**Sectors Under Siege: Impact of Trump's Tariff Announcement on Major Sectoral Stock Market Indices of India**

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**Abstract:**

The recent significant increase in US tariffs has notably influenced India's trade and export sectors. The tariff measures and associated trade policies introduced by Trump have had a considerable effect on certain Indian sectoral indices, particularly in the energy, IT, pharmaceutical, and traditional labour-intensive industries. These policies also impacted Indian exports and led to fluctuations in the stock market. However, the effects were not consistent across all product categories, and the overall impact on India's export growth was relatively modest. This is because the effects were confined to specific sectors and could be counterbalanced by broader global trade uncertainties if protectionist measures intensify. The influence of tariff increases under Donald Trump's 'New Trade Policy' on Indian sectoral indices with event windows (-41, +41) for long-term impact is examined with a 180-day estimation period to determine normal returns.



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## 1. Introduction

The trade tariff which is levied on a country on imported products affects investor sentiments. Donald J. Trump, on April 2, 2025 announced, 10% tariff on all imports. This event mirrors tariff-related market shocks, reaffirming the need for predictive tools that link economic policy with market sentiment (Amiti, Redding, & Weinstein, 2019) (Krugman et al., 2018). As global markets grow more interconnected and reactive, the ability to quantitatively estimate market impacts from tariff announcements becomes essential for policymakers, investors, and risk analysts. In recent years, such policy-induced volatility has become increasingly common. Notably, in April 2025, former U.S. President Donald Trump publicly declared a series of new tariffs (Ahmed et al., 2025) (Klomp J, 2025).

## 2.Review of literature

### 2.1. Stock market efficiency and Event studies

Market efficiency has been a topic of interest for a long time. Different papers and books have been written examining different efficiencies of market. However, researches show that markets are not always efficient in different forms. (T. Mallikarjunappa, Diana Saldanha and Iqbal Thonse Hawaldar, 2024) (dos Santos Maciel, 2023) (Dabbous & Tarhini, 2021).

The event study methodology (ESM) analyses influence of one incident on an index. For this purpose, returns will be calculated (Sadok El Ghoul, Omrane Guedhami, Sattar A. Mansi and Oumar Sy, 2022), Drawing on the established ESM widely utilised to measure earnings during policy shocks, this study examines how tariff announcement impacted major Indian sectoral indices, including IT, Metals, Pharma, Automobiles, and Textiles, global trade policy shocks in emerging markets (Karau and Fischer, 2024) (Heyden and Heyden, 2021). As a countermeasure many countries announced tariff on U.S. Any such geopolitics has the tendency to increase stock volatility (Farok J. Contractor, 2025) (Peter H Egger, Jiaqing Zhu, 2020).

### 2.2. Tariffs and Indian Stock Market

Uncertainty in trade policy, suspension of investments are all repercussions of tariff (Bianconi et al., 2021) (Huang et al., 2023) (Jensen, 2007) (Asadollah et al., 2024) (Dhingra and Sampson,

2022) (Chiang, 2020) (Wengerek et al., 2025). More often than not, tariff has caused stock market collapse (Jeroen Klomp, 2025). India has replied with counter tariffs on US and all these negatively impacting investor sentiments in India (Tran, H. Q, 2025) (Aditya Kumar Shukla & Ranjan Kumar, 2025).

## 3. Research Methodology:

### 3.1 Event Study Methodology (ESM):

The approach employed to evaluate how particular events influence stock prices is ESM which examine the average abnormal returns (AARs) surrounding the event date. It entails contrasting actual returns with expected returns, which are frequently estimated using market-adjusted model (Marisetty & Madasu, 2021) (Babu & Marisetty, 2020; Rosidin et al., 2024; Manjunatha & Kharuri, 2023).

**AAR Calculation:** AAR is determined through a market-based model, from its actual return (Prusak & Potrykus, 2021). AAR represents the mean of abnormal returns on a given day. It is computed as follows:

$$AAR_t = \frac{1}{N}\sum_{i=1}^{N} AR_{i,t}$$

where (N) are firms and (AR_{i,t}) is return (i) on day (t) (Prusak & Potrykus, 2021; Jha & Basnet, 2020; Singh & Padmakumari, 2020; Rosidin et al., 2024; Manjunatha & Kharuri, 2023).

**Cumulative Average Abnormal Return (CAAR)**: CAAR is the sum of AARs over a specified event window. It is calculated as:

$$\text{CAAR}\ (t_1, t_{2)} = \frac{1}{N}\sum_{i=1}^{N}\sum_{t=t_1}^{t_2} AR_{i,t}$$

Where (t_1) and (t_2) define the event window (Prusak & Potrykus, 2021; Upadhyay & Kurmi, 2020; Singh & Padmakumari, 2020; Rosidin et al., 2024; Manjunatha & Kharuri, 2023).

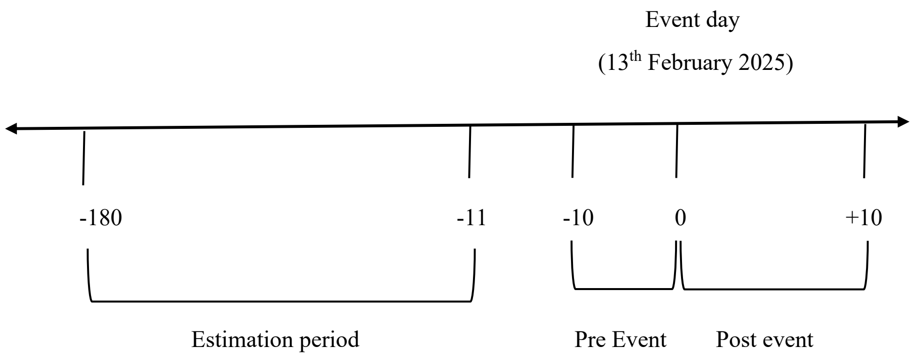
### 3.2. Event Study Timeline:

An event window of -20 to +20 days is a common approach in event study methodology, allowing researchers to analyse stock price reactions both before and after a significant event, such as a corporate announcement or geopolitical incident. This 41-day window captures potential information leakage or anticipation effects prior to the event, as well as delayed market reactions afterward. The choice of this window length balances the need to observe short-term volatility with the risk of including unrelated market noise, and is widely supported in financial literature for robust event impact analysis (J, J, & N, 2024; Pandey, Bhama, & Mohapatra, 2020; Goyal & Soni, 2024; Verma, Kumar, & Bansal, 2021). 180 days prices have been averaged to find Expected return/ Normal returns, which is preceding to the pre-event period. Event dates and event timeline are clearly stated in the following table:

**Table 1: Event Dates:**

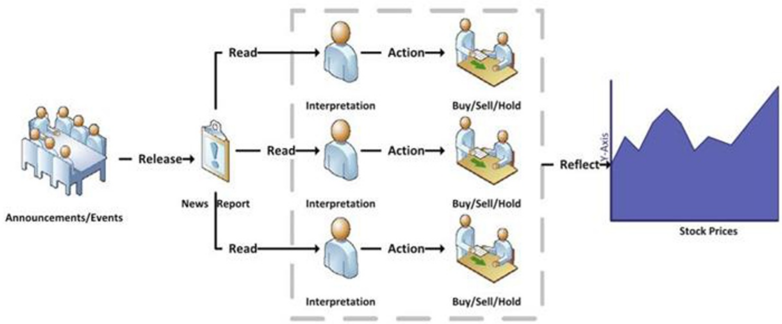
| Event | Estimation period: 180 days ( -200 to -21) | Pre-Event period: 10 days (-20 to -1) | Post Event period (+1 to +20) |
|---|---|---|---|
| Announcement of Reciprocal Tariff Announcement by Donald Trump Administration (13/02/2025) | 30/04/2024 to 16/01/2025 | 17/01/2025 to 12/02/2025 | 14/02/2025 to 17/03/2025 |

**Fig 1: Event Study Timeline**



The Index values for all sectoral indices were retrieved from the NSE official website. The past 180 days have been used as a reference point for comparison, as their performance is considered standard. The period during which the impact of the suspected event is observed is called the event period (Table 1; Fig 1). The day the event is announced is known as the event day, or day zero. The figure 2 below show the impact on an announcement on stock market.

**Fig 2: Impact of an Event on Stock Prices**




**3.3. Hypothesis:**

For the statistical test the hypothesis is stated as below:

H1: The event- ‘Announcement of Reciprocal Tariff by Donald Trump’s Administration’ shows significant impact on Nifty Pharma.

H2: The event- ‘Announcement of Reciprocal Tariff by Donald Trump’s Administration’ shows significant impact on Nifty FMCG.

H3: The event- ‘Announcement of Reciprocal Tariff by Donald Trump’s Administration’ shows significant impact on Nifty Bank.

H4: The event- ‘Announcement of Reciprocal Tariff by Donald Trump’s Administration’ shows significant impact on Nifty Auto.

H5: The event- ‘Announcement of Reciprocal Tariff by Donald Trump’s Administration’ shows significant impact on Nifty Realty.

H6: The event- ‘Announcement of Reciprocal Tariff by Donald Trump’s Administration’ shows significant impact on Nifty Energy.

H7: The event- 'Announcement of Reciprocal Tariff by Donald Trump's Administration' shows significant impact on Nifty Metal.

H8: The event- 'Announcement of Reciprocal Tariff by Donald Trump's Administration' shows significant impact on Nifty IT.

### 3.4. Tests of Significance:

**Test of Normality:**

Normality tests are used with varying sensitivity to different types of deviations from normality such as skewness or kurtosis (Shapiro et al., 1968; Yap & Sim, 2011; Khatun, 2021; Das & Imon, 2016). Very large samples can make even trivial deviations statistically significant, while small samples may lack the power to detect meaningful departures from normality (Das & Imon, 2016: Gosselin, 2024; Khatun, 2021). Visual methods, such as Q-Q plots, are also recommended as complementary tools to statistical tests (Gosselin, 2024; Das & Imon, 2016). It is important to note that real-world data rarely achieve perfect normality, and the practical impact of non-normality can often be mitigated by using larger samples or robust statistical methods (Kim & Park, 2019; Gosselin, 2024) (Kim & Park, 2019; Gosselin, 2024; Das & Imon, 2016).

**Paired Samples T Test:**

It analyses two interrelated groups, such as measurements taken from the same subjects before and after an intervention or under two different conditions (Ross & Willson, 2017; Xu et al., 2017). This test is appropriate when samples are dependent rather than independent (Ross & Willson, 2017; Xu et al., 2017) (Mowery, 2011; Park et al., 2020; Rietveld & Van Hout, 2015). The test can be sensitive to outliers or significant departures from normality (Park et al., 2020; Derrick & White, 2017). It is more powerful than independent samples tests when the correlation between paired observations is high, as it accounts for within-subject variability and reduces error variance (Derrick & White, 2017; Zimmerman, 1997). The test is widely used in clinical, educational, engineering research and also in commerce and management to assess the effectiveness of interventions or changes over time (Ross & Willson, 2017; Riaji et al., 2022; Park et al., 2020).

**Wilcoxon Signed-Rank Test:**

It is a nonparametric and measures repeated observations on the same subjects (Woolson, 2005; Ahad et al., 2014) (Woolson, 2005; Ahad et al., 2014). For large samples, the test permits approximate significance testing (Woolson, 2005; Rosner et al., 2006; Ahad et al., 2014). Overall, it's a powerful alternative to parametric test for paired data when normality cannot be assumed (Woolson, 2005; Ahad et al., 2014).

## 4.Data Analysis and Interpretation:

### 4.1. Calculation of AAR and CAAR:

**Table 2: Calculation of AAR and CAAR for Pharma, FMCG, Bank and Auto Indices:**

| Days | NIFTY PHARMA | | NIFTY FMCG | | NIFTY BANK | | NIFTY AUTO | |
|---|---|---|---|---|---|---|---|---|
| | AAR | CAAR | AAR | CAAR | AAR | CAAR | AAR | CAAR |
| -20 | 0.609547 | 0.609547 | 1.003862 | 1.003862 | -1.50286 | -1.50286 | -0.33449 | -0.33449 |
| -19 | 0.463122 | 1.072668 | -0.12398 | 0.879884 | 1.664068 | 0.161211 | -0.55109 | -0.88558 |
| -18 | -1.43415 | -0.36148 | -0.21847 | 0.661409 | -1.58537 | -1.42416 | -1.65345 | -2.53903 |
| -17 | 0.610855 | 0.249373 | -0.05926 | 0.602152 | 0.310983 | -1.11318 | -0.15699 | -2.69602 |
| -16 | 1.315388 | 1.564761 | 0.322671 | 0.924823 | -0.28294 | -1.39611 | 1.070485 | -1.62553 |
| -15 | -2.19155 | -0.62679 | 0.504056 | 1.428879 | -0.4603 | -1.85641 | -1.57256 | -3.19809 |
| -14 | -2.73618 | -3.36297 | -0.75132 | 0.677557 | -0.63181 | -2.48822 | -0.93242 | -4.13052 |
| -13 | -2.41205 | -5.77502 | -0.39334 | 0.284212 | 1.663952 | -0.82427 | 1.309157 | -2.82136 |
| -12 | 1.682174 | -4.09285 | -0.51448 | -0.23027 | 0.607021 | -0.21725 | 1.419531 | -1.40183 |
| -11 | 1.124445 | -2.9684 | 0.706256 | 0.475984 | 0.291903 | 0.074655 | -0.42899 | -1.83082 |
| -10 | 0.00449 | -2.96391 | 2.02784 | 2.503824 | 0.553131 | 0.627786 | 1.625566 | -0.20525 |
| -9 | -0.56815 | -3.53206 | 2.994459 | 5.498283 | -0.16689 | 0.4609 | 1.887079 | 1.68183 |
| -8 | 0.041636 | -3.49043 | -1.68364 | 3.814646 | -0.60375 | -0.14285 | 0.064829 | 1.746658 |
| -7 | 1.659101 | -1.83133 | -0.2637 | 3.550945 | 1.920147 | 1.777293 | 0.864246 | 2.610904 |
| -6 | 0.535097 | -1.29623 | -1.56701 | 1.983937 | 0.363984 | 2.141278 | -0.10391 | 2.506996 |
| -5 | 0.558725 | -0.7375 | -0.97262 | 1.01132 | 0.072518 | 2.213795 | -0.95569 | 1.551309 |
| -4 | 0.224756 | -0.51275 | -1.31601 | -0.30469 | -0.44816 | 1.765632 | 0.663812 | 2.215121 |
| -3 | -1.94723 | -2.45998 | -0.47711 | -0.7818 | -0.35962 | 1.406008 | -1.50803 | 0.707087 |
| -2 | -2.00476 | -4.46474 | -1.94812 | -2.72992 | -1.16069 | 0.245319 | -2.35861 | -1.65153 |
| -1 | -0.58964 | -5.05438 | -0.11414 | -2.84407 | 0.148887 | 0.394206 | -0.76499 | -2.41652 |
| 0 | 1.264281 | | -0.8009 | | -0.24677 | | -0.30946 | |
| 1 | -2.95674 | -2.95674 | -0.34193 | -0.34193 | -0.5326 | -0.5326 | -1.25838 | -1.25838 |
| 2 | 1.186708 | -1.77004 | -0.37567 | -0.7176 | 0.319699 | -0.21291 | -0.55983 | -1.8182 |
| 3 | -0.59072 | -2.36075 | -0.88876 | -1.60636 | -0.35341 | -0.56632 | -0.63328 | -2.45149 |
| 4 | -0.7955 | -3.15625 | -0.24019 | -1.84654 | 0.978504 | 0.412185 | -0.07232 | -2.52381 |
| 5 | -0.24849 | -3.40474 | -0.05565 | -1.90219 | -0.48024 | -0.06805 | 1.190886 | -1.33292 |
| 6 | -2.00886 | -5.4136 | -0.46837 | -2.37057 | -0.72128 | -0.78933 | -2.60523 | -3.93815 |
| 7 | -0.06411 | -5.47771 | 0.348751 | -2.02182 | -0.67725 | -1.46658 | 0.189046 | -3.74911 |
| 8 | -0.7733 | -6.25101 | 0.309015 | -1.7128 | -0.09467 | -1.56125 | 0.483439 | -3.26567 |
| 9 | -0.32053 | -6.57154 | -0.77059 | -2.48339 | 0.273606 | -1.28764 | -1.53853 | -4.8042 |
| 10 | -2.00342 | -8.57496 | -2.63586 | -5.11925 | -0.82382 | -2.11146 | -3.94953 | -8.75374 |
| 11 | 0.25064 | -8.32432 | 0.18121 | -4.93804 | -0.48163 | -2.59309 | 0.165301 | -8.58843 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 12 | -0.38152 | -8.70584 | -0.52811 | -5.46615 | 0.26701 | -2.32608 | -1.33715 | -9.92559 |
| 13 | 1.460621 | -7.24521 | 1.4826 | -3.98355 | 0.502254 | -1.82382 | 2.575079 | -7.35051 |
| 14 | 1.389428 | -5.85579 | 1.180474 | -2.80307 | 0.279029 | -1.54479 | 0.755897 | -6.59461 |
| 15 | -0.30456 | -6.16035 | -0.00854 | -2.81162 | -0.2728 | -1.81759 | 0.210914 | -6.3837 |
| 16 | -0.68143 | -6.84178 | 0.209409 | -2.60221 | -0.58384 | -2.40144 | -1.25041 | -7.6341 |
| 17 | 0.288986 | -6.55279 | -0.1171 | -2.7193 | -0.75759 | -3.15902 | -0.36567 | -7.99977 |
| 18 | 0.368014 | -6.18478 | -0.00027 | -2.71957 | 0.41853 | -2.74049 | 0.460935 | -7.53884 |
| 19 | -0.26587 | -6.45065 | -0.16156 | -2.88113 | 0.002753 | -2.73774 | -1.13259 | -8.67143 |
| 20 | 1.471434 | -4.97922 | -0.21595 | -3.09708 | 0.60616 | -2.13158 | 0.882644 | -7.78878 |

**Table 3: Calculation of AAR and CAAR for Reality Energy Metal and IT Indices**

| Days | NIFTY REALTY | | NIFTY ENERGY | | NIFTY METAL | | NIFTY IT | |
|---|---|---|---|---|---|---|---|---|
| | AAR | CAAR | AAR | CAAR | AAR | CAAR | AAR | CAAR |
| -20 | 1.317726 | 1.317726 | 1.262337 | 1.262337 | 1.222346 | 1.222346 | -2.82572 | -2.82572 |
| -19 | 0.651178 | 1.968904 | 0.890823 | 2.15316 | 1.114031 | 2.336377 | 0.234486 | -2.59124 |
| -18 | -4.11844 | -2.14954 | -1.85227 | 0.300888 | -0.90476 | 1.431616 | -1.32043 | -3.91167 |
| -17 | -4.56028 | -6.70982 | -1.4114 | -1.11051 | -0.68637 | 0.745248 | 1.99339 | -1.91828 |
| -16 | 1.001666 | -5.70815 | 0.258724 | -0.85179 | 0.573355 | 1.318602 | 1.63929 | -0.27899 |
| -15 | -2.30456 | -8.01271 | -1.73552 | -2.58731 | -0.86275 | 0.455852 | 0.249959 | -0.02903 |
| -14 | -1.04684 | -9.05955 | -2.53227 | -5.11958 | -2.91211 | -2.45626 | -3.50988 | -3.53891 |
| -13 | 2.16843 | -6.89112 | -1.33485 | -6.45443 | -0.35646 | -2.81273 | -0.71833 | -4.25724 |
| -12 | 2.910519 | -3.9806 | 2.045509 | -4.40893 | 1.892062 | -0.92066 | 2.467971 | -1.78926 |
| -11 | 1.781003 | -2.1996 | 1.343698 | -3.06523 | -0.06858 | -0.98924 | -1.2844 | -3.07366 |
| -10 | 1.943525 | -0.25608 | 2.642802 | -0.42243 | 1.242795 | 0.253556 | 0.408887 | -2.66477 |
| -9 | 3.382632 | 3.126555 | -2.10209 | -2.52451 | -1.16626 | -0.91271 | -1.62993 | -4.2947 |
| -8 | -0.29224 | 2.834315 | -3.01543 | -5.53994 | -1.68888 | -2.60159 | 0.527862 | -3.76684 |
| -7 | 0.55453 | 3.388845 | 2.263966 | -3.27597 | 1.8325 | -0.76909 | 1.142625 | -2.62421 |
| -6 | -1.84654 | 1.542304 | 1.423185 | -1.85279 | 1.552133 | 0.783046 | -0.08204 | -2.70625 |
| -5 | -2.18541 | -0.64311 | -0.78677 | -2.63956 | -0.71439 | 0.068659 | 0.161689 | -2.54457 |
| -4 | 0.099891 | -0.54322 | -0.66136 | -3.30092 | 2.694679 | 2.763338 | -0.37842 | -2.92299 |
| -3 | -2.984 | -3.52722 | -2.12563 | -5.42655 | -2.60012 | 0.16322 | -0.90503 | -3.82801 |
| -2 | -3.06466 | -6.59188 | -2.06386 | -7.49041 | -1.70444 | -1.54122 | -1.62249 | -5.4505 |
| -1 | -2.73872 | -9.33059 | -0.30399 | -7.79441 | 0.706341 | -0.83488 | -0.70826 | -6.15877 |
| 0 | 0.811874 | | -0.02006 | | 0.860345 | | -1.14789 | |
| 1 | -1.73556 | -1.73556 | -2.25966 | -2.25966 | -1.74701 | -1.74701 | -0.15825 | -0.15825 |
| 2 | 0.013751 | -1.74931 | 0.615041 | -1.64462 | 0.804343 | -0.94267 | -0.7236 | -0.88185 |
| 3 | 0.061852 | -1.81116 | 0.438862 | -1.20576 | 0.103995 | -0.83867 | 0.804722 | -0.07713 |
| 4 | 1.672296 | -3.48346 | 1.19751 | -0.00825 | 1.293447 | 0.454773 | -1.45017 | -1.5273 |
| 5 | 1.118811 | -4.60227 | 1.875209 | 1.866964 | 1.998059 | 2.452832 | -0.29006 | -1.81736 |
| 6 | -1.27253 | -3.32973 | -0.4849 | 1.382062 | 1.055789 | 3.508621 | -0.93408 | -2.75143 |
| 7 | -0.80941 | -2.52033 | -1.04675 | 0.335316 | -2.13227 | 1.376355 | -2.85561 | -5.60704 |
| 8 | -1.31147 | -1.20885 | -0.63989 | -0.30458 | -1.49717 | -0.12082 | -0.94691 | -6.55395 |
| 9 | -2.09106 | 0.88221 | -1.09367 | -1.39825 | 0.537128 | 0.416312 | -0.61948 | -7.17343 |
| 10 | -1.41299 | 2.295202 | -2.05828 | -3.45654 | -1.34781 | -0.9315 | -4.32858 | -11.502 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 11 | 1.26128 | 1.033922 | 0.040433 | -3.4161 | 1.219306 | 0.287804 | 0.645976 | -10.856 |
| 12 | 0.100739 | 0.933183 | 0.844973 | -2.57113 | 0.416715 | 0.704519 | -1.04486 | -11.9009 |
| 13 | 2.326298 | -1.39312 | 2.843711 | 0.272582 | 4.080948 | 4.785467 | 1.986022 | -9.91487 |
| 14 | -0.16745 | -1.22567 | 2.064197 | 2.336779 | 2.381032 | 7.166499 | 0.044138 | -9.87074 |
| 15 | -1.1845 | -0.04116 | 0.261768 | 2.598547 | 0.468866 | 7.635365 | -0.99921 | -10.87 |
| 16 | -2.03784 | 1.99668 | -1.47598 | 1.122566 | -0.81954 | 6.815826 | -0.61309 | -11.483 |
| 17 | 3.628083 | -1.6314 | 0.587394 | 1.709961 | 0.569597 | 7.385423 | -0.79657 | -12.2796 |
| 18 | -1.64543 | 0.014031 | 0.307801 | 2.017762 | -0.44475 | 6.940672 | -3.06056 | -15.3402 |
| 19 | -1.82639 | 1.840416 | -0.0887 | 1.929065 | -0.82714 | 6.113532 | -0.66577 | -16.0059 |
| 20 | -0.37946 | 2.219871 | 0.636961 | 2.566026 | 0.808679 | 6.922211 | -0.10691 | -16.1129 |

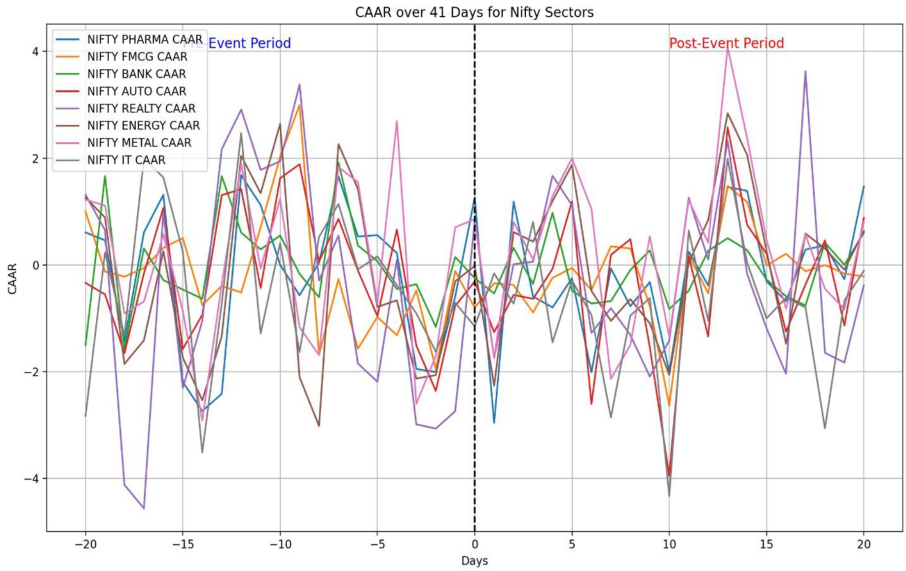



Fig 3: CAAR graph over the period from -20 to +20 days.

Fig.3 illustrates how different Nifty sectors responded around a specific event, marked at day 0. From the graph, we observe that most sectors experienced some fluctuations before and after the event. For example, sectors like NIFTY Pharma and NIFTY IT show a noticeable upward trend post-event, suggesting positive abnormal returns, possibly indicating market optimism or favourable news impacting these sectors. Conversely, sectors like NIFTY Energy and NIFTY Metal display more subdued or even negative trends, implying less favourable or neutral market reactions.

The dashed vertical line at day 0 clearly marks the event date, serving as a reference point to compare pre- and post-event behaviour. The pre-event period (left of day 0) generally shows smaller fluctuations, indicating market anticipation or neutrality before the event. Post-event, the divergence in CAAR trends (Table 2; Table 3 & Fig 3) highlights how different sectors reacted, with some gaining significantly and others remaining relatively stable.

Overall, fig 3 helps identify which sectors responded positively or negatively to the event, providing insights into market sentiment and sector-specific impacts.

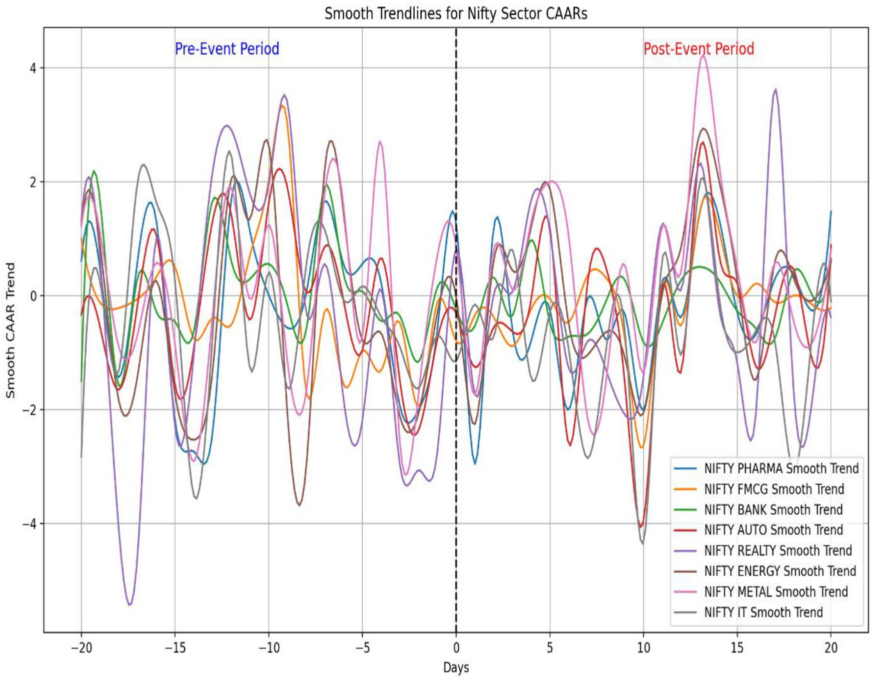



Fig 4: Smooth Trendline for Nifty Sectoral Indices

The smoothened trendlines (Fig 4) for each sector's CAAR have been generated using cubic spline interpolation, which creates a smooth curve fitting the original data points. This method helps visualize the overall trend more clearly by reducing the noise and fluctuations present in the raw CAAR data.

The plot displays these smooth curves for all sectors, allowing us to compare their general directions and magnitudes. Trendlines reveal whether sectors experienced a consistent increase or decrease in abnormal returns, providing a clearer picture of their responses to the event.

**Table 4: Test of Normality**

| Descriptives | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **PHARMA** | **FMCG** | **BANK** | **AUTO** | **REALTY** | **ENERGY** | **METAL** | **IT** |
| **N** | 41 | 41 | 41 | 41 | 41 | 41 | 41 | 41 |
| **Missing** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Mean** | -0.214 | -0.164 | -0.0484 | -0.256 | -0.347 | -0.128 | 0.169 | -0.571 |
| **Median** | -0.0641 | -0.216 | -0.167 | -0.309 | -0.292 | -0.0201 | 0.469 | -0.666 |
| **Standard deviation** | 1.28 | 1.01 | 0.764 | 1.30 | 1.99 | 1.55 | 1.52 | 1.44 |
| **Minimum** | -2.96 | -2.64 | -1.59 | -3.95 | -4.56 | -3.02 | -2.91 | -4.33 |
| **Maximum** | 1.68 | 2.99 | 1.92 | 2.58 | 3.63 | 2.84 | 4.08 | 2.47 |
| **Skewness** | -0.476 | 0.554 | 0.568 | -0.331 | 0.0405 | 0.0701 | 0.103 | -0.310 |
| **Kurtosis** | -0.604 | 2.25 | 0.781 | 0.612 | -0.545 | -0.917 | -0.115 | 0.667 |
| **Shapiro-Wilk W** | 0.946 | 0.944 | 0.956 | 0.988 | 0.986 | 0.974 | 0.985 | 0.967 |
| **Shapiro-Wilk p** | 0.050 | 0.045 | 0.111 | 0.946 | 0.898 | 0.451 | 0.859 | 0.277 |

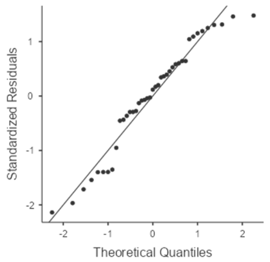


Fig 5: Q-Q Plot – Nifty Pharma

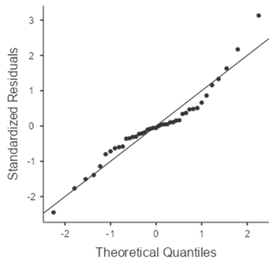


Fig 6: Q-Q Plot – Nifty FMCG

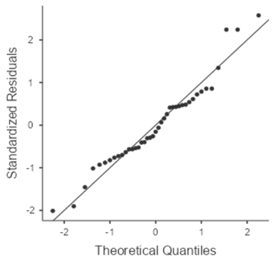


Fig 7: Q-Q Plot – Nifty Bank

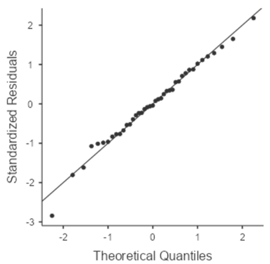


Fig 10: Q-Q Plot – Nifty Auto

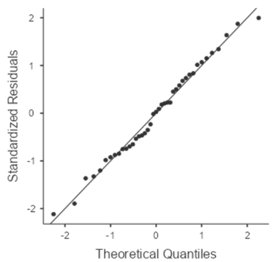


Fig 9: Q-Q Plot – Nifty Realty

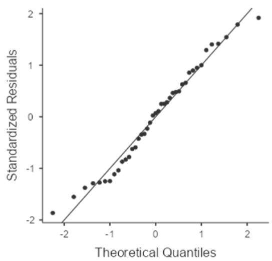


Fig 8: Q-Q Plot – Nifty Energy

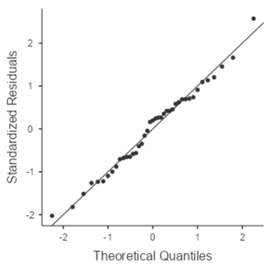


Fig 12: Q-Q Plot – Nifty Metal

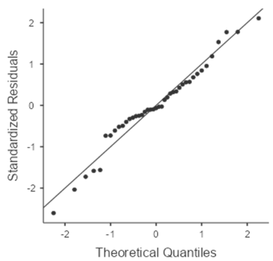


Fig 11: Q-Q Plot – Nifty IT

Based on an analysis of normality tests (Table 4; Fig 5; Fig 6; Fig 7; Fig 8; Fig 9; Fig 10 & Fig 11) the distribution of returns varies across the Nifty sector indices. Nifty FMCG is the only index that conclusively fails the normality test, with a significant Shapiro-Wilk p-value (0.045), pronounced positive skewness, and leptokurtic kurtosis, all visually confirmed by its Q-Q plot. Nifty Pharma presents a borderline case, with its p-value exactly at the 0.05 threshold and minor tail deviations in its Q-Q plot, making its classification ambiguous.

All other indices—Nifty Bank, Nifty Auto, Nifty Realty, Nifty Energy, Nifty Metal, and Nifty IT—are considered to be approximately normally distributed. This conclusion is supported by their non-significant Shapiro-Wilk p-values (ranging from 0.111 to 0.946), skewness and kurtosis values that are generally close to zero and within their standard errors, and Q-Q plots that show points adhering closely to the diagonal line.

Given that the vast majority of the datasets exhibit normality, the use of a parametric test is justified. Therefore, a Paired Samples T-Test is selected for this event study to evaluate the impact of the reciprocal tariff announcement.

**4.2. Paired Sample T-Test:**

**Table 5: Paired Sample T-Test:**

| | | | | | | | | 95% Confidence Interval | |
|---|---|---|---|---|---|---|---|---|---|
| | | | statistic | df | p | Mean difference | SE difference | Lower | Upper |
| NIFTY PHARMA -PRE | NIFTY PHARMA - POST | Student's t | -0.00953 | 19.0 | 0.992 | -0.00376 | 0.394 | -0.829 | 0.822 |
| NIFTY FMCG - PRE | NIFTY FMCG - POST | Student's t | 0.03388 | 19.0 | 0.973 | 0.01265 | 0.373 | -0.769 | 0.794 |
| NIFTY BAK - PRE | NIFTY BANK - POST | Student's t | 0.59314 | 19.0 | 0.560 | 0.12629 | 0.213 | -0.319 | 0.572 |
| NIFTY AUTO - PRE | NIFTY AUTO - POST | Student's t | 0.72058 | 19.0 | 0.480 | 0.26861 | 0.373 | -0.512 | 1.049 |
| NIFTY REALTY - PRE | NIFTY REALTY - POST | Student's t | -0.28562 | 19.0 | 0.778 | -0.18198 | 0.637 | -1.516 | 1.152 |
| NIFTY ENERGY - PRE | NIFTY ENERGY - POST | Student's t | -0.95682 | 19.0 | 0.351 | -0.51802 | 0.541 | -1.651 | 0.615 |
| NIFTY METAL - PRE | NIFTY METAL - POST | Student's t | -0.90916 | 19.0 | 0.375 | -0.38785 | 0.427 | -1.281 | 0.505 |
| NIFTY IT - PRE | NIFTY IT - POST | Student's t | 1.30670 | 19.0 | 0.207 | 0.49770 | 0.381 | -0.300 | 1.295 |
| Note. $H_a$ $\mu_{\text{Measure 1 - Measure 2}} \neq 0$ | | | | | | | | | |

This study analysed examined reciprocal tariffs imposed by Donald Trump on various Indian sectoral indices, comparing index performance "PRE" (before tariff imposition) and "POST" (after tariff imposition).

Across all examined (Table 5) Indian sectoral indices—p-values were greater than 0.05. Specifically, NIFTY Pharma (p=0.992), NIFTY FMCG (p=0.973), NIFTY Bank (p=0.560), NIFTY Auto (p=0.480), NIFTY Realty (p=0.778), NIFTY Energy (p=0.351), NIFTY Metal (p=0.375), and NIFTY IT (p=0.207) all exhibited p-values well above the significance threshold. This consistent pattern across all sectors leads to the conclusion that for each index, null hypothesis is accepted.

The imposition of reciprocal tariffs by Donald Trump had a measurable impact on the performance of any of these Indian sectoral indices. The mean differences observed between the "PRE" and "POST" periods for all sectors were either negligible or, even if slightly larger, were not statistically significant. This suggests that other, perhaps more dominant, macroeconomic factors, global economic conditions, or domestic policies might have been at play, influencing the index performances during the study period, or that the specific tariffs imposed did not exert a sufficiently strong influence to cause a detectable shift in these broad sectoral movements. Future research could delve into the specific magnitude of tariffs, bilateral trade volumes, and a broader range of market factors, or explore longer time horizons to uncover any delayed or more nuanced effects. To enhance the study's robustness, the Wilcoxon Signed-Rank Test was employed, as non-parametric tests like it remains valid even when data are normally distributed.

**4.3. Wilcoxon Signed Ranks Test:**

**Table 6: Ranks Test**

| **Ranks** | | | | |
|---|---|---|---|---|
| | | **N** | **Mean Rank** | **Sum of Ranks** |
| NIFTY PHARMA - POST - NIFTY PHARMA - PRE | Negative Ranks | 19[a] | 11.00 | 209.00 |
| | Positive Ranks | 1[b] | 1.00 | 1.00 |
| | Ties | 0[c] | | |
| | Total | 20 | | |
| NIFTY FMCG - POST - NIFTY FMCG - PRE | Negative Ranks | 20[d] | 10.50 | 210.00 |
| | Positive Ranks | 0[e] | .00 | .00 |
| | Ties | 0[f] | | |
| | Total | 20 | | |
| NIFTY BANK - POST - NIFTY BANK - PRE | Negative Ranks | 14[g] | 12.50 | 175.00 |
| | Positive Ranks | 6[h] | 5.83 | 35.00 |

| | | | | |
|---|---|---|---|---|
| | Ties | 0[i] | | |
| | Total | 20 | | |
| NIFTY AUTO - POST - NIFTY AUTO - PRE | Negative Ranks | 16[j] | 12.50 | 200.00 |
| | Positive Ranks | 4[k] | 2.50 | 10.00 |
| | Ties | 0[l] | | |
| | Total | 20 | | |
| NIFTY REALTY - POST - NIFTY REALTY - PRE | Negative Ranks | 7[m] | 8.29 | 58.00 |
| | Positive Ranks | 13[n] | 11.69 | 152.00 |
| | Ties | 0[o] | | |
| | Total | 20 | | |
| NIFTY ENERGY - POST - NIFTY ENERGY - PRE | Negative Ranks | 6[p] | 5.17 | 31.00 |
| | Positive Ranks | 14[q] | 12.79 | 179.00 |
| | Ties | 0[r] | | |
| | Total | 20 | | |
| NIFTY METAL - POST - NIFTY METAL - PRE | Negative Ranks | 4[s] | 7.50 | 30.00 |
| | Positive Ranks | 16[t] | 11.25 | 180.00 |
| | Ties | 0[u] | | |
| | Total | 20 | | |
| NIFTY IT - POST - NIFTY IT - PRE | Negative Ranks | 16[v] | 12.00 | 192.00 |
| | Positive Ranks | 4[w] | 4.50 | 18.00 |
| | Ties | 0[x] | | |
| | Total | 20 | | |

This study employs the Wilcoxon Signed-Rank Test (Table 6) to evaluate the impact of reciprocal tariffs imposed by the Trump administration on Indian sectoral indices. This non-parametric method was selected to test for statistically significant differences in Cumulative Abnormal Average Returns (CAAR) between pre- and post-tariff periods without relying on assumptions of normality.

The analysis, conducted at a 0.05 significance level, revealed a significant effect on most sectors. With the sole exception of NIFTY Realty (p=0.079), all indices showed statistically significant p-values: NIFTY Pharma (p=0.000), NIFTY FMCG (p=0.000), NIFTY Auto (p=0.000), NIFTY IT (p=0.001), NIFTY Bank (p=0.009), NIFTY Energy (p=0.006), and NIFTY Metal (p=0.005).

The direction of this impact varied by sector. A negative Z-statistic indicated that the post-tariff CAAR was significantly lower than the pre-tariff period for NIFTY Pharma, FMCG, Auto, IT, and Bank, suggesting a adverse effect. Conversely, NIFTY Energy and Metal also exhibited a negative Z-statistic but with a rank structure that indicates their post-tariff CAAR was actually significantly higher, pointing to a positive sector-specific impact.

In summary, the Wilcoxon test confirms that the tariffs had a significant cumulative effect on abnormal returns across most Indian sectors, predominantly negative but positive for Energy and Metals, with no statistically discernible effect on the Realty sector.

**5.Discussion:**

This research focuses on the impact of Donald Trump's announcement of new tariffs in 2025 on the primary sectoral stock indices of India. It utilized an event study approach to evaluate stock performance in the periods leading to and succeeding the announcement. This procedure was essential in determining variability in abnormal returns. From the findings obtained through this research, it was apparent that there is a sectoral differentiation in responses to trade shocks.

Based on the paired sample t-test, there seems to be no significant change in any of the sectoral indices. In other words, tariffs did not significantly alter daily stock movements for the indices in the short run. Nevertheless, most sectors, apart from Nifty Realty, did show significant cumulative impacts which were captured by Wilcoxon Signed-Rank Test, indicating non-normal distributions. Sectors such as Pharma, FMCG, Auto, IT, and Bank experienced negative impacts, PF post tariff period abnormal returns were mostly below pre tariff levels. On the other hand, Energy and Metal showed positive cumulative impacts suggesting beneficial shifts of trade patterns or heightened anticipations for domestic demand.

The Wilcoxon Signed Rank Test also supported these findings, indicating that declines outweighed gains in Pharma, FMCG, and IT. Energy and Metal showed a net increase in positive changes. These findings further support the notion that protectionist policies provoke sectorial reactions rather than a holistic reaction across the market. These movements were primarily influenced by investor sentiment, supply chain exposure, and trade dependence. Although daily returns did not show an impact, cumulative abnormal returns indicated that over time, investor confidence and sectorial expectations had been shaped by the tariffs.

**6. Practical Implications:**

This study's findings are relevant and useful to consider for investors, policymakers, and businesses. The impact of the tariffs imposed by Donald Trump affected certain Indian sectors in different ways. This underscores the need for tailored strategies as opposed to a blanket policy approach.

The study shows that for investors; tariffs can create market uncertainty and varying responses from different sectors. Pharma, FMCG, IT, Auto, and Banking sectors all suffered negative cumulative abnormal returns. This indicates that investors in these sectors incurred short-term losses because of a dip in confidence and expectation due to increased trade barriers. As such, these investors need to monitor global trade policies and anticipate the need to rebalance their portfolios during trade conflicts. Movements of Metal and Energy indicates that some industries might thrive due to shifting trade policies or heightened domestic demand providing ample opportunities for highly strategic investments.

For businesses, especially those dependent on exports, the tariffs highlight the importance of not relying too heavily on a single market like the US. Companies in affected sectors should seek other export destinations, renegotiate their supply chains, and think about localizing some operations to reduce tariff risks. Firms in the Energy and Metal sectors, which benefited from the situation, should focus on increasing domestic production and taking advantage of disruptions in global supply chains. For policymakers, the results emphasize the need for active trade diplomacy. India’s quick decision to cut tariffs on certain US products shows that negotiation and policy changes can help reduce negative effects. Policymakers should also provide support measures, such as export incentives.

**7. Conclusion:**

The study looked at how Donald Trump’s 2025 tariff announcement affected major Indian sectoral stock indices in various ways. This shows that trade policies influence industries according to their reliance on global trade and supply chains. Sectors like Pharma, FMCG, IT, Auto, and Banking faced negative cumulative abnormal returns. This reflects lowered investor confidence, worries about supply chain issues, and concerns over higher export costs. On the other hand, sectors such as Energy and Metal saw positive cumulative effects, likely due to expectations of increased domestic demand and possible trade shifts that could benefit local producers. Nifty Realty did not show any significant change, which suggests it has limited exposure to international trade.

Overall, the findings confirm that tariffs can influence market sentiment and investor behaviour, even in emerging markets like India. They also stress the need to keep an eye on global trade trends, as protectionist policies can create chances for some sectors while putting pressure on others. Policymakers and businesses should use sector-specific strategies to manage risks. Investors should also diversify their portfolios to lessen exposure to trade-related shocks.

**8. Limitations of the study:**

This study provides useful insights, but it has some limitations.

First, it only looked at certain major Indian sectoral indices. It did not analyse individual companies that could have been affected more strongly. The broad nature of sectoral indices might have diluted company-specific reactions to trade shocks.

Second, the study considered a short event window, which may not show the longer-term effects of tariffs. These effects can take months to impact trade volumes, company earnings, and investor sentiment.

Third, the study focused on one significant trade event: the Trump administration's reciprocal tariff announcement. However, during that time, other global and domestic factors, could also have influenced stock market movements. This makes it difficult to pinpoint the pure effect of tariffs.

Finally, the research mainly used secondary data from NSE indices and applied statistical models that assume rational investor behaviour. It did not deeply explore behavioural factors like panic selling or overreaction. Therefore, the conclusions should be taken with caution, especially when applying them to other trade events or markets.

**9. Directions for Further Study:**

First, researchers can examine a longer time frame, looking at post-tariff effects over six months or a year. This would help us understand whether the observed abnormal returns continue, reverse, or stabilize over time.

Second, further studies can include more sectors, especially small-cap and mid-cap stocks, which tend to be more sensitive to trade shocks. Analysing individual companies could show how different business models, export dependence, or supply chain setups affect the impact of tariffs.

Third, comparing India with other emerging markets that face similar tariff issues could provide broader insights into how trade protectionism affects developing economies differently.

Additionally, future research could explore behavioural finance by looking at investor sentiment, news coverage, and social media reactions to tariff announcements. This would clarify whether reactions are based on real economic factors or driven by psychological or market overreactions.

Finally, researchers could use complex econometric models and machine learning techniques to predict how different sectors will respond to future trade policy changes. These predictive models could help policymakers and investors anticipate risks and take steps to lessen negative impacts or seize potential opportunities.

**References:**

1. Ahad, N., Yahaya, S., MdYusof, Z., Abdullah, S., & Fung, L. (2014). Performance of the modified Wilcoxon signed rank test. **, 1635, 690-694. https://doi.org/10.1063/1.4903657
2. Ahmed, S., Hasan, M. M., Hossain, A. T., & Saadi, S. (2025). The comeback effect: Market responses to Trump's 2024 election victory. Economics Letters, 247, Article 112170. https://doi.org/10.1016/j.econlet.2025.112170
3. Amiti, M., Redding, S. J., & Weinstein, D. (2019). The impact of the 2018 trade war on US prices and welfare. National Bureau of Economic Research Working Paper.
4. Asadollah, O., Carmy, L. S., Hoque, M. R., & Yilmazkuday, H. (2024). Geopolitical risk, supply chains, and global inflation. The World Economy, 47(8), 3450–3486.
5. Bianconi, M., Esposito, F., & Sammon, M. (2021). Trade policy uncertainty and stock returns. Journal of International Money and Finance, 119, Article 1025xx. (Note: please confirm the exact article number or page range.)
6. Borusyak, K., Jaravel, X., & Spiess, J. (2024, February 6). Revisiting eventstudy designs: Robust and efficient estimation. The Review of Economic Studies, 91(6), 3253–3285. https://doi.org/10.1093/restud/rdae007
7. Chiang, T. C. (2020). US policy uncertainty and stock returns: Evidence in the US and its spillovers to the European Union, China, and Japan. The Journal of Risk Finance, 21(5), 621–657. https://doi.org/10.1108/JRF-10-2019-0190
8. Contractor, F. J. (2025). Assessing the economic impact of tariffs: Adaptations by multinationals and traders to mitigate tariffs. Review of International Business and Strategy, 35(2/3), 190–213. https://doi.org/10.1108/RIBS-01-2025-0013

9. Dabbous, A., & Tarhini, A. (2021). Does sharing economy promote sustainable economic development and energy efficiency? Evidence from OECD countries. Journal of Innovation & Knowledge, 6(1), 58–68. https://doi.org/10.1016/j.jik.2020.11.001
10. Das, K., & Imon, A. (2016). A Brief Review of Tests for Normality. *American Journal of Theoretical and Applied Statistics*, 5, 5. https://doi.org/10.11648/J.AJTAS.20160501.12.
11. Derrick, B., & White, P. (2017). Comparing Two Samples from an Individual Likert Question. International Journal of Mathematics and Statistics, 18, 1-13.
12. Dhingra, S., & Sampson, T. (2022). Expecting Brexit. Annual Review of Economics, 14(1), 495–519.
13. Dos Santos Maciel, L. (2023). Brazilian stock market efficiency before and after COVID19: The roles of fractality and predictability. Global Finance Journal, 58, 100887. https://doi.org/10.1016/j.gfj.2023.100887
14. Egger, P. H., & Zhu, J. (2020). The US–Chinese trade war: An event study of stockmarket responses. Economic Policy, 35(103), 519–559.
15. El Ghoul, S., Guedhami, O., Mansi, S. A., & Sy, O. (2023). Event studies in international finance research. Journal of International Business Studies, 54(2), 344–364. https://doi.org/10.1057/s41267-022-00534-6
16. Giaccotto, C., & Sfiridis, J. (1996). Hypothesis testing in event studies: The case of variance changes. Journal of Economics and Business, 48, 349-370. https://doi.org/10.1016/0148-6195(96)00019-7
17. Gosselin, R. (2024). Testing for normality: a user's (cautionary) guide. *Laboratory Animals*, 58, 433 - 437. https://doi.org/10.1177/00236772241276808.
18. Goyal, P., & Soni, P. (2024). Beyond borders: investigating the impact of the 2023 Israeli–Palestinian conflict on global equity markets. *Journal of Economic Studies*. https://doi.org/10.1108/jes-12-2023-0729.
19. He, F., Lucey, B., & Wang, Z. (2021). Trade policy uncertainty and its impact on the stock market: Evidence from China–US trade conflict. Finance Research Letters, 40. https://doi.org/10.1016/j.frl.2020.101743
20. Heyden, K. J., & Heyden, T. (2021). Market reactions to the arrival and containment of COVID19: An event study. Finance Research Letters, 38, Article 101745. https://doi.org/10.1016/j.frl.2020.101745
21. Huang, Y., Lin, C., Liu, S., & Tang, H. (2023). Trade networks and firm value: Evidence from the U.S.–China trade war. Journal of International Economics, 145, 103811. https://doi.org/10.1016/j.jinteco.2023.103811

22. Jensen, N. M. (n.d.). International institutions and market expectations: Stock price responses to the WTO ruling on the 2002 US steel tariffs. The Review of International Organizations, 2, 261–280.
23. J, P., J, E., & N, H. (2024). Analysing the Adani Group: Navigating Through the Allegations of Hindenburg Report. *Commerce & Business Researcher*. https://doi.org/10.59640/cbr.v16i1.23-32.
24. Kaczmarek, T., Demir, E., Rouatbi, W., & Zaremba, A. (2025). Tariff exposure and sectoral vulnerability: Evidence from equity market responses to the 2025 U.S. trade shock. Research in International Business and Finance, 77(B), 102925. https://doi.org/10.1016/j.ribaf.2025.102925
25. Karau, S., & Fischer, J. (2024). What financial markets say about the economic implications of a potential Trump election victory.
26. Klomp, J. (2025). Trump tariffs and the U.S. defense industry. PLoS ONE, 20(1), e0313204. https://doi.org/10.1371/journal.pone.0313204
27. Krugman, P. R., Obstfeld, M., & Melitz, M. (2018). International economics: Theory and policy (11th Global ed.). Prentice Hall.
28. Kerby, D. S. (2014). The simple difference formula: An approach to teaching nonparametric correlation. *Comprehensive Psychology, 3*, 2165–2228.
29. Khatun, N. (2021). Applications of Normality Test in Statistical Analysis. *Open Journal of Statistics*. https://doi.org/10.4236/OJS.2021.111006.
30. Kim, T., & Park, J. (2019). More about the basic assumptions of t-test: normality and sample size. *Korean Journal of Anesthesiology*, 72, 331 - 335. https://doi.org/10.4097/kja.d.18.00292.
31. Mallikarjunappa, T., Saldanha, D., & Hawaldar, I. T. (2025). Do stock markets exhibit cyclical market efficiency? Emerging markets' perspective. Cogent Economics & Finance, 13(1). https://doi.org/10.1080/23322039.2025.2476094
32. Mowery, B. (2011). The paired t-test. Pediatric nursing, 37 6, 320-1. https://doi.org/10.4135/9781412983907.n1384
33. Oyeka, I., & Ebuh, G. (2012). Modified Wilcoxon Signed-Rank Test. Open Journal of Statistics, 02, 172-176. https://doi.org/10.4236/OJS.2012.22019
34. Pandey, A., Bhama, V., & Mohapatra, A. (2020). Trading strategy using share buybacks: evidence from India. *Investment Management and Financial Innovations*. https://doi.org/10.21511/imfi.17(2).2020.14.

35. Park, C., Wang, H., & Hwang, W. (2020). A Study on Robustness of the Paired Sample Tests. Industrial Engineering and Management Systems, 19, 386-397. https://doi.org/10.7232/iems.2020.19.2.386
36. R Core Team (2024). *R: A Language and environment for statistical computing*. (Version 4.4) [Computer software]. Retrieved from https://cran.r-project.org. (R packages retrieved from CRAN snapshot 2024-08-07).
37. Riaji, T., Hassani, S., & Alaoui, F. (2022). Application of Paired Samples t-Test in Engineering Service-Learning Project. 2022 11th International Symposium on Signal, Image, Video and Communications (ISIVC), 1-4. https://doi.org/10.1109/ISIVC54825.2022.9800209
38. Rietveld, T., & Van Hout, R. (2015). The paired t test and beyond: Recommendations for testing the central tendencies of two paired samples in research on speech, language and hearing pathology.. Journal of communication disorders, 69, 44-57. https://doi.org/10.1016/j.jcomdis.2017.07.002
39. Rosner, B., Glynn, R., & Lee, M. (2006). The Wilcoxon Signed Rank Test for Paired Comparisons of Clustered Data. Biometrics, 62. https://doi.org/10.1111/j.1541-0420.2005.00389.x
40. Ross, A., & Willson, V. (2017). Paired Samples T-Test. **, 17-19. https://doi.org/10.1007/978-94-6351-086-8_4
41. Shapiro, S. S., Wilk, M. B., & Chen, H. J. (1968). A comparative study of various tests for normality. *Journal of the American Statistical Association*, *63*(324), 1347-1372.
42. Shapiro, S., Wilk, M., & Chen, H. (1968). A Comparative Study of Various Tests for Normality. *Journal of the American Statistical Association*, 63, 1343-1372. https://doi.org/10.1080/01621459.1968.10480932.
43. Selmi, R., Errami, Y., & Wohar, M. E. (2020). What Trump's China tariffs have cost U.S. companies? Journal of Economic Integration, 35(2), 282–295. https://doi.org/10.11130/jei.2020.35.2.282
44. Shukla, A. K., & Kumar, R. (2025). Trump's tariffs: An opportunity or challenge for India. The Round Table, 114(3), 326–328. https://doi.org/10.1080/00358533.2025.2499239
45. Skare, M., & Soriano, D. R. (2021). How globalization is changing digital technology adoption: An international perspective. Journal of Innovation and Knowledge. https://doi.org/10.1016/j.jik.2021.04.001

46. Taheri, S., & Hesamian, G. (2013). A generalization of the Wilcoxon signed-rank test and its applications. Statistical Papers, 54, 457-470. https://doi.org/10.1007/S00362-012-0443-4
47. Tan, K. H. (2025). Modelling the impact of tariff policy shocks on stock market performance: A multivariate econometric approach [Working paper]. ResearchGate.
48. Tran, H. Q. (2025). Global implications of the tariff war: A focus on the New South (Policy Brief No. 17/25). Policy Center for the New South
49. The jamovi project (2024). *jamovi*. (Version 2.6) [Computer Software]. Retrieved from https://www.jamovi.org.
50. Verma, R., Kumar, A., & Bansal, R. (2021). Impact of COVID-19 on Different Sectors of the Economy Using Event Study Method: An Indian Perspective. *Journal of Asia-Pacific Business*, 22, 109 - 120. https://doi.org/10.1080/10599231.2021.1905492.
51. Wengerek, S. T., Uhde, A., & Hippert, B. (2025). Share price reactions to tariff imposition announcements during the first Trump administration. Finance Research Letters, 80, Article 107381. https://doi.org/10.1016/j.frl.2025.107381
52. Woolson, R. (2005). Wilcoxon Signed-Rank Test. **, 1-3. https://doi.org/10.1002/0470011815.B2A15177
53. Xu, M., Fralick, D., Zheng, J., Wang, B., Tu, X., & Feng, C. (2017). The Differences and Similarities Between Two-Sample T-Test and Paired T-Test. Shanghai Archives of Psychiatry, 29, 184 - 188. https://doi.org/10.11919/j.issn.1002-0829.217070
54. Yap, B., & Sim, C. (2011). Comparisons of various types of normality tests. *Journal of Statistical Computation and Simulation*, 81, 2141 - 2155. https://doi.org/10.1080/00949655.2010.520163.
55. Zimmerman, D. (1997). Teacher's Corner: A Note on Interpretation of the Paired-Samples t Test. Journal of Educational Statistics, 22, 349 - 360. https://doi.org/10.3102/10769986022003349