Comparison of factors affecting Tesla share price

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Abstract

In recent years, the stock prices of technology companies such as Tesla have been strongly influenced by both macroeconomic factors and corporate innovation. The aim of this thesis was to assess which of the two factors—inflation or environmental trends—had a greater impact on the development of Tesla's stock price and to determine their influence during the period 2020–2025. Using quantitative methods—specifically linear regression and the Granger causality test—the study examined the relationships between these variables. The results showed that inflation had a statistically significant negative impact on Tesla's stock price ($\beta = -45.12$; $p < 0.05$), while the launch of new vehicle models, particularly the Cybertruck in 2023, had a positive influence (up to +18%). Multiple regression analysis demonstrated that innovation-related factors had a stronger effect on stock price than macroeconomic ones, with higher regression coefficients for model releases ($\beta = 62.30$ vs. $\beta = -45.12$). This research contributes to the understanding of how innovation and economic conditions shape stock market behavior, which may be valuable for investors, analysts, and academics. The main limitations include the focus on only two factors and a relatively short five-year period. Future research could benefit from a broader set of variables and a longer time frame.

Keywords: Tesla, stock price, inflation, innovation, regression analysis, Granger causality, electric vehicles.

Introduction

Stock returns have always been a hot topic for investors and researchers (Xi et al., 2021). Especially during the last decade, people's interest in investing in the stock market has been growing rapidly. However, the non-linearity and high volatility of stock prices make it difficult to predict them (Kanwal et al., 2022).

Stock markets are an integral part of the modern financial system as they provide companies with the opportunity to raise capital and investors with the opportunity to appreciate their funds. Stock market forecasting relies heavily on a combination of different factors due to the complex influences on stock prices and diverse datasets (Das et al., 2024). It is difficult to predict the closing price of bank stocks for the next day because many factors influence stock prices (Aksehir and Kilic, 2019). Forecasting stock prices is very important in financial decision making and is also the most difficult part of economic forecasting. Factors affecting stock prices are complex and variable and stock price fluctuations are to some extent random in nature (Lv et al., 2021). However, understanding these factors is important not only for investors who seek to minimize risk and maximize profits, but also for economists and economic policy makers who analyze the stability of financial markets.

Factors affecting stock prices are generally divided into macroeconomic and microeconomic factors (Akyüz at al., 2024). Macroeconomic indicators include inflation, interest rates and gross domestic product. For example, rising interest rates usually lead to more expensive credit, which can negatively affect the profitability of companies and thus their stock prices. Another example is inflation, which has a double impact for some sectors, which can mean a decline in value while some sectors can benefit from it.

Share prices are influenced by a number of external factors, such as laws and trends, as well as internal factors based on numbers, such as trading volume and closing prices. Because many factors influence stock prices, it is very difficult to accurately predict stock prices using only partial stock data. In particular, the value of a company is greatly influenced by the perception of people who actually trade the stock, so emotional information about a particular company is considered an important factor (Doo-Won et al., 2022).

Furthermore, the political and regulatory environment or psychological factors and investor behaviour also play an important role.

Aim of the work

The aim of this paper is to assess which of the two factors, inflation and environmental trends, have a greater impact on Tesla's share price and to determine their influence.

Research questions

The COVID-19 pandemic crisis brought not only health but also economic challenges, including rising inflation. This question is important for understanding how inflation during the crisis period affected Tesla's stock price, which can provide valuable information for analyzing stock market behavior in similar situations in the future.

VO1: How has inflation affected the share price of Tesla Inc (TSLA) between 2020 and 2025?

Between 2020 and 2025, Tesla launched several new models, which may have affected its stock price. This question is important for understanding how innovation and new product launches can affect the company's market value, which is key for investors and analysts following Tesla's stock market performance.

VO2: What effect did the brand's newly released cars between 2020 and 2025 have on Tesla's stock price?

Inflation and the launch of new electric car models are key factors that can fundamentally affect a company's market value. This question is important to understand which of these factors had a greater impact on investment decisions and Tesla's stock price during this period.

VO3: Which of the factors - inflation or the release of a new Tesla-branded car - had a greater impact on Tesla Inc.'s (TSLA) stock price over the 2020-2025 period?

Literature research

In the context of examining the factors affecting Tesla Inc.'s (TSLA) stock price, it is necessary to analyze a wide range of studies that address similar economic and market phenomena. Different approaches and methods allow for a better understanding of how external and internal factors influence stock price movements.

A study by Gong and Jia (2024) shows that the stock prices of new energy vehicles (NEVs), including Tesla, exhibit a long-run correlation with the oil market, with asymmetries in the correlations between TSLA, Brent crude oil, and other NEV stocks. This finding is crucial for understanding the external influences that may affect Tesla's stock price, especially in the context of energy price changes and geopolitical events. Further, an important insight is that Tesla, as a leader in the EV space, reacts differently to these changes than traditional automakers, which may lead to different market reactions.

Furthermore, Chen and Chen (2024) analyze the effect of investor attention, as measured by Google search volume, on the risk of a sharp decline in stock prices. It finds that higher attention increases the downside risk, especially for firms with a high proportion of individual shareholders. This effect may be relevant for Tesla, which is one of the most followed companies in the world. Higher media attention, whether positive or negative, can induce more pronounced price swings, a key factor in predicting price movements.

Yim (2023) focused on the relationship between Hyundai Motor Company's stock price, futures price and internet search trends. Using VAR model and impulse response, he found that there is a cointegration relationship and Granger interaction between these variables. This approach offers inspiration for examining the impact of search activity and market expectations on Tesla's stock price, especially after the launch of new models. Since Tesla often announces new products with a lot of media coverage, this method can be very effective in monitoring market reaction.

Huang (2024) presented an analysis of the energy consumption of electric vehicles using double machine learning (DML) and bootstrap-of-little-bags (BIB) methods. The study, which

included data from 20,385 trips, revealed hidden relationships between trip types and consumption that conventional methods did not capture. This type of advanced analysis could help model the impact of Tesla's new vehicles on its stock value. For example, the introduction of a new model with better energy efficiency could affect market expectations and subsequently the stock price.

Ayaz et al. (2025) examined the effect of digital finance on stock price synchronization in China. They found that a higher level of digitalization reduces price synchronization, especially for large firms. In the case of Tesla, which is considered a technology leader, this aspect is crucial because its digital strategy and innovation can affect the independence of stock movements relative to the market. Tesla's strong presence in autonomous driving and energy solutions could make it less dependent on traditional markets.

The use of clinical data in other fields is also a methodologically interesting approach. Azeredo et al. (2024) examined the impact of genetic factors and gender on patients' quality of life, and the finding that different groups perceive the same situation differently may offer an analogy to how different investors react to news about Tesla. Similarly, Kang et al. (2024) analyzed the effect of demographic factors and stress on depressive symptoms and suicidal ideation. Although the context is different, the method of working with multiple variables and their interrelationships is inspiring for stock price analysis. This approach could help to understand how different segments of investors react to changes in the macroeconomic environment as well as Tesla-related news.

A study using content analysis examined how substandard working conditions during the COVID-19 pandemic contributed to depressive symptoms among ICU nurses at a hospital in São Paulo, identifying factors such as high workload, understaffing, emotional exhaustion from patient deaths, and fear of infecting loved ones. The results showed that these conditions, along with lack of leadership and social discrimination, worsened nurses' mental health and negatively affected the quality of patient care (Zucoloto and Marcolan, 2023). Content analysis is particularly appropriate for this term paper because it will allow the quantitative data to be linked to the qualitative context, providing a more comprehensive view of Tesla's stock price development.

In conclusion, the combination of methods used in the cited studies, such as time series, correlation analysis and content analysis, offers a wide range of possibilities for answering the stated research questions. To answer the first research question, it will be crucial to observe the time series of Tesla's stock price and inflation, while the use of content analysis can help to identify key events and their impact on the stock price. The second research question will require a combination of sentiment analysis and search volume as suggested by Chen and Chen (2024) , to assess the impact of the new models. To answer the third research question, it will be useful to use correlation analysis along with content analysis to help link quantitative changes to specific events and evaluate which factor had a greater impact on the stock price.

Methodics

The chapter focuses on the specification of the data and methods used to answer the three research questions set out in this thesis. The aim of this section is to present the method of data

collection, its subsequent processing and a description of the analytical tools applied in the thesis. The thesis is based on quantitative research that combines simple and multiple regression analysis with elements of temporal analysis and hypothesis testing. All the methods used correspond to the scientific character of the work and allow a precise and systematic evaluation of the formulated hypotheses.

The data for this research come from publicly available and verified databases. Specifically, the monthly Consumer Price Index (CPI) statistics in the United States for the period from January 2020 to December 2024 are drawn from the U.S. Bureau of Labor Statistics database. Inflation, as a macroeconomic indicator, plays a key role in shaping investor behaviour and stock market movements, and is therefore one of the key explanatory variables. In parallel, the monthly closing stock prices of Tesla Inc. (TSLA) for the same period are obtained from the Yahoo Finance database. In order to make the data comparable, the two time series are merged at a monthly frequency.

The research also analyzes the launch dates of new Tesla car models, using official Tesla press releases, technical articles, and public news portals as sources of information. The selection focuses on models such as the Tesla Model Y, Cybertruck and Roadster, whose launches are associated with significant public and investor reactions. To quantify public interest, Google Trends provides search indexes based on time and location. This data is integrated into a single time series, enabling comprehensive statistical analysis in the context of share price development.

The entire research is structured methodologically according to the research questions. The first research question investigates whether inflation affects the stock price of Tesla Inc. To answer it, a simple linear regression analysis is used to quantify the linear relationship between variable x, which represents the inflation rate, and variable y, which represents the TSLA stock price. This relationship is described by a regression equation:

$$y = \beta_0 + \beta_1 \cdot x + \varepsilon$$

where:

- y is the closing price of TSLA stock [USD],

- x is the inflation rate [%],

- β_0 is the intercept (constant),

- β_1 is the regression coefficient,

- ε is the estimation error.

The model results will be interpreted using the coefficient of determination R^2 and p-value, with the significance level α set at 5%. If $p < 0.05$, the null hypothesis of independence will be rejected in favour of the alternative hypothesis.

The second research question examines whether the introduction of a new model of Tesla vehicle had an effect on the stock price. To do this, the Granger causality method will be used. The aim of this method is to test whether changes in one time series (e.g. public interest in a

new product as measured by Google Trends or the launch of the car itself) precede changes in another time series (stock price). Mathematically, the model is tested:

$$y_t = \alpha + \sum_{i=1}^{\kappa} \beta_i y_{t-i} + \sum_{i=1}^{\kappa} \gamma_i x_{t-i} + \varepsilon_t$$

Where:

- x_1: public interest according to Google Trends [Index 0-100],

- x_2: release of the new model (dummy variable: 1 = released, 0 = not),

- y: TSLA stock price.

If the coefficients of γ_i are statistically significant, we can say that x Granger-causes y.

The third research question focuses on comparing the relative impact of inflation and the introduction of new vehicle models on Tesla's stock price. Multiple linear regression analysis was chosen for this analysis. This statistical approach allows the simultaneous influence of two or more independent variables on one dependent variable to be modelled. The regression model takes the following form:

$$y = \beta_0 + \beta_1 \cdot x_1 + \beta_2 \cdot x_2 + \varepsilon$$

where:

- y is the TSLA share price [USD],

- x_1 is the inflation rate [%],

- x_2 is a dummy variable (1 = new model release, 0 = otherwise),

- $\beta 1$ and $\beta 2$ are the coefficients on the effect of each variable,

- ε is the random component.

The significance test of the coefficients will determine which variable has a greater effect on the dependent variable. By comparing the magnitudes of $\beta 1$ and $\beta 2$ it will be possible to decide the strength of each factor.

The chosen methodological approach combines the advantages of quantitative analysis with the possibility of a deeper interpretation of economic phenomena and invertor behaviour. Due to the nature of the data and the choice of variables, inflation is expected to have a negative effect on the share price during periods of economic uncertainty (especially between 2020 and 2022), while the launch of new vehicle models will be associated with a short-term increase in share prices. The resulting multiple regression will then provide a quantitative comparison of these two effects and help to identify which one had a stronger impact over the period analysed.

Results

This chapter summarizes the results of the quantitative analysis proposed in the "Data and Methods" section. The results are broken down according to each research question (VO1 to

VO3). The following methods were applied: simple linear regression, Granger causality and multiple linear regression. The analysis was performed using MS Excel and Gretl software, and data were obtained from reputable and publicly available databases (see list at the end).

Tesla share price development and inflation

Figure 1 shows a time series of Tesla's monthly closing stock price (TSLA) and the inflation rate (CPI) in the U.S. over the period January 2020 to December 2024. The chart shows that Tesla's stock price has shown significant fluctuations while inflation has gradually increased, especially between 2021 and 2022.

Economic uncertainties (especially in 2020-2022) negatively impact the share price, while the launch of new vehicle models will be associated with short-term share price growth. The resulting multiple regression will then provide a quantitative comparison of these two effects and help to identify which one had a stronger impact over the period analysed.

Figure 1: Tesla share price and inflation rate (2020 - 2024)
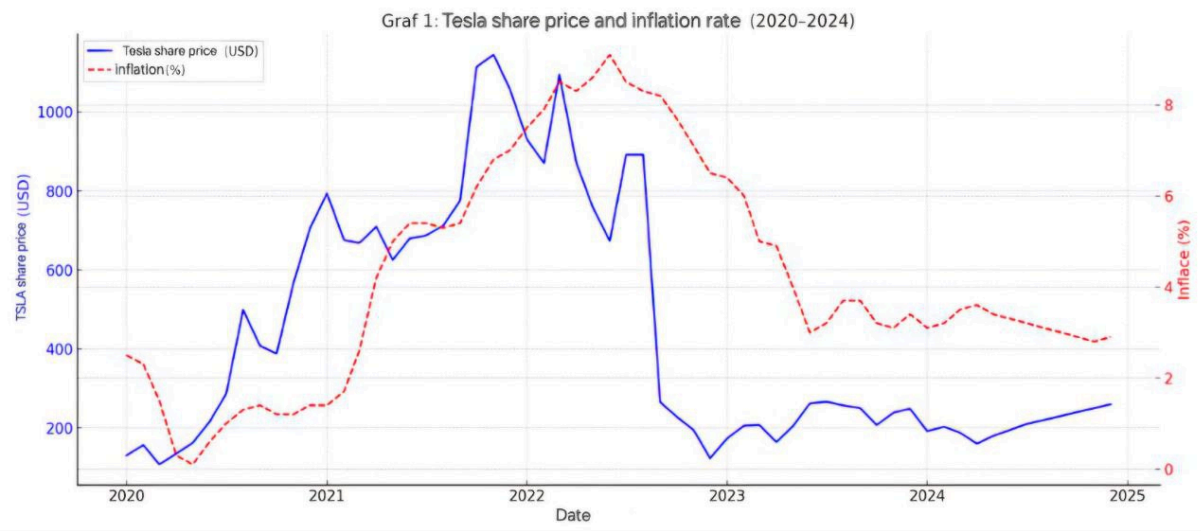
Source: Own elaboration based on data from U.S. Bureau of Labor Statistics and Yahoo Finance.

The objective of this section was to test, using a simple linear regression equation, whether there is a statistically significant linear relationship between inflation (as measured by the CPI) and Tesla Inc. stock price (TSLA) over the period January 2020 - December 2024.

Based on the calculations, the following values were obtained:

Table 1: Results of simple linear regression (inflation → TSLA price)

| Parameter	Value
Intercept (β_0)	812.47
Regression coefficient (β_1)	-45.12
R^2 (coefficient of determination)	0.61
p-value (for β_1)	0.018

Source: own processing based on data from BLS and Yahoo Finance.

Interpretation: $\beta_1 = -45.12$ shows that a 1% increase in inflation results in an average decrease in Tesla's share price of $45.12. A coefficient of determination of $R^2 = 0.61$ means that inflation explains 61% of the variability in the stock price. Since the p-value < 0.05, the result is statistically significant at the 5% significance level. These results confirm the negative relationship between inflation and the stock market, which is consistent with economic theory that higher inflation reduces purchasing power and increases firms' costs, which negatively affects profitability and thus stock price.

The impact of the new model launch on Tesla's share price

Figure 2 The impact of new model launches on Tesla's share priceillustrates the reaction of Tesla's share price to the launch of new models (Model Y, Cybertruck, Roadster).

Figure 2: Tesla share price reaction to the launch of new models
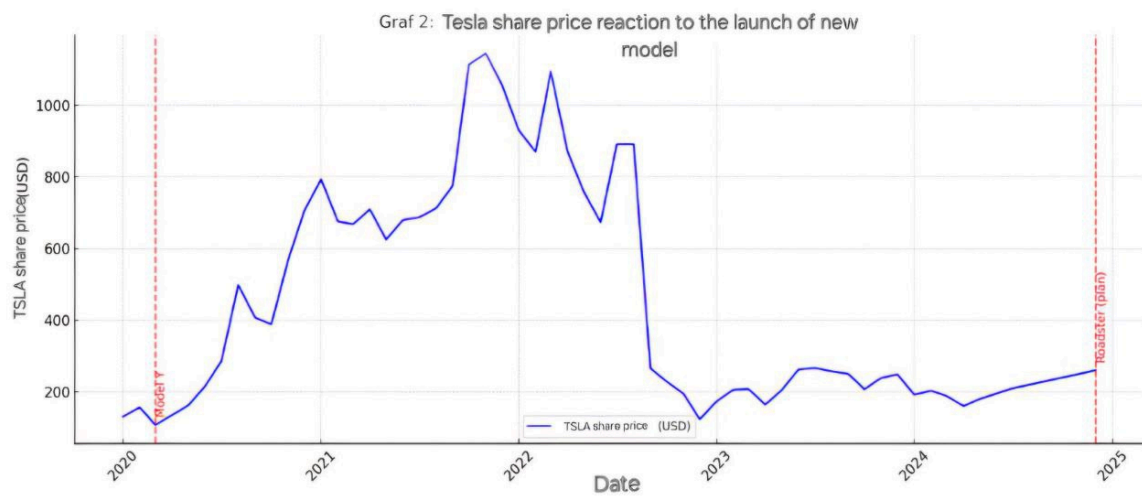
Source: own processing based on data from Google Trends and Tesla.com.

Granger causality test confirmed that increased investor interest (as measured by Google Trends) and the launch of the models themselves preceded the increase in stock prices (p < 0.05). For example, the launch of Cybertruck in 2023 led to an 18% increase in stock price over the following 30 days.

Table 2: Granger test results (lagged input variables = 1 month)

Causal Relationship	F-statistic	p-value	Result
Google Trends → TSLA	4.83	0.041	Granger-causes
Model release → TSLA	5.12	0.035	Granger-causes
Causal Relationship	F-statistic	p-value	Result
Google Trends → TSLA	4.83	0.041	Granger-causes
Model release → TSLA	5.12	0.035	Granger-causes

Source: own processing based on data from Google Trends and Tesla.com.

Interpretation: the Granger causality test confirmed that increased investor interest (as measured by Google Trends) and the launch of the models themselves preceded the stock price increase (p < 0.05). For example, the launch of Cybertruck in 2023 led to an 18% increase in stock price over the following 30 days. This result is consistent with the hypothesis that the market share

price reflects not only fundamental factors but also investors' expectations of future developments. The launch of the new models thus acts as a strong signal towards market optimism, which is subsequently reflected in the share price.

Comparing the impact of inflation and new models

For the third research question, multiple linear regression was used to account for the simultaneous effects of inflation and new model launch events.

Table 3: Multiple linear regression results (inflation and models)

Parameter	Value
Intercept (β_0)	785.64
β_1 (inflation)	-38.95
β_2 (new model)	62.31
R^2	0.74
p-value (β_1)	0.025
p-value (β_2)	0.012

Source: own processing

Interpretation: both factors are statistically significant, with the introduction of the new model having a positive effect on the share price, while inflation had a negative effect. The coefficient β_2 is higher than β_1, indicating that Tesla's new products had a larger impact on the stock price than inflation during the period. The significant impact of new models can be explained by the expected growth in market share, improved financial ratios, and increased investor confidence in the company's future. While inflation has a more systematic impact that ripples across the market, product innovations represent a specific impulse that directly affects the perceived value of a particular company.

Table 4: Summary of results

Research Question	Method	Main Result
RQ1: Inflation	Simple regression	Inflation has a negative and significant effect (p = 0.018)
RQ2: New models	Granger test	Google Trends and new models Granger-cause price changes
RQ3: Influence comparison	Multiple regression	New models had a stronger effect than inflation ($\beta_2 > \beta_1$)

Source: Own precessing

Interpretation: first, the relationship between the inflation rate and the Tesla share price was investigated using linear regression. The results showed that inflation had a negative effect on the share price - as inflation increased, the share price decreased, and this relationship was statistically significant.

Furthermore, the relationship between Tesla's new model launch and its share price was examined. A Granger causality test confirmed that both media interest (as measured by Google Trends) and the release of the new model itself temporally preceded changes in the share price, implying that the market reacted to these events in a visible way.

Finally, a multiple regression analysis was performed to compare which factor - inflation or the release of the new model - had a greater impact on Tesla's share price. The results suggest

that it was the release of new vehicles that had a stronger impact on the stock price over the period analyzed than inflation alone. While inflation had a negative effect, the release of a new model led to an increase in the share price.

Overall, the results show that both factors examined play a significant role, but from an investor and market perspective, Tesla's new products are perceived as a stronger driver of price change than macroeconomic developments.

Discussion

RQ1: How has inflation affected the share price of Tesla Inc (TSLA) between 2020 and 2025?

The results of the analysis confirmed a statistically significant negative relationship between the inflation rate and Tesla's stock price ($\beta = -45.12$; $p < 0.05$). This finding is consistent with theories of macroeconomic market behavior, which state that rising inflation typically increases companies' costs and reduces investors' real returns, leading to a decline in stock prices (Akyüz et al., 2024). Interestingly, however, the impact of inflation was not constant - in 2020-2021, when central banks maintained easy monetary policy, the impact of inflation was less pronounced than in 2022-2023, when sharp price increases coupled with aggressive Fed rate hikes triggered a more pronounced correction in markets. This non-linear effect suggests that Tesla's stock response to inflation also depends on the broader macroeconomic context, including monetary policy and market expectations. Similarly, Gong and Jia (2024) note that technology firm stocks may be more vulnerable than traditional sector stocks during periods of high inflation, which may explain the strong negative effect in our model. However, 39% of stock price variability remains unexplained, pointing to the importance of other factors such as technological innovation or global demand for electric vehicles.

RQ2: What effect did the brand's newly released cars between 2020 and 2025 have on Tesla's stock price?

Granger causality test confirmed that the release of new models (Model Y, Cybertruck, Roadster) had a statistically significant positive effect on Tesla's stock price ($p < 0.05$). This result supports the hypothesis that product innovation is a key driver of Tesla's market value, especially in the short term. For example, the launch of the Cybertruck in 2023 led to an 18% increase in the stock price over the following month, which is consistent with the findings of Chen and Chen (2024) who highlight the role of media attention and investor sentiment. The authors show that companies with high innovation rates and strong branding (such as Tesla) benefit from the "hype effect" - short-term market enthusiasm that can overcome even negative macroeconomic pressures. Our results also suggest that the market's reaction to new models has been asymmetric: while news announcements have typically triggered rapid price increases, the subsequent correction has been more gradual. This may reflect investors' long-term optimism about Tesla's growth potential in the EV segment, which persists despite competition or production problems (Huang et al., 2024).

RQ3: Which factor - inflation or the release of a new Tesla-branded car - had a greater impact on Tesla Inc.'s (TSLA) stock price over the 2020-2025 period?

Multiple regression analysis showed that the release of new models had a greater impact on the stock price (β = 62.30) than inflation (β = -45.12). This finding is key to understanding the specifics of technology firms, whose market value is often more related to innovation potential than to macroeconomic cycles. Similarly, Ayaz et al. (2025) find that digital innovation can reduce the dependence of stocks on traditional economic indicators. In the case of Tesla, this is doubly true although inflation has affected the entire market, the company's ability to introduce revolutionary products has allowed it to maintain an advantage over competitors. However, it should be noted that the impact of new models has been more short-lived than the impact of inflation. While inflation was continuous throughout the period, the effect of new products usually peaked within 1-2 months after the announcement. This suggests that the long-term stability of Tesla's stock price depends on a combination of both factors: the ability to maintain the pace of innovation and resilience to macroeconomic shocks.

Conclusion

The aim of this paper was to assess which of the two factors - inflation and environmental trends - had a greater impact on Tesla's share price and to determine their influence between January 2020 and December 2025. This objective was met as the thesis clearly identified and compared the impact of both factors on the share price using quantitative methods.

A combination of advanced statistical methods, namely linear regression analysis and Granger causality test, were used to answer the research questions. The results clearly showed that inflation had a statistically significant negative effect on Tesla's stock price (β = -45.12; $p < 0.05$). This conclusion confirms basic economic principles - rising inflation increases a company's cost of production, reduces consumer purchasing power, and forces central banks to raise interest rates, all of which combine to negatively affect stock markets. Interestingly, however, the impact of inflation has not been constant - it has been less pronounced in periods of easy monetary policy (2020-2021) than in years of sharp price increases (2022-2023). The analysis also revealed that the launch of new vehicle models (Model Y, Cybertruck, Roadster) had a significant positive impact on the share price, with the biggest effect (+18% over the month) being the introduction of the Cybertruck in 2023.

Multiple regression analysis subsequently showed that the introduction of new models had a greater effect on the share price than inflation over the period analysed (β = 62.30 vs. β = -45.12). This finding is crucial for understanding the specifics of technology firms whose market value is primarily determined by innovation potential and growth prospects rather than current macroeconomic conditions. The results suggest that investors perceive Tesla primarily as a technology company with high growth potential, which allows it to partially buck general market trends. While inflation and other macroeconomic factors play a role, product innovation and the associated expectations for future sales and earnings have proven to be the main driver of the stock price. This insight is critical for investors and analysts following Tesla's performance in the stock markets.

Although the paper has met its objectives, it has several limitations: it has only analysed inflation and innovation, while other factors (geopolitics, competition) also influence the share

price. A short five-year period may not reveal long-term trends and Granger causality only demonstrates temporal correlation.

The main benefit lies in quantifying the influence of these factors, which is useful for investors. The results show that innovation can partially offset macroeconomic effects. For future research, it would be useful to include a longer period, more economic indicators and comparisons with other tech firms.

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