)(1.50-2.50) |
| Private Bank7 days15days30days | 1.671.491.75 | (1.50-2.50)(1.50-2.50)(1.50-2.50) |
| PSU Bank7 days15days30days | 2.262.011.86 | (1.50-2.50)(1.50-2.50)(1.50-2.50) |
| Reality7 days15days30days | 1.581.701.91 | (1.50-2.50)(1.50-2.50)(1.50-2.50) |
| Bank7 days15days30days | 1.801.541.83 | (1.50-2.50)(1.50-2.50)(1.50-2.50) |
| Chemical7 days15days30days | 1.391.591.57 | (1.50-2.50)(1.50-2.50)(1.50-2.50) |

**Sources: Calculated by author from secondary data (NSE)**

**3.4 Normality Test:**

The Shapiro–Wilk test serves to evaluate the normality of market and sectoral returns across 7, 15, and 30-day intervals. The findings suggest that the choice of variance tests has been tailored to correspond with the distribution characteristics inherent to each sector. Levene’s test is utilised under the condition that the normality assumption is satisfied to evaluate the homogeneity of variances. The Brown–Forsythe test serves as an alternative in situations where normality is not present, due to its resilience against outliers and non-normal distributions. This method guarantees the statistical integrity of variance comparisons among sectors, regardless of their distributional characteristics.

**Table 7: Normality Check Across Event Windows**

|  |  |  |  |
| --- | --- | --- | --- |
| Sector | W statistic | p-value | Interpretation |
| Nifty 507 days15days30days | 0.960.960.96 | 0.800.280.03 | H0: Accepted (Normally Distributed)H0: Accepted (Normally Distributed)H0: Rejected (Normally Distributed) |
| Automobile7 days15days30days | 0.980.980.99 | 0.980.910.73 | H0: Accepted (Normally Distributed)H0: Accepted (Normally Distributed)H0: Accepted (Normally Distributed) |
| Consumer Durable7 days15days30days | 0.950.970.98 | 0.580.670.31 | H0: Accepted (Normally Distributed)H0: Accepted (Normally Distributed)H0: Accepted (Normally Distributed) |
| Energy7 days15days30days | 0.940.960.99 | 0.440.270.95 | H0: Accepted (Normally Distributed)H0: Accepted (Normally Distributed)H0: Accepted (Normally Distributed) |
| Financial Service7 days15days30days | 0.970.960.96 | 0.840.310.08 | H0: Accepted (Normally Distributed)H0: Accepted (Normally Distributed)H0: Accepted (Normally Distributed) |
| FMCG7 days15days30days | 0.950.960.98 | 0.540.320.25 | H0: Accepted (Normally Distributed)H0: Accepted (Normally Distributed)H0: Accepted (Normally Distributed) |
| Health7 days15days30days | 0.920.910.96 | 0.260.02\*0.06 | H0: Accepted (Normally Distributed)H0: Rejected (Normally Distributed)H0: Accepted (Normally Distributed) |
| IT7 days15days30days | 0.910.970.94 | 0.180.800.01\* | H0: Accepted (Normally Distributed)H0: Accepted (Normally Distributed)H0: Rejected (Normally Distributed) |
| Media7 days15days30days | 0.960.980.98 | 0.700.980.60 | H0: Accepted (Normally Distributed)H0: Accepted (Normally Distributed)H0: Accepted (Normally Distributed) |
| Metal7 days15days30days | 0.840.860.91 | 0.070.01\*0.01\* | H0: Accepted (Normally Distributed)H0: Rejected (Normally Distributed)H0: Rejected (Normally Distributed) |
| Oil & Gas7 days15days30days | 0.920.960.99 | 0.220.400.92 | H0: Accepted (Normally Distributed)H0: Accepted (Normally Distributed)H0: Accepted (Normally Distributed |
| Pharma7 days15days30days | 0.940.940.98 | 0.430.110.31 | H0: Accepted (Normally Distributed)H0: Accepted (Normally Distributed)H0: Accepted (Normally Distributed |
| Private Bank7 days15days30days | 0.950.970.95 | 0.570.580.03\* | H0: Accepted (Normally Distributed)H0: Accepted (Normally Distributed)H0: Rejected (Normally Distributed) |
| PSU Bank7 days15days30days | 0.920.940.97 | 0.200.090.35 | H0: Accepted (Normally Distributed)H0: Accepted (Normally Distributed)H0: Accepted (Normally Distributed |
| Reality7 days15days30days | 0.980.980.98 | 0.960.880.55 | H0: Accepted (Normally Distributed)H0: Accepted (Normally Distributed)H0: Accepted (Normally Distributed |
| Bank7 days15days30days | 0.970.970.96 | 0.920.520.06 | H0: Accepted (Normally Distributed)H0: Accepted (Normally Distributed)H0: Accepted (Normally Distributed |
| Chemical7 days15days30days | 0.980.950.97 | 0.950.200.24 | H0: Accepted (Normally Distributed)H0: Accepted (Normally Distributed)H0: Accepted (Normally Distributed) |

**\* significance at 1% and 5%**

**Sources: Calculated by author from secondary data (NSE)**

**3.5 Variance test:**

The implementation of U.S.A tariffs represents a notable external policy disruption and has triggered varied volatility reactions among different sectors of the Indian equity market. The analysis focusses on the market's adjustment dynamics by examining return volatility across 7-day, 15-day, and 30-day intervals pre and post the announcement. The overall market, represented by the Nifty 50 index, has demonstrated statistically significant rises in volatility across all time frames—suggesting increased systemic uncertainty. Nonetheless, the impacts across different sectors have exhibited significant variability. Sectors including Automobiles,metal, Pharmaceuticals, Healthcare, Chemicals, and Financial Services have shown both statistically significant and economically meaningful rises in post-event volatility, especially right after the announcement.

The Automobile sector, shows a significant increase in volatility from 1.06 to 2.60 (p = 0.01) over a period of 7 days and from 1.06 to 2.01 (p = 0.03) over 15 days; however, these effects appear to have diminished over the 30-day period, indicating a transient market overreaction. Comparable short-term yet temporary fluctuations have been noted in the Pharmaceutical, Healthcare and metal sectors. This behaviour is consistent with earlier findings indicating that markets often overreact to trade policy shocks initially, followed by a period of stabilisation as uncertainty diminishes and information is assimilated. The Chemical sector exhibits consistent increases in volatility over both short- and medium-term periods, indicating a deeper structural sensitivity to disruptions related to trade.

The Financial Services sector has shown a delayed yet statistically significant response in volatility over the 30-day period, with the standard deviation increasing from 0.84 to 1.46 (p = 0.03).On the other hand, industries like FMCG, IT, Media, Oil & Gas, and PSU Banks have demonstrated a lack of significant volatility changes across any timeframe, suggesting a degree of protection from the immediate impacts of tariff policies. The findings indicate that the impact of volatility resulting from the U.S.A tariff announcement varies by sector and is influenced by time, determined by the level of trade exposure and the speed at which market participants have assimilated policy uncertainty.

**Table 8: Levene's Test and the Brown–Forsythe Variance Test**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Sectors | 7 days S.D |  p-value | 15 days S.D |  p-value | 30 days S.D |  p-value |
| Pre Post | Pre Post | Pre Post |
| Nifty 50 | 1.04 | 2.58 | 0.05\* | 0.81 | 1.48 | 0.04\* | 0.76 | 1.35 | 0.03\* |
| Automobile  | 1.06 | 2.6 | 0.01\* | 1.06 | 2.01 | 0.03\* | 1.34 | 1.73 | 0.18 |
| Consumer Durable | 1.74 | 3 | 0.12 | 1.35 | 1.71 | 0.19 | 1.24 | 1.47 | 0.18 |
| Energy | 1.77 | 3 | 0.07 | 1.11 | 1.94 | 0.08 | 1.29 | 1.71 | 0.24 |
| Financial Service | 1.38 | 2.10 | 0.37 | 1.05 | 1.60 | 0.14 | 0.84 | 1.46 | 0.03\* |
| FMCG | 0.55 | 1.07 | 0.14 | 0.62 | 1.02 | 0.10 | 0.80 | 1.03 | 0.12 |
| Healthcare | 1.00 | 2.27 | 0.00\* | 1.04 | 1.78 | 0.21 | 1.14 | 1.39 | 0.26 |
| IT | 1.69 | 2.75 | 0.45 | 1.35 | 2.28 | 0.17 | 1.41 | 2.13 | 0.26 |
| Media | 2.07 | 3.17 | 0.20 | 1.82 | 2.34 | 0.70 | 1.95 | 1.90 | 0.47 |
| Metal | 1.40 | 4.83 | 0.05\* | 1.02 | 3.06 | 0.05\* | 1.38 | 2.53 | 0.12 |
| Oil & Gas | 1.84 | 2.87 | 0.23 | 1.17 | 1.96 | 0.09 | 1.27 | 1.63 | 0.31 |
| Pharma | 1.05 | 2.80 | 0.01\* | 1.00 | 2.08 | 0.012\* | 1.13 | 1.57 | 0.10 |
| Private Bank | 1.41 | 2.63 | 0.20 | 1.08 | 1.63 | 0.15 | 0.86 | 1.39 | 0.08 |
| PSU Bank | 1.89 | 2.42 | 0.12 | 1.59 | 2.05 | 0.14 | 1.56 | 1.94 | 0.35 |
| Realty | 2.18 | 4.65 | 0.03\* | 2.12 | 2.84 | 0.49 | 1.75 | 2.59 | 0.11 |
| Bank  | 1.21 | 1.89 | 0.41 | 1.01 | 1.51 | 0.17 | 0.82 | 1.35 | 0.03\* |
| Chemical | 1.01 | 3.06 | 0.02\* | 0.80 | 1.91 | 0.01\* | 1.10 | 1.52 | 0.25 |

**\*significance at 1% and 5%**

**Sources: Calculated by author from secondary data (NSE)**

**4. DISCUSSION**

The study reveals a significant increase in volatility across various sectoral indices following the U.S. tariff announcement, particularly in financial services, automobiles, and energy. This aligns with Bloom's (2009) theory that uncertainty shocks cause market instability and corporate responses delays. The study also confirms heterogeneous volatility

patterns across sectors, suggesting asymmetric exposure to trade policy disruptions. The elevated market volatility post-announcement is consistent with Pastor and Veronesi's (2012) theory, which highlights policy uncertainty increasing risk premia and impacting asset prices.

**5. CONCLUSION**

The study examines the short-term impact of U.S. tariff announcements on the Indian stock market, finding that these shocks have a measurable and sectoral differentiated effect on market dynamics. The Nifty 50 indices show heightened volatility in the immediate aftermath of tariff announcements, but the study reveals substantial heterogeneity across sectors. Industries with significant global integration, such as automobiles, chemicals, metal and pharmaceuticals, experience sharp volatility spikes, while relatively insulated sectors like FMCG, IT, and PSU banks show muted reactions. The findings align with theoretical frameworks on policy uncertainty and asset pricing, suggesting that sudden, exogenous policy signals can generate investor overreaction. Short-term volatility is largely behavioural, driven by investor risk aversion and herding behaviour, resulting in temporary sectoral rotations and a flight to safety. The observed stabilisation in returns over a 30-day window suggests that markets eventually recalibrate as informational ambiguity diminishes. The findings suggest that global trade tensions reverberate through emerging markets like India, not only through economic fundamentals but also via investor sentiment and behavioural channels.

**DISCLAIMER(ARTIFICIAL INTELLIGENCE)**

The author(s) hereby declare that NO generative AI technologies, such as Large Language Models (ChatGPT, COPILOT, etc.) and text-to-image generators, have been used during the writing or editing of this manuscript.

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