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Trump's 25% Auto Tariff: A Tesla-Ford Comparison

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Abstract. This study empirically investigates the impact of the 25% tariff on imported automobiles, a key trade policy enacted by the Trump administration on April 2nd, focusing on its effect on two leading U.S. automotive manufacturers, Tesla and Ford. Utilizing data from the S&P 500 stock market, the analysis is structured around the event study methodology. This involves the precise delineation of event windows around the policy announcement alongside corresponding estimation windows. Through the calculation of firm-specific Abnormal Returns (AR) and their aggregation into Cumulative Abnormal Returns (CAR), the research employs standard statistical tests to establish confidence intervals for these metrics. The core objective is to determine whether the observed market reactions provide statistically significant evidence that the tariff policy materially affected the valuations of these prominent firms, thereby assessing its direct implications for this critical sector of the U.S. economy. The findings contribute to a nuanced understanding of how targeted trade measures translate into financial market outcomes for domestic industry leaders.

Keywords: Tesla, Ford, CAR, AR

1. Introduction

The auto industry responds strongly to trade policy, specifically regarding the Trump administration's 25% tariffs on imported cars, which poses concerns for US firms. This paper uses an event study approach to study the tariff on two dominant auto companies with different business models, Tesla and Ford, utilizing S&P500 stocks and calculating abnormal return and cumulative abnormal return to reflect the reaction of the market [1]. The past literature highlighted the critical roles played by supply chain robustness and raw materials dependency, as well as the economic implications that follow the tariffs in the auto industry, and this study tried to fill in the blank that bridges between them by presenting different responses from Tesla and Ford towards the announcement of tariffs and their possible implications on corporate strategies and policies' designs.

2. Literature review

2.1. Research on Automotive Industry Trends and Demand for Critical Raw Materials

In "Development of Automotive Industry Trends and Demand for Critical Raw Materials Worldwide", Richert and Lebkowski reveal that environmental protection pressure results in an

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explosive development of the electric vehicle industry, which leads to a rise in mineral critical material demand, such as rare earth metal, aluminum and steel [2]. According to them, the production of all of these minerals is extremely centralized, where China accounts for 69% of the rare earth worldwide, so there is significant risk to the stability of the supply chain. The use of steel, aluminum, and critical minerals in automotive production are evaluated by the paper—steel used for car bodies will require 2–3 trillion Euros of investments towards the transition to green steel but current global share of steel is still very low; aluminum is extensively utilized in electric vehicle batteries and structural parts owing to its light weight. The 2022 transportation industry in global aluminum utilization has risen to 26.7 Mt, however, given that over half the world's aluminum comes from countries such as China and with a comparatively lower recycling rate in comparison to iron (about 51.8%), therefore, the supply chain remains dependent on individual countries, leading to risks. Some resource-prone areas or blocs like the EU rely excessively on critical raw materials supplied outside, thus they actively advocate resource supply chain diversification, technological innovation, and recycling system improvement [3].

2.2. Research on the Economic Impact of Trump's Tariff Policy

In "2024 U.S. Presidential Election: The Effects of Trump's Tariff Policy", Kim [4] constructed 10 tariff scenario models to analyze the potential impact of Trump's proposed "comprehensive 10% tariff", "60% tariff on China", and "reciprocal tariffs". The study found that unilateral tariff increases by the United States may reduce imports by 255.1-499.7 billion US dollars and improve the trade balance by 171.5-315.3 billion US dollars, but will lead to a 0.12%-0.36% decline in GDP and a 1.8%-3.6% increase in consumer prices [4]. If trading partners impose retaliatory tariffs, U.S. exports will decrease by 83.6-184.4 billion US dollars, and the increase in consumer prices will widen to 1.9%-10.4%, with the scenario of imposing tariffs on free trade agreement partners having the most significant impact [4]. For trading partners such as South Korea, if tariffs are extended to the scope of free trade agreements, exports will decrease by 15.2 billion US dollars, and indirect impacts (such as the transfer of demand in third-country markets) will additionally cause losses of 7-8.9 billion US dollars [4].

2.3. Research on Tesla's stock price prediction and risk management

In "Analysis of Tesla", Qu and Gu [5] used multi-factor models, time series models (ARCH/GARCH), and LSTM models to predict Tesla's stock price. The results show that Tesla's stock price is significantly affected by market risk premium (β coefficient 1.46), size effect (SMB), and momentum effect, and its volatility is higher than the market average [5]. In terms of risk management, through Value at Risk (VaR) analysis, it is found that the VaR of Tesla's stock with a 1-day 99% confidence interval is $8.45, with high tail risk, and it is recommended that investors hedge through financial instruments [5]. The study also points out the limitations of the model: it relies on historical data and does not consider transaction costs, but its conclusions provide a reference for Tesla's stock price analysis and investment strategies [5].

3. Material and method

To analyze the impact of Trump's tariffs on Tesla using the event study methodology, we first need to select an estimation window and an event window. The estimation window should not be too long —usually a few months to one year is appropriate. We selected data from July 5, 2023, to June 5,

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2024, mainly for two reasons: First, during this period, Trump had not yet started his election campaign. That means his policy proposals were unlikely to affect Tesla, so the market was relatively stable. Second, this time frame falls after the COVID-19 pandemic [6]. It's commonly known that the pandemic had a huge impact on the global economy. If we had used data from during the pandemic, the results might have been distorted due to economic shutdowns and other disruptions. That's why we avoided that period. For the event window, we chose the 5 days before March 26 and about several days after April 2, adding up to around 10 days. Here's the reasons: First, events often unfold quickly, so the event window shouldn't be too long. A length of 10 to 12 days is commonly considered suitable. Second, Trump announced the policy on March 26, but it didn't take effect until April 2. There was a gap between the two events. Picking just one day as the event window would clearly be not enough. A 10-day window gives a more reasonable span for data and event analysis.

4. Data analysis

First, we will collect the daily stock prices of the S&P 500, Tesla, and Ford during the estimation period. Subsequently, we will calculate the daily returns using the single-period stock return formula.1. As illustrated in Figure.1 below:

$$R_t = \frac{p_t - p_{t-1}}{p_{t-1}}$$

Formula.1 single period stock return formula



Figure 1. Stock price of S&P500 during the estimation window

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Figure 2. Stock price of Ford Motor company during the estimation window



Figure 3. Closing price of Tesla during estimation window

With the data, we can calculate the daily return of S&P 500, Tesla, and Ford. Figures 2 and 3 demonstrate the trend of daily return.

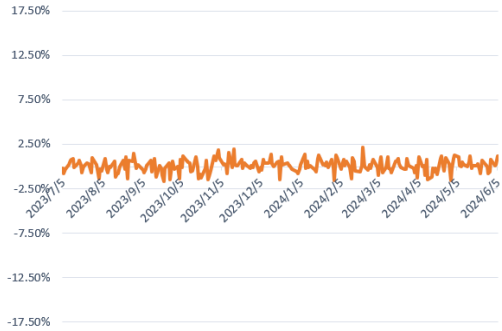


Figure 4. Daily return of S&P500 during the estimation window

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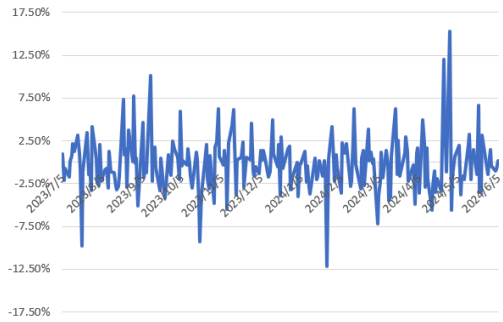


Figure 5. Daily return of Tesla during estimation window

To ensure the clarity and accessibility of the paper, we will initially focus our analysis on Tesla and the S&P 500, with subsequent analyses of the S&P 500 and Ford following an identical methodological framework.

The next step involves performing a linear regression between the market return rate and Tesla's return rate to derive an estimated alpha hat ($\hat{\alpha}$) and an estimated beta hat ($\hat{\beta}$) [6]. These estimated values will serve as a benchmark against which the price fluctuations in the subsequent event window data will be evaluated. The result is shown on figure 6, formula for market model (linear regression) is (2)

$$R_t = \hat{\alpha} + \hat{\beta} * R_{mt} + \varepsilon_t$$

Formula.2 Market model formula

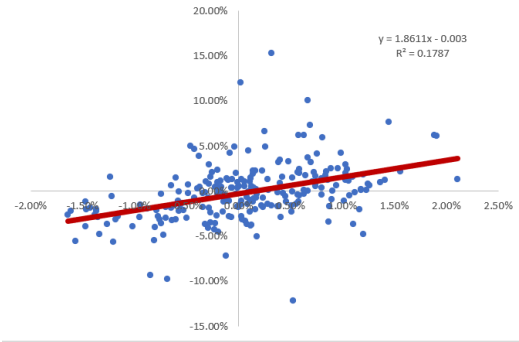


Figure 6. Linear regression of Tesla daily return and S&P500 daily return

Armed with the key estimated parameters $\hat{\alpha}$ and $\hat{\beta}$, with values of -0.003 and 1.8611 respectively, we can proceed to calculate the confidence intervals for alpha, abnormal returns (AR), and cumulative abnormal returns (CAR). Prior to this calculation, however, it is necessary to process the event window data and organize it into a tabular format, figure 7,8,9. By incorporating the computed confidence intervals into this structured dataset, we will be able to determine whether the fluctuations observed during the event period fall within a reasonable range or deviate from it. AR formula (3), confidence interval of AR (4), CAR formula (5), CAR confidence interval (6).

AR formula: $$AR_t = R_t - E(R_t) \quad (3)$$

Confidence interval of AR: $$CI_{AR} = \pm 1.96 * \sigma_{Rmt} \quad (4)$$

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CAR formula: $$CAR_t = \sum_1^t AR_t \quad (5)$$

Confidence interval of CAR: $$\pm 1.96 * \sigma_{Rmt} * \sqrt{t} \quad (6)$$



Figure 7. Abnormal return and confidence interval graph of tesla during event window

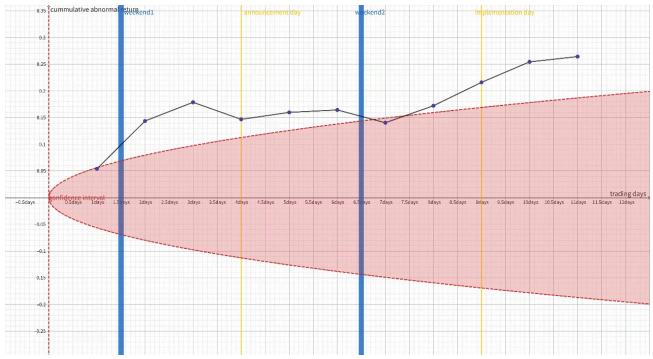


Figure 8. The CAR and confidence interval graph of tesla during event window

From Figure 7, we can see that before Trump announced the policy, i.e., before March 26, Tesla's daily abnormal returns (AR) were positive. However, after the announcement, the abnormal returns dropped sharply. Nevertheless, they remained within a very stable range and stayed within the confidence interval. Turning to the cumulative abnormal return (CAR), as shown in Figure 8, we can see that Tesla's CAR mostly stayed above the confidence interval. This suggests that Trump's policy had a positive impact on company Tesla [1]. One possible explanation is that Tesla's stock price rose more than expected. This may be because the company also introduced new technologies in early April. Another factor could be Trump's personal style. He is often seen as unpredictable, so many people did not expect the tariff policy to actually happen. When the policy officially took effect on April 2, Tesla's CAR dropped back into the confidence interval. This still shows that the policy had some impact on Tesla.

The same process and methodology are also applicable to Ford. To avoid complicating the paper further, I will directly include Ford's data along with the final analysis. Figures 9, 10 and 11 show the results for Ford.

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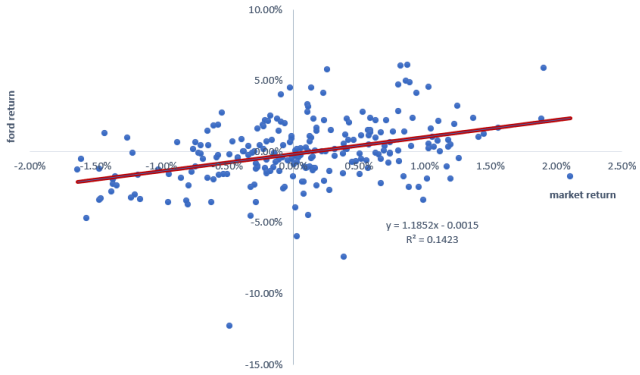


Figure 9. Linear regression of ford and S&P500

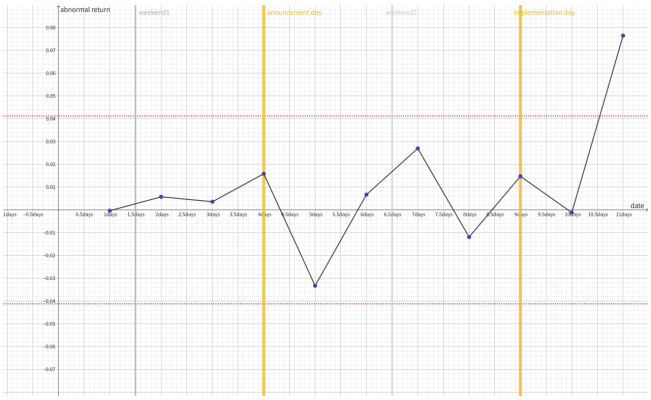


Figure 10. AR and confidence interval of ford during event window

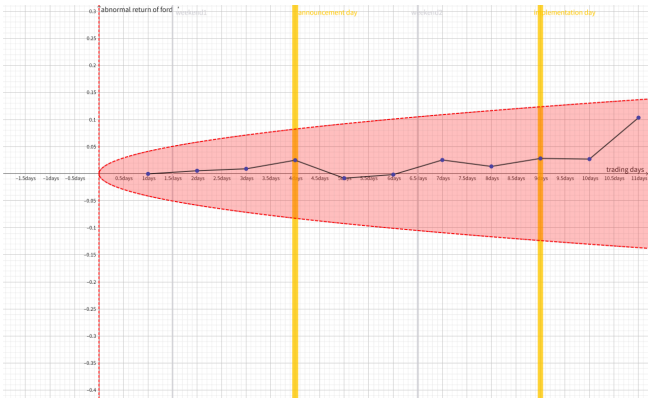


Figure 11. CAR and confidence interval of ford during event window

As can be seen from Figure 10, Ford's abnormal returns (AR) remained within a very stable range throughout, except for the last day, i.e., April 5th. Its cumulative abnormal return (CAR) also showed a very stable trend, all falling within the confidence interval of CAR. During the event window, this phenomenon can be attributed to the fact that Ford has a high degree of localization, which means it does not need to pay more taxes like Tesla, in line with the intended purpose of the policy.

Compared to companies like Tesla, Trump shows stronger support for traditional automakers such as Ford, which mainly produce gasoline-powered vehicles. Many investors noticed his

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preference. They believed Ford would face less pressure from the new policy. As a result, confidence in Ford remained high, and the company was not heavily affected by the event.

Another point is that Ford is not as high-profile or well-known as Tesla. Elon Musk himself attracts a lot of media attention, while Ford's CEO, Jim Farley, is much less familiar to the public. High visibility often leads to greater market reactions, which is why Tesla's stock price saw bigger swings. On the other hand, Ford's stock price stayed relatively stable throughout this period.

5. Conclusion

Comparing these two companies It's hard to say who win the tariff campaign in a short run. However, it's clear that higher level of localization and technicalization are the keys to fight against the tariff policy. Tariff is the "execution knife" for traditional companies. To avoid being killed by the tariff, their supply chains should combine the characteristics of localization and regionalization. For example, they can establish tariff free port in other countries, and also they can construct joint venture factory. They need to cooperate with those technological companies and develop high tech like autonomous driving. Their capital operation should spin off. For example, model e in Ford is listed independently [2].

For technical car companies, tariff can help them become stronger and more resilient. They should improve the resilience of their supply chains and set up resilience triangle (localization, regionalization and diversification) Moreover, they should overcome the technical barriers. Their software advantages can make them immune to the tariff like vaccination

And their business patterns should convert selling cars into mobile service focusing on three levels: hardware software and ecosphere, not only focus on manufacturing.

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