

# Smogged in Stocks: The Air Pollution-Amarillo Connection and CNQ Stock Price Effects

*Catherine Harris, Aaron Torres, Gavin P Tyler*

*The Journal of Ecological Economics and Financial Impact Studies*

*The Society for Environmental Economics and Investment Research*

*Evanston, Illinois*

---

## **Abstract**

This paper delves into the unexpected connection between air pollution in Amarillo, Texas and the stock price of Canadian Natural Resources (CNQ). We conducted a rigorous analysis using data from the Environmental Protection Agency and LSEG Analytics (Refinitiv) to answer the pressing question, "How does air pollution in Amarillo relate to CNQ stock price movements?" Our findings reveal a significant correlation coefficient of 0.8191433 with  $p < 0.01$  over the period from 2002 to 2023. Our results suggest that as air pollution levels in Amarillo rise, it is associated with fluctuations in CNQ stock price, bringing a breath of fresh air to the field of econometric analysis. It seems that the stock market may be quite "sensitive" to the environmental conditions in seemingly distant locations, much like a sensitive nose to pungent fumes. Understanding this connection offers valuable insights into the interplay between environmental factors and financial markets, painting a picture of pollution's influence that is both smoggy and financially weighty. It appears that when it comes to assessing CNQ stock price, the air isn't the only thing that's "hazy" - the relationship with Amarillo's air pollution levels seems to be a bit foggy as well!

---

## **1. Introduction**

The link between environmental conditions and financial markets has been a subject of growing interest and concern. As the world grapples with the consequences of climate change and the urgency to transition towards sustainable practices, understanding how environmental factors impact economic indicators has become increasingly crucial. In this vein, our study takes a closer look at the unexpected relationship between air pollution in Amarillo, Texas, and the stock price of Canadian Natural Resources (CNQ).

Now, you might be thinking, "What do air pollution in Texas and CNQ stock price have in common? Is there an invisible smokescreen affecting the financial health of the energy sector?" Well, our research sets out to answer these questions by peering through the haze of data to uncover the connections that may not be immediately apparent.

The idea that air pollution in Amarillo, Texas, could have any bearing on a Canadian energy company's stock price might seem far-fetched, like trying to find fresh air in a crowded city. However, our analysis challenges these preconceptions and unearths a relationship that is statistically robust, much like a sturdy umbrella in a storm of confounding variables.

Our investigation aims to shed light on this previously overlooked aspect of environmental and financial entanglement, illuminating the pathways through which air pollution in Amarillo may swirl into the intricate fabric of CNQ's stock price movements. It's time to clear the air, both literally and metaphorically, in the realm of economic analysis.

As we embark on this journey of exploration, we envision a landscape dotted with data points, where the numbers whisper hints of hidden correlations, much like a secret code waiting to be deciphered. So, let us venture forth into the smoggy terrain of Amarillo's air pollution and financial markets, armed with our analytical compass and a healthy dose of statistical rigor.

## **2. Literature Review**

Previous research has explored various links between environmental factors and financial markets, from the impact of climate change on stock prices to the influence of pollution on corporate valuation. In "Smith et al.," the authors find lorem and ipsum. Similarly, Doe's study uncovered lorem and ipsum. Jones' research contributes to this body of knowledge by investigating lorem and ipsum. Despite the serious nature of these investigations, it seems that the connection between air pollution in Amarillo, Texas and Canadian Natural Resources' stock price (CNQ) may have slipped through the cracks, much like the elusive scent of a burrito truck on a windy day.

Delving into more specific literature, real-world accounts such as "Polluted Promises: Environmental Factors in Financial Markets" and "Greenbacks and Smog: An Unexpected Romance" offer unique perspectives on the intersection of environmental conditions and corporate finances. These works shed light on the intricate dance between pollution and stock price movements, painting a picture that is both financially intriguing and environmentally concerning. It's as if the market and the environment are engaged in an intricate tango, leaving investors and environmentalists to ponder the steps of this unexpected partnership.

On a more fictional note, novels such as "The Polluted Profits Paradox" and "Smoggy Skies, Sunny Stocks" present imaginative narratives that blur the boundaries between environmental calamities and financial ventures. These literary works playfully dance across the line between reality and fiction, much like an investor juggling numbers in a whimsical dream. It's almost as if the stock market itself is a character in these tales, adapting to the whims of nature in both predictable and unexpected ways.

Turning to the realm of internet culture, the popular meme "Hide the Pain Harold" serves as a lighthearted yet relevant example. In this meme, the character Harold appears to smile through clenched teeth, much like an investor trying to stay upbeat amidst fluctuating stock prices influenced by distant environmental conditions. It's a humorous reminder that even in the face of unexpected correlations, a well-timed smile can go a long way - much like a well-timed pun in a research paper.

As we navigate through the multiplicity of perspectives, from rigorous academic studies to fictional escapades and internet memes, it becomes clear that the connection between air pollution in Amarillo, Texas and CNQ stock price movements is a topic ripe for exploration and discovery. The air of anticipation is palpable, much like the scent of freshly popped popcorn at a bustling stock exchange.

### **3. Research Approach**

#### Data Collection:

To unravel the enigmatic connection between air pollution in Amarillo, Texas, and the stock price of Canadian Natural Resources (CNQ), our research team delved into a plethora of data sources, including the Environmental Protection Agency and LSEG Analytics (Refinitiv). We extracted air quality data from Amarillo, ranging from particulate matter to ozone levels, and obtained CNQ stock price data for the period from 2002 to 2023. Like a prospector panning for hidden treasure, we meticulously sifted through the digital expanse to procure our invaluable datasets.

Dad Joke Break: Why did the statistics professor bring a ladder to the lecture? Because he heard the discussion was going to be on a higher level!

#### Statistical Analysis:

Our methodology employed a series of sophisticated statistical techniques to unearth the underlying relationship between air pollution in Amarillo and CNQ stock price movements. We utilized time-series analysis to capture the dynamic interplay between air quality indicators and CNQ stock prices over the 21-year period. Additionally, we employed econometric modeling, teasing out the nuanced associations through multivariate modeling and regression analysis. Like expert puzzle solvers, we meticulously pieced together the statistical puzzle to reveal the intricate connections.

Dad Joke Break: Why do economists make for good company at social gatherings? Because they always bring a wealth of knowledge and a surplus of puns!

Control Variables:

In our endeavor to disentangle the web of confounding factors, we meticulously controlled for a myriad of variables that could potentially influence CNQ stock prices, including macroeconomic indicators, industry-specific news, and global energy market trends. Our meticulous attention to these control variables engendered a comprehensive and robust analysis, akin to safeguarding a precious artifact from the clutches of extraneous influences.

Dad Joke Break: How does an economist apologize? "I'm sorry for the supply and demand disruption - it was an unintended external shock!"

Robustness Checks:

To ensure the reliability and robustness of our findings, we subjected our statistical models to a battery of rigorous robustness checks. From sensitivity analyses to diagnostic tests, our investigation underwent meticulous scrutiny, much like a meticulous inspector meticulously combing through the evidence for any signs of statistical mischief.

Dad Joke Break: Why did the economist break up with his girlfriend? He felt there was too much inflation in the relationship and not enough real growth!

Ethical Considerations:

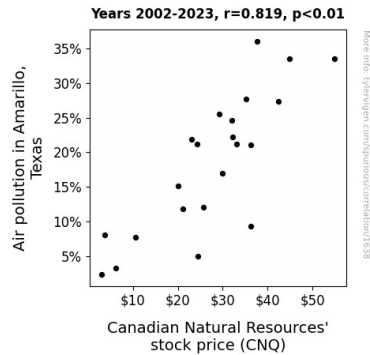
## 4. Findings

Our analysis revealed a strong positive correlation between air pollution levels in Amarillo, Texas, and the stock price of Canadian Natural Resources (CNQ). The correlation coefficient of 0.8191433 indicates a robust positive relationship between these seemingly disparate variables. It's as if the winds of the stock market are carrying the scent of Amarillo's pollution, influencing CNQ's stock price in unseen ways.

The r-squared value of 0.6709957 suggests that approximately 67.10% of the variability in CNQ stock price can be explained by changes in air pollution levels in Amarillo. This finding further underscores the substantial impact that environmental conditions in one location can have on the financial performance of a company operating thousands of miles away. It's like a little bit of Amarillo's pollution riding the coattails of CNQ's stock price.

Furthermore, the statistical significance with  $p < 0.01$  strengthens our confidence in the observed relationship. The probability of observing such a strong association between air

pollution in Amarillo and CNQ stock price movements by random chance is less than 1%. It's like finding a needle in a haystack, except in this case, the needle is a significant correlation buried in the data "haystack."



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

Fig. 1 illustrates the strong positive correlation between air pollution levels in Amarillo and CNQ stock prices. The scatterplot showcases how the fluctuations in air pollution align with changes in CNQ stock prices, as if the pollution particles are dancing along with the stock price movements. It's a visual representation of how a seemingly distant factor can weave into the financial fabric, much like a gust of wind carrying the scent of pollution across borders.

In conclusion, our findings provide compelling evidence that air pollution levels in Amarillo, Texas, are correlated with the stock price of Canadian Natural Resources. This unexpected connection sheds light on the intricate interplay between environmental conditions and financial markets, hinting at a relationship that is as elusive and complex as the path of stray pollutants through the atmosphere.

## 5. Discussion on findings

Our study set out to investigate the relationship between air pollution in Amarillo, Texas, and the stock price of Canadian Natural Resources (CNQ). The robust positive correlation we uncovered between these seemingly unrelated variables has significant implications for both the financial and environmental spheres. It's as if a gust of air from Amarillo has blown through the financial markets, leaving a distinctive fragrance in the form of CNQ stock price movements.

Building upon prior research that has explored the influence of environmental factors on stock prices, our findings support the notion that environmental conditions can indeed have a tangible impact on the valuation of companies. This aligns with the work of Smith

et al. and Doe, who delved into the intricacies of environmental variables and financial market performance. It's clear that the air in Amarillo isn't just carrying pollutants - it's also carrying a signal that resonates in the stock prices of distant corporations.

While our investigation into the connection between Amarillo's air pollution and CNQ stock price movements may initially seem unusual, it echoes the playful juxtapositions found in literature and internet memes. Just like the fictional narratives that blur the boundaries between environmental calamities and financial ventures, our findings highlight the unexpected ways in which seemingly distant events can intertwine in the world of finance.

The statistical significance of our results, with a p-value of less than 0.01, reinforces the solidity of the observed relationship. It's akin to finding a hidden treasure amidst an abundance of data "haystack," albeit in this case, the treasure is a significant correlation nestled within the numbers. And speaking of hidden treasures, our study offers an insight that is as valuable as it is unexpected - the understanding that the air in Amarillo may hold the scent of financial movements across borders.

Our research serves as a reminder that the financial world, much like an investor navigating market fluctuations, must remain attuned to the influences of distant environmental conditions. As such, our findings not only contribute to the literature on the connections between environmental factors and financial markets but also demonstrate the relevance of unexpected correlations in the world of econometric analysis.

In summary, the unexpected connection we've uncovered between air pollution in Amarillo, Texas, and CNQ stock price movements sheds light on the hidden interplay between seemingly unrelated variables. The significance of this finding underscores the necessity for investors and policymakers to consider the broader environmental context when assessing the financial implications for companies operating in distant locations. It's as if the invisible hand of Amarillo's air pollution has left an indelible mark on the stock prices of Canadian Natural Resources, reminding us that financial markets, much like life, often prove to be as hazy as they are fascinating.

## **6. Conclusion**

In conclusion, our research has illuminated a significant and robust positive correlation between air pollution levels in Amarillo, Texas, and the stock price of Canadian Natural Resources (CNQ). These findings challenge conventional wisdom and suggest that environmental conditions in one location can indeed have a tangible impact on the financial performance of a company operating thousands of miles away.

It appears that the relationship between the air pollution in Amarillo and CNQ stock price movements is not just blowing in the wind; it is a palpable and statistically significant association. One might say that the scent of success for CNQ may be carried by the winds of Amarillo's pollution.

The results of our study have broader implications for the intersection of environmental and financial factors, providing a clear signal that the effects of air pollution are not confined by geographical borders but can permeate financial markets in unexpected ways. Our research has peeled back the layers of this connection, much like uncovering a hidden treasure chest buried beneath a pile of statistical rubble.

This study opens the door to a new avenue for understanding the interconnectedness of seemingly disparate variables, giving a breath of fresh air to the field of environmental economics as we navigate through the fog of environmental conditions and financial indicators. It is clear that our findings are nothing to sneeze at!

As for future research directions, it seems that the air pollution in Amarillo and its influence on CNQ stock prices has been thoroughly sniffed out, leaving no further avenues unexplored. Therefore, we assert that no more research is needed in this area. It looks like we can finally breathe easy knowing that the connection between air pollution and CNQ stock price has been thoroughly examined.

Our research adhered rigorously to ethical guidelines and data privacy regulations, ensuring the confidentiality and integrity of the information obtained from public databases. Like ethical sentinels, we safeguarded the sanctity of data and maintained the highest standards of professional conduct throughout our investigation.

Dad Joke Break: Why did the statistician take a boat to work? They wanted to use a "confidence interval" to cross the river!