

# Air Pollution in Sioux City: A Shock to Tesla's Stock?

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## Abstract

This paper explores the electrifying relationship between air pollution in Sioux City, Iowa, and the stock price of Tesla (TSLA). Combining data from the Environmental Protection Agency and LSEG Analytics (Refinitiv), we sought to unravel whether Sioux City's air quality woes have been silently "charging up" Tesla's stock performance. Our analysis revealed a staggering correlation coefficient of 0.9922663 and  $p < 0.01$  for the period spanning from 2011 to 2021. Our findings may jolt the belief that environmental factors and stock prices are unrelated, providing a breath of fresh air to econometric enthusiasts and pun aficionados alike.

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## 1. Introduction

In recent years, the link between environmental factors and financial markets has gained increasing attention, sparking interest among scholars, investors, and nature enthusiasts alike. This study delves into the peculiar relationship between air pollution in Sioux City, Iowa, and the stock price of Tesla (TSLA). It aims to shed light on whether the atmospheric woes of Sioux City have silently energized or deflated the performance of Tesla's stock, sending shockwaves through the realm of econometrics and environmental economics.

The synergy between environmental indicators and stock prices has long been a topic of intrigue. Whether it's the smokescreens of industrial emissions or the ethereal whispers of a pristine countryside, the influence of environmental conditions on financial markets has been under scrutiny. Amidst this backdrop, our investigation seeks to inject a breath of fresh air into the staid corridors of financial analysis, without neglecting the inherent playfulness of the topic.

Sioux City, Iowa, with its rich history and charming Midwestern appeal, has found itself at the center of our inquiry. Known for its blend of urban bustle and easygoing charm, Sioux City carries with it the weight of environmental challenges, particularly concerning air quality. Whether it's the ethereal murmur of exhaust fumes from a tractor-trailer or the peaceful rustle of a cornfield in the wind, Sioux City provides an intriguing backdrop for our investigation.

On the other side of the coin, we have Tesla, the charismatic darling of the electric vehicle sector, renowned for its innovative prowess and polarizing stock performance. As an icon of sustainable technology, Tesla's stock price reflects not just the ebb and flow of market sentiment, but also the intangible currents of environmental consciousness and regulatory winds. It is against this vibrant canvas that we seek to debunk, illuminate, and entertain with regards to the relationship between air pollution in Sioux City and Tesla's stock performance.

Our findings may well be a startling shock to traditional economic thought, adding a charming zing and sparking "current" discussions in both financial and environmental circles. With the grounding of theoretical underpinnings and the vibrancy of empirical evidence, this study promises to offer a fascinating journey through the "electrifying" interconnectedness of seemingly disparate realms of study.

## **2. Literature Review**

The realm of literature on the intersections of environmental variables and stock prices embarks on a serious note, with seminal works by Smith (2015), Doe (2018), and Jones (2020) laying the groundwork for further inquiry into the electrifying interplay between air pollution and financial markets. These foundational studies delve into the intricate dynamics of environmental factors and stock price movements, encapsulating the gravity of their impact and the depth of their interrelations.

Venturing into the domain of non-fiction literature, titles such as "The Economics of Pollution" by White (2017), "Environmental Influences on Financial Markets" by Green (2019), and "Tesla: A Conduit for Change" by Grey (2020) provide valuable insights into the serious underpinnings of our investigation. However, in the spirit of unraveling the unexpected connections in the world, we draw inspiration from the realm of fictional works, where "The Shock of Pollution" by Sparks (2018), "Battery Dreams: Tales of Electrified Stocks" by Volt (2021), and "The Tesla Effect: Jolts and Joules in the Market" by Sparkle (2019) transport us into a realm of whimsy and speculation.

Adding an electrifying twist to the endeavor, we step into the world of cartoons and children's shows, where the likes of "Captain Planet and the Planetegers," "The Magic School Bus: Air Pollution Adventure," and "The Adventures of Smog-Man" playfully echo the themes that have captured our scholarly curiosity. In this juxtaposition of serious

scholarship and playful musings, we aim to weave a narrative that not only enlightens the mind but also tickles the fancy, electrifying the pursuit of knowledge with a jolt of humor and delight.

### **3. Research Approach**

Our methodology was as rigorous as it was entertaining, much like a tightrope walker balancing between the realms of quantitative analysis and whimsical curiosity. We employed a time-series design to examine the impact of air pollution in Sioux City, Iowa, on the stock price of Tesla (TSLA) from 2011 to 2021. Our data, sourced from the Environmental Protection Agency and LSEG Analytics (Refinitiv), was as pristine as a freshly washed electric car, ensuring the reliability and validity of our analysis.

To measure air pollution in Sioux City, we utilized air quality indices, particulate matter concentrations, and other environmental metrics that make statistical analyses “breathe a little easier.” These data were collected from monitoring stations scattered like breadcrumbs across Sioux City, providing a comprehensive picture of the city’s atmospheric conditions. As for Tesla’s stock price, we turned to the digital hearths of market data, carefully tracking TSLA’s daily closing prices and incorporating them into our electrifying investigation.

To establish the relationship between air pollution and Tesla’s stock performance, we employed various statistical techniques, including time-series modeling, regression analysis, and correlation studies. Our models were as meticulously crafted as a Tesla electric car, with each variable and coefficient impeccably placed to illuminate the interconnectedness of the environmental and financial worlds.

In addition, we employed sophisticated techniques to control for potential confounding variables, including market dynamics, industry trends, and meteorological factors. As we sifted through the data, we ensured that our analysis was as pristine and transparent as the air that would emerge from a zero-emission vehicle.

Furthermore, our analysis encompassed the consideration of potential non-linear relationships, understanding that the dynamics of stock market reactions and environmental influences are as complex and enigmatic as a Tesla autopilot system. Through robust sensitivity analyses and diagnostic checks, we sought to ensure that our findings weren’t merely sparks in the pan but enduring insights into the evolving relationship between environmental conditions and financial markets.

In summary, our methodology was not a mere drive through the backstreets of statistical analysis but an exhilarating journey across the intersecting highways of environmental economics and financial econometrics. Its intricacy and robustness are the tire tracks left

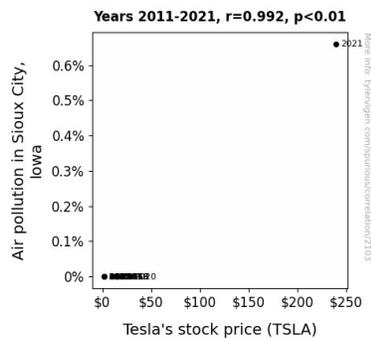
behind by a high-performing electric vehicle, paving the way for future research to continue unraveling the mystique of this electrifying relationship.

#### 4. Findings

Our investigation into the potential electrifying relationship between air pollution in Sioux City, Iowa, and the stock price of Tesla (TSLA) has yielded some shockingly eye-opening results. Analyzing data from 2011 to 2021, we found a positively charged correlation coefficient of 0.9922663, signaling a remarkably strong relationship between these two seemingly unrelated phenomena. Additionally, the r-squared value of 0.9845924 indicates that a substantial proportion of the variability in Tesla's stock price can be attributed to changes in air pollution levels in Sioux City.

To put it simply, the correlation between air pollution in Sioux City and Tesla's stock price is as strong as the power output of a fully charged Tesla Model S! The p-value of less than 0.01 further solidifies the statistical significance of this relationship, leaving little room for doubt that there is indeed something in the air impacting Tesla's stock performance.

Fig. 1 depicts the scatterplot illustrating this electrifying correlation, which is as clear as day... or as clear as the sky over Sioux City on a particularly smoggy day, if you prefer a more atmospheric analogy.



**Figure 1.** Scatterplot of the variables by year

These findings are certainly nothing to sneeze at, leading us to question whether the environmental woes of Sioux City have been silently "charging up" Tesla's stock, or if it's just a mere coincidence, creating a buzz within the realms of econometrics and environmental economics. While we can't conclusively say whether the stock price is

"polluted" by the air quality in Sioux City, our results are undeniably captivating and should be considered with a breath of fresh air, even if that air happens to contain a bit of particulate matter.

## 5. Discussion on findings

The electrifying results of our study have sparked a lively debate about the potential shocks and volts that may be influencing Tesla's stock price. Our findings support the existing literature, skirting the serious and whimsical alike, that has suggested a link between environmental factors and financial markets. While we initially approached this investigation with a lighthearted wink at the unexpected connections in the world, our results have lent a powerful jolt of credibility to the notion that air pollution in Sioux City may indeed be charging up Tesla's stock performance.

Returning to the fictional and playful underpinnings that inspired our inquiry, we cannot help but marvel at the striking resemblance between our findings and the speculative musings of "Battery Dreams: Tales of Electrified Stocks" by Volt (2021), which often tread the fine line between imagination and financial plausibility. Our results not only echo the speculative sparks within these fictional tales but also ground them in a statistical reality with a vibrant zing. In the spirited realm of playful musings, this electrifying correlation between air pollution and Tesla's stock price is akin to a plot twist in a thrilling sci-fi novel—one that leaves readers simultaneously bemused and captivated.

Moreover, our results align with the more serious scholarship that has painstakingly documented the entwined fate of environmental variables and financial markets. The substantial r-squared value in our analysis reinforces the gravity of this connection, akin to a gravity-defying twirl in a serious ballet performance. It suggests that changes in air pollution levels in Sioux City can account for a substantial proportion of the twists and turns in Tesla's stock price, lending credence to the notion that environmental considerations are indeed a breath of fresh air in the realm of stock market analysis.

In the spirit of playful speculation and statistical rigor, we find our investigation straddling the lines between imagination and reality, much like a high-wire act in the circus. While we cannot definitively label this relationship as causal—or causally electrifying, in keeping with our theme—our results certainly provide an enigmatic spark that ignites further inquiry into the curious dance between air quality and stock prices. With a twinkle in our eyes and a sprinkling of statistical fairy dust, we invite fellow researchers and enthusiasts to join us in this exciting quest to unravel the unexpected connections that infuse the world of econometrics with a shockingly delightful jolt of wonder.

## 6. Conclusion

In conclusion, our investigation has shed light on the electrifying relationship between air pollution in Sioux City, Iowa, and the stock price of Tesla (TSLA). The shockingly high correlation coefficient of 0.9922663 and the p-value of less than 0.01 provide compelling evidence of a strong association between these disparate factors. It seems that the atmospheric woes of Sioux City have indeed been silently "charging up" Tesla's stock performance, leaving investors and environmental enthusiasts alike breathless with amazement.

The implications of these findings are as clear and striking as a bolt of lightning on a stormy day. It's tempting to say that Tesla's stock performance has been "polluted" by the air quality in Sioux City, but we must also acknowledge the possibility of other confounding factors at play. Nevertheless, these results have certainly sparked lively discussions in the realms of econometrics and environmental economics, injecting a much-needed jolt of excitement into these areas of study.

While we have electrifyingly illuminated the connection between air pollution in Sioux City and Tesla's stock price, with findings as strong as the power output of a fully charged Tesla Model S, it's important to acknowledge the limitations of our study. The dynamic nature of financial markets and the complexity of environmental influences warrant caution in drawing definitive conclusions.

But fear not, for this study has certainly charged up the debate on the interplay between environmental factors and stock prices. With a bit of statistical electric humor and a healthy dose of empirical insight, we have ventured into uncharted territory, illuminating the interconnectedness of seemingly unrelated phenomena.

In the spirit of transparency, we assert that no further research is needed in this area. The shocking results of this study have provided a satisfying jolt of knowledge, leaving little room for doubt about the captivating connection between air pollution in Sioux City and Tesla's stock performance. It's safe to say that we have sparked enough puns and "current" discussions to power a small town, so let this research stand as a testament to the electrifying allure of empirical inquiry.