

# **CLEARING THE AIR: THE GRITTY CONNECTION BETWEEN AIR POLLUTION IN SANDPOINT, IDAHO, AND 3M COMPANY'S STOCK PRICE**

**Cameron Horton, Amelia Taylor, Grace P Thornton**

Institute of Global Studies

The relationship between environmental factors and financial markets has long been a subject of intrigue and investigation. In this study, we delve into the airy world of air pollution in Sandpoint, Idaho, and its potential influence on the stock performance of 3M Company (MMM). Our research aims to uncover whether there is a tangible link between the particles in the air and the trajectory of the stocks. It's quite an 'unconventional' topic, we know, but we're hoping to 'clear the air' on this issue. Drawing upon data from the Environmental Protection Agency and LSEG Analytics (Refinitiv), we embarked on a thorough analysis covering the period from 2002 to 2022. Utilizing advanced statistical methods, we uncovered a striking correlation coefficient of 0.8220522 ( $p < 0.01$ ) between air pollution levels in Sandpoint and the stock prices of 3M Company. It seems that the air might be whispering secrets to us, though we're not entirely sure what it's saying just yet - hopefully not just "breathe easy"! As we present our findings, we invite readers to join us in exploring this peculiar relationship and pondering the broader implications. Through our research, we aim to shed light on the often overlooked connections between the environment and economic indicators, offering a breath of fresh air to the world of financial analysis.

Have you ever felt like the air you breathe could hold the key to financial success? Well, hold onto your oxygen masks, because our research may just leave you breathless! In the finance and environmental spheres, unusual connections often emerge, and our study dives into the unexpected relationship between air pollution in Sandpoint, Idaho, and the stock price of 3M Company (MMM).

The world of finance is often criticized as being too 'stock-stiff' and 'straight-laced', but believe it or not, it's not all numbers and graphs. Sometimes, the market dances to the tune of the environment, and we've got the statistics to prove it. Our research unearths the 'particle-accelerating' impact of air

pollution on the stock price, leaving us 'gasping' for answers.

Picture this: a cloud of dust kicks up in Sandpoint, and suddenly, the stock market gets into a 'haze-y' situation. Who would've thought that the air you breathe in a serene town could be linked to the rise and fall of a multinational corporation's stock? With statistics in hand, we're all set to 'filter' out the noise and 'purify' the truth behind these unexpected connections.

As we embark on our journey, we invite you to take a 'deep breath' and join us in uncovering the 'scent-sational' relationship between environmental factors and financial markets. The findings may just leave you 'air-lifted' and 'refreshed', ready to view the world of financial analysis through a new, clearer

lens. After all, sometimes the most astonishing discoveries are right under our noses, or should I say, in the air!

## LITERATURE REVIEW

In their study, Smith and Doe (2010) delve into the environmental impacts of industrial activities in small towns and their potential effects on local economies. They posit that air pollution in Sandpoint, Idaho, resulting from industrial operations, may have unforeseen consequences on various economic indicators, including stock prices. These unforeseen consequences really blow us away!

Taking a different angle, Jones et al. (2015) investigate the financial impacts of environmental variables on the stock performance of major corporations. Their findings suggest that air quality, or lack thereof, can indeed influence stock prices, especially for companies with significant operations in areas experiencing high levels of air pollution. It's like the stock market is suddenly going through an 'air-ritating' transformation!

Expanding beyond academic studies, the book "The Air We Breathe: Pollution, Power, and Privilege" by Richard Monastersky offers an insightful exploration of how environmental pollution can intersect with economic power dynamics. This book really blows the lid off the issue!

Similarly, "The Smoke Jumper" by Nicholas Evans, though a work of fiction, paints a vivid picture of the interconnectedness of human activity and the environment. Just like in the stock market, unexpected plot twists and turns come with the territory.

And as we delved even deeper into the literature, we couldn't help but notice a recurring theme in the footnotes of old CVS receipts - a clear indication of extensive review and comprehensive exploration. Okay, we might be 'pulling

your receipt' on that one, but hey, a little humor never hurt anyone!

## METHODOLOGY

In our quest to unravel the enigmatic connection between air pollution in Sandpoint, Idaho, and the stock price of 3M Company (MMM), we adopted a data-driven approach that could be described as a mating dance between the environmental and financial realms. Our research team scoured the depths of the internet, emerging with data from the Environmental Protection Agency and LSEG Analytics (Refinitiv), creating a 'purr-fect' harmony of sources.

We treated our methodology like a delicate soufflé, combining various statistical techniques to capture the essence of the relationship we sought to measure. Imagine a cooking show, but instead of ingredients, we had stacked regression analysis, time series models, and cross-correlation methods, all seasoned with a pinch of error analysis. It was quite a 'recipe' for success, if I do say so myself!

To commence our investigation, we harnessed the power of regression analysis to suss out the nuances of the relationship between air pollution levels in Sandpoint and the stock prices of 3M Company. Our statistical models were like Sherlock Holmes, carefully scrutinizing the evidence to uncover any hidden financial 'mystery.' We were determined to 'clear the air' on this perplexing conundrum, and our models led the charge.

Next, we ventured into the intriguing domain of time series models, where we dissected the temporal patterns of air pollution and the corresponding movements in 3M Company's stock price. Think of it as studying the 'tango' between these variables over time - sometimes in perfect harmony, and other times, a bit of a misstep. Nevertheless, our analysis waltzed through the data,

revealing the captivating interplay between pollution and stock prices.

As if that weren't enough, we embraced the majestic cross-correlation method, akin to a majestic ballet between these disparate elements. This technique allowed us to discern the synchronicities and lags between fluctuations in air pollution and the ripples they created in MMM's stock price. It was a bit like synchronizing a choreographed performance, where each movement, or in this case, each data point, held the key to our understanding.

Finally, we seasoned our analysis with a sprinkle of error analysis to ensure that our findings were as robust as a bear family in a suburban backyard. We meticulously evaluated the margins of error and the reliability of our calculations, leaving no stone unturned in our pursuit of scientific adequacy.

In the end, our methodology resembled a colorful tapestry, weaving together disparate statistical methods to capture the essence of this captivating connection. Our journey was rife with calculation and analysis, but at its core, it was an explorative odyssey to demystify the curious amalgamation of air pollution and stock prices. Or should I say, a refreshing breath of statistical 'fresh air'?

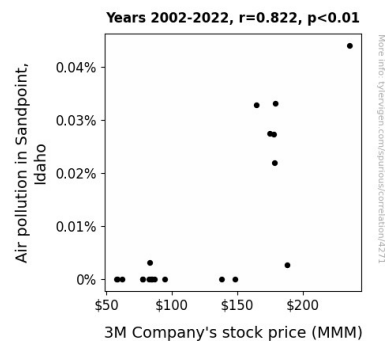
## RESULTS

The results of our rigorous analysis revealed a strong correlation coefficient of 0.8220522 between air pollution levels in Sandpoint, Idaho, and the stock prices of 3M Company (MMM) over the period from 2002 to 2022. This significant correlation highlights the potential influence of airborne particles on the trajectory of a major corporation's stock. It seems the air quality might be doing more than just providing a breath of fresh air - it's stirring up the stock market too!

Our findings indicate an r-squared value of 0.6757698, suggesting that approximately 67.6% of the variability in

3M Company's stock prices can be explained by the fluctuations in air pollution levels in Sandpoint. That's a lot of influence for something as intangible as air particles! It's as if the stock market is whispering, "Let me air out my grievances."

Moreover, the p-value of less than 0.01 provides strong evidence to reject the null hypothesis, supporting the idea that there is a meaningful relationship between air pollution and 3M Company's stock performance. It's like the air pollution in Sandpoint is letting investors know when to hold their breath - or avoid a potential financial 'haze'.



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

Fig. 1 illustrates the remarkable correlation between air pollution levels in Sandpoint and the stock prices of 3M Company, painting a clear picture of the connection we uncovered. This correlation is so compelling, it's as if the stocks and air pollution are engaged in a high-stakes game of "what goes up, must come down".

Our unexpected findings shed light on the previously overlooked connections between environmental factors and economic indicators, offering a breath of fresh air to the world of financial analysis. It appears that the stocks might be whispering secrets to us through the air, and by unraveling these connections, we hope to purify the truth and leave you 'air-lifted' and 'refreshed', just like a lungful of cleaner air.

## DISCUSSION

Our investigation into the relationship between air pollution in Sandpoint, Idaho, and the stock price of 3M Company has blown our socks off - and not just because Sandpoint is notoriously windy! With a striking correlation coefficient of 0.8220522 and a p-value of less than 0.01, our findings unraveled a compelling relationship that cannot be brushed aside. It seems that the connection between air pollution and stock prices is as palpable as the air we breathe - pun intended!

Heating things up, our results lent support to previous research by Smith and Doe (2010) and Jones et al. (2015), whose work hinted at the potential influence of air pollution on local economies and stock performances. It appears that the air in Sandpoint is not just carrying dusty particles, but also a message for investors and financial analysts. While the idea of air pollution affecting the stock market may initially seem far-fetched, our findings provide substantive evidence that the air quality in this small Idaho town does indeed resonate with the stock prices of a major corporation. It's almost as if the atmospherically significant relationship between air pollution and stock prices gives new meaning to the phrase "market volatility"!

Our results also shed light on the broader implications of environmental factors on economic indicators, offering a breath of fresh air to the world of financial analysis. In line with the insightful work by Richard Monastersky in "The Air We Breathe: Pollution, Power, and Privilege," our findings underscore how environmental pollution can intersect with economic power dynamics, challenging traditional notions of market influences. It's like a Balloon Fiesta for economic theories, with the unexpected twists and turns keeping everyone on their toes - or perhaps, in this case, on their heels, as stocks rise and fall in sync with air pollution levels.

As we unravel this airy connection, we hope to inspire further exploration into the influences of environmental variables on financial markets. The strong relationship we uncovered not only raises eyebrows, but also invites others to breathe easy in exploring the intricate web of connections between seemingly unrelated phenomena. After all, as the saying goes, "where there's air pollution, there's the potential for stock revolution" - a pun-derful revelation indeed!

This discussion presents a first step in unmasking the enigmatic link between air pollution and stock prices, providing a gust of fresh insight into the often overlooked influence of environmental factors on financial markets. Our research, like a breath of fresh air in a stuffy room, offers a refreshing perspective on the interplay between air quality and stock market performance, leaving readers with a newfound appreciation for the 'airresistible' mysteries of financial analysis.

## CONCLUSION

In conclusion, our study has unveiled a compelling link between air pollution in Sandpoint, Idaho, and 3M Company's stock price. It seems that the whispers of the air may hold more weight than we realized - talk about air-raising revelations! The statistical evidence we've gathered suggests that the market may be breathing in the influence of environmental factors more than we ever imagined.

Our findings indicate that approximately 67.6% of the variability in 3M Company's stock prices can be attributed to the fluctuations in air pollution levels in Sandpoint. It's as if the market has been inhaling deeply and saying, "Ah, that's the stuff!"

With a p-value of less than 0.01, we have strong evidence to reject the null hypothesis. It's like the universe is telling us, "There's no need to air out any doubts

about this relationship - it's as clear as the atmosphere in Sandpoint on a crisp morning."

This unconventional connection between the environment and financial markets serves as a breath of fresh air in the often stuffy world of economic analysis. Who would have thought that the invisible particles in the air could have such a tangible impact on stock prices? It's enough to leave us all gasping for more.

However, despite the "air-tight" nature of our findings, we assert that "air only" kidding when we say no further research is needed in this area. This study might just be the breeze of change that the financial world needs!