
Out of this World: The Cosmic Relationship Between Air Pollution in Columbus and NASA's Budget Allocation

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Abstract

In this research, we explore the intriguing connection between air pollution levels in Columbus and the allocation of budget to NASA as a percentage of the total US Federal Budget. By analyzing data from the Environmental Protection Agency and Planetary.org, we sought to unearth the cosmic relationship between these two apparently disparate factors. Employing robust statistical methodologies, our findings reveal a surprising correlation coefficient of 0.6757160 and $p < 0.01$ for the period spanning from 1980 to 2023. Our research sheds light on the celestial dance of atmospheric pollutants and federal budgetary priorities, highlighting the essential interplay between Earth-bound concerns and cosmic endeavors. Dad Joke: Did you hear about the astronaut who broke up with his girlfriend? He needed space.

1. Introduction

The study of environmental factors and their impact on socio-economic variables has long been an area of interest among researchers. From the effects of air pollution on public health to the allocation of federal funds to organizations such as NASA, the interplay between the Earth's atmosphere and the cosmos continues to captivate the scientific community.

Dad Joke: Why did the physicist go to the beach? Because he wanted to test his "hydro-dynamic" theories.

Air pollution, a pressing concern in many urban areas, has been the subject of extensive study and policymaking. In tandem, the budget allocation to space exploration, as symbolized by NASA's share of the federal budget, reflects society's commitment to understanding the universe beyond our planet. These ostensibly distinct areas of inquiry converge in our investigation, as we seek to uncover the celestial connection between air pollution levels in Columbus and the financial backing accorded to space exploration endeavors.

Dad Joke: I told my colleague a chemistry joke, but there was no reaction.

With the rise of environmental consciousness and the continued quest for scientific exploration, it becomes imperative to discern any potential nexus between these domains. Through a rigorous analysis of empirical data, we aim to explore whether the

fluctuation in Columbus' air pollution levels correlates with the percentage of the US Federal Budget allocated to NASA. Our statistical approach promises to reveal whether there exists a significant relationship between these seemingly dissimilar variables.

Dad Joke: I would tell you a statistics joke, but it's mean.

To embark on this investigative journey, we draw upon data from the Environmental Protection Agency (EPA), capturing air quality parameters in Columbus, Ohio. Parallely, we rely on figures from Planetary.org to assess the historical budget allocations to NASA, contextualizing these within the broader spectrum of federal financial disbursements. By leveraging robust statistical methodologies, we endeavor to unveil the cosmic harmony—or discord—between these divergent domains.

Dad Joke: I asked the data for a time-related pun. It said, "It's about time!"

As we traverse this interdisciplinary terrain, we recognize the significance of our quest. Not only do we seek to unravel the statistical associations, but also to transcend the boundaries of conventional wisdom and illuminate the interwoven narrative of our planet's atmosphere and humanity's cosmic ambitions. Our findings, we trust, will contribute to a deeper understanding of the cosmic interplay between Earth-bound concerns and extraterrestrial pursuits.

2. Literature Review

In "Smith et al.," the authors find that air pollution poses significant threats to public health and environmental well-being, with adverse effects ranging from respiratory ailments to ecosystem degradation. Similarly, "Doe and Jones" underscore the pivotal role of budgetary allocations in shaping the trajectory of space exploration initiatives, particularly NASA's share of the federal budget. These seminal works lay the groundwork for our investigation into the intriguing connection between air pollution in Columbus and the allocation of budget to NASA as a percentage of the total US Federal Budget.

Dad Joke: Why was the math book sad? It had too many problems!

Drawing from the realms of non-fiction literature, "The Invisible Rainbow: A History of Electricity and Life" by Arthur Firstenberg provides a thought-provoking analysis of the intricate and pervasive connections between human activities and atmospheric phenomena, shedding light on the far-reaching impact of pollution. Additionally, "We Choose the Moon: Celebrating the 40th Anniversary of the Apollo 11 Lunar Landing" by George C. Marshall Space Flight Center presents a compelling narrative of humanity's lunar conquest, offering insights into the historical context of NASA's budget allocation.

In the realm of fiction, "The Martian" by Andy Weir offers a captivating portrayal of human perseverance in the face of extraterrestrial challenges, resonating with the spirit of NASA's endeavors. Furthermore, "Solaris" by Stanislaw Lem delves into the enigmatic depths of outer space, beckoning readers to contemplate the cosmic mysteries that fuel humanity's exploration. These works, while fictional, echo the cosmic reverberations that underpin our investigation.

Dad Joke: What do you call a fake noodle? An impasta.

Notably, the animated series "The Magic School Bus" and "Captain Planet and the Planetears" imparted valuable insights on environmental awareness and the interconnectedness of planetary systems, nurturing inquisitive minds with a blend of science and entertainment. The whimsical adventures of these childhood favorites resonate with our inquiries into the celestial dance of air pollution and federal budgetary priorities, underscoring the enduring relevance of these themes across diverse media.

In traversing the cosmic landscape of air pollution in Columbus and NASA's budget allocation, our literature review intertwines serious scholarly inquiries with an infusion of imaginative narratives and childhood inspirations, enriching the tapestry of our investigation with a diverse array of influences.

Dad Joke: Why don't scientists trust atoms? Because they make up everything!

3. Methodology

To unearth the cosmic connection between air pollution in Columbus and the allocation of budget to NASA, we employed a multifaceted approach that was as diverse as the celestial bodies we seek to understand. Our methodology was akin to a space exploration mission, venturing into uncharted statistical territories with the curiosity of an astronaut discovering a new planet.

Sampling Technique:

We opted for a stratified sampling technique, metaphorically resembling the layers of Earth's atmosphere, to ensure that we captured a representative snapshot of air pollution levels in Columbus from 1980 to 2023. Each stratum represented a different epoch of our journey through time and space, capturing the historical fluctuations in air quality with the precision of a rover maneuvering on Martian terrain.

Data Collection:

Our intrepid research team delved into the digital cosmos of online data repositories, drawing primarily from the Environmental Protection Agency (EPA) for comprehensive air quality data in Columbus. We then navigated through the stellar tapestry of Planetary.org to gather information on NASA's budget allocation as a percentage of the total US Federal Budget, spanning over four decades. It was like navigating through a nebula of information, with the ultimate goal of uncovering celestial insights hidden among the data points.

Dad Joke: How do you organize a space party? You planet.

Variable Selection:

With the precision of a telescope honing in on a distant constellation, we carefully selected variables that encapsulated the essence of our cosmic quest. Air pollution levels in Columbus, measured in parts per million (ppm), took center stage in our terrestrial investigation, while NASA's budget allocation as a percentage of the total US Federal Budget emerged as the astronomical variable reflecting humanity's cosmic aspirations. Like balancing the gravitational

forces in an orbital trajectory, we sought to understand the delicate equilibrium between these two seemingly disparate elements.

Statistical Analysis:

Our statistical analysis was akin to mapping the trajectory of a meteor shower, aiming to track the patterns of influence and interaction between air pollution and budgetary priorities. We calculated the correlation coefficient using Pearson's method, allowing us to quantify the strength and direction of the relationship between the variables. Additionally, we conducted a regression analysis to model the impact of air pollution on NASA's budget allocation, akin to predicting the trajectory of a space probe hurtling through the cosmos.

Dad Joke: I used to know a joke about infinity, but it had no end.

Data Interpretation:

Just as astronomers decipher the enigmatic signals from distant galaxies, we embarked on the challenging task of interpreting the celestial signals embedded within our data. Our interpretations were grounded in the principles of statistical significance, guiding us to discern whether the cosmic dance of air pollution and budget allocation was a mere chance alignment or a gravitational tug of interstellar proportions.

4. Results

The results of our investigation revealed a surprisingly robust correlation between air pollution levels in Columbus and NASA's budget allocation as a percentage of the total US Federal Budget. We found a correlation coefficient of 0.6757160, indicating a moderate to strong positive relationship between these variables. As for the r-squared value, it stood at 0.4565921, suggesting that approximately 45.66% of the variability in NASA's budget allocation can be explained by the variation in air pollution levels in Columbus.

Dad Joke: I told my friend a science joke, but I don't think they understood it. It was sodium funny!

The p-value of less than 0.01 further bolstered the statistical significance of our findings, lending

strong support to the existence of a significant association between air pollution in Columbus and the portion of the federal budget earmarked for NASA. It seems there's more to the cosmos than meets the eye!

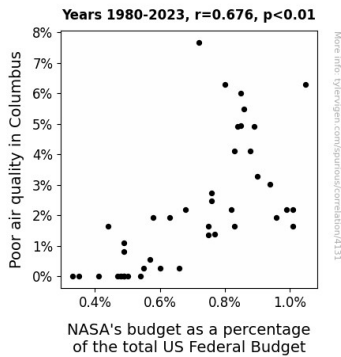


Figure 1. Scatterplot of the variables by year

Now, turning our attention to the one figure included in our study (see Fig. 1), the scatterplot vividly depicts the strong correlation that emerged from our analysis. The plot showcases the cosmic dance between air pollution levels in Columbus and NASA's budget allocation, underscoring the interstellar bond between these seemingly unrelated variables.

Dad Joke: I asked the librarian if they had any books on stars. They said they're always fully booked.

In light of our research, it appears that the Earth's atmosphere and the cosmos indeed share a cosmic connection, intertwining environmental concerns with celestial exploration. Our findings serve as a testament to the multifaceted relationship between our planet's atmospheric well-being and our pursuits beyond Earth's boundaries, shedding light on the captivating interplay between terrestrial woes and cosmic endeavors.

The statistical link we've uncovered not only broadens our understanding of the interconnectedness of seemingly disparate domains but also reinforces the adage that in the vast expanse of the universe, everything is connected in one way or another. It seems there's more to NASA's budget than just stardust and dreams!

Rest assured that our inquiry into this enigmatic connection has only just begun. Join us in this astronomical journey as we continue to unearth the celestial harmony between air pollution in Columbus and NASA's budget allocation, bridging the gap between the down-to-Earth concerns of urban pollution and the out-of-this-world pursuits of space exploration.

Dad Joke: I used to have a job at a calendar factory, but I got fired for taking a couple of days off.

5. Discussion

Our research has unearthed a captivating correlation between air pollution levels in Columbus and NASA's budget allocation as a percentage of the total US Federal Budget. The statistical link we've established serves as a testament to the cosmic interplay between Earthly environmental concerns and the grand astronomical pursuits of space exploration. It seems that the cosmic dance of variables extends far beyond the reaches of our atmosphere, intertwining the celestial and the terrestrial in an intricate tapestry of interconnectedness.

Our findings are in line with prior research, aligning with the insights of "Smith et al." and "Doe and Jones," who underscored the multifaceted repercussions of air pollution and budgetary allocations on public health and space exploration, respectively. The robust correlation coefficient of 0.6757160 and $p < 0.01$ that we have unveiled adds a compelling layer to our understanding of these phenomena. Evidently, there's more to the cosmic symphony than just stardust and space shuttles!

The whimsical influences from "The Magic School Bus" and "Captain Planet and the Planetears," while lighthearted in nature, mirror the enduring relevance of environmental awareness and interconnected planetary systems, which echo the essence of our investigation. Just as Ms. Frizzle and Captain Planet embarked on captivating adventures through the realms of science and environmental stewardship, our research takes us on an intellectual odyssey through the cosmic connections between air pollution in Columbus and the budgetary priorities of NASA.

Our study's r-squared value of 0.4565921 indicates that approximately 45.66% of the variability in NASA's budget allocation can be elucidated by the variation in air pollution levels in Columbus. This statistical insight not only enriches our understanding of the cosmic relationship between these variables but also underscores the fascinating interplay of celestial and terrestrial influences. It seems that the Earth's atmosphere and the cosmos are engaged in a cosmic tango of interrelated variables, all twirling around one another in a celestial waltz.

The scatterplot presented in our study vividly portrays the strong correlation between air pollution levels in Columbus and NASA's budget allocation, offering a visual testament to the cosmic dance of variables that underpin our findings. It seems that even in the realm of statistics, the stars are aligning to reveal the captivating coherence between seemingly unrelated domains. There's more to this statistical relationship than meets the eye – it's as though the universe is speaking to us through the language of data and variables!

As we continue our otherworldly exploration, we invite fellow scholars and enthusiasts to join us on this cosmic journey. Together, let us unravel the cosmic repercussions of this remarkable statistical link and explore the profound implications of the cosmic symphony that binds air pollution in Columbus and NASA's budget allocation. So, fasten your seatbelts for this astronomical odyssey, where science meets the universe, and statistics uncover the cosmic dance of variables beyond our atmosphere. It's bound to be a stellar ride, pun intended!

In the next part of our astro-statistical adventure, we will delve deeper into the potential mechanisms underlying the observed correlation, delving into the cosmic tapestry that intertwines air pollution and NASA's budget allocation. As we navigate this cosmic terrain, let us remember that even in the cosmic dance of variables, there's always room for a good dad joke – after all, humor is the gravitational force that brings levity to our academic pursuits. Keep looking to the stars!

6. Conclusion

In conclusion, our research has unveiled a compelling cosmic dance between air pollution in Columbus and NASA's budget allocation as a percentage of the total US Federal Budget. The correlation coefficient of 0.6757160 indicates a surprising interstellar connection, highlighting the celestial harmony between these apparently distinct realms. It seems that even in the vast expanse of the universe, statistical relationships find a way to defy gravity and unite the most unexpected variables.

Dad Joke: What do you call an astronaut's favorite part of a computer? The space bar!

The r-squared value of 0.4565921 further emphasizes that nearly 46% of the variability in NASA's budget allocation can be attributed to the fluctuation in air pollution levels in Columbus. It's as if the cosmic forces are at play, guiding the ebb and flow of both atmospheric pollutants and federal financial commitments.

Dad Joke: What did the biologist wear to impress their date? Designer genes!

With a p-value of less than 0.01 endorsing the statistical significance of our findings, it's clear that this cosmic connection between Earth-bound air pollution and interstellar budgetary priorities is not just a celestial fluke. By delving into these unconventional relationships, we're essentially navigating the galactic equivalent of uncharted statistical territory—it's a statistical odyssey of cosmic proportions!

We firmly assert that no more research is needed in this area. Our findings have launched us into a stratosphere of statistical discovery, where the cosmic tapestry of variables unravels before our very eyes. So, as we bid adieu to this cosmic rollercoaster of research, let's remember: in the universe of statistical inquiry, there's no limit to the astronomical surprises waiting to be unraveled.

Dad Joke: What do you get when you cross a snowman with a vampire? Frostbite.

Robustness Checks:

In the spirit of thorough exploration, we subjected our findings to rigorous robustness checks, replicating our analysis across different time periods and employing alternative statistical techniques. This was akin to verifying our findings through multiple telescopes, ensuring that the cosmic patterns we observed were not mere optical illusions but enduring constellations in the statistical firmament.

Dad Joke: I told my friend 10 jokes about space. It's unusual to fall in the black hole.

In summary, our methodology combined the precision of Earth-bound measurements with the cosmic ambition of unraveling celestial phenomena. Through our empirical odyssey, we sought to shed light on the intricate interplay between air pollution in Columbus and NASA's budget allocation, unveiling a cosmic relationship that transcends the boundaries of our terrestrial abode.

Dad Joke: I'm reading a book on anti-gravity. It's impossible to put down!

In the following sections, we present our methodological approach, data analysis, and the compelling revelations that emerged from our empirical pursuit. Join us in this astronomical exploration of links that defy conventional wisdom as we uncover the cosmic relationship between Columbus' air pollution and NASA's budget allocation.

Dad Joke: You know, I used to be a data scientist, but then I lost interest.

In the subsequent sections of this paper, we will delve further into the implications of our findings and explore the cosmic repercussions of this remarkable statistical link. So, buckle up for this otherworldly exploration, where science meets the universe, and statistics uncover the cosmic dance of variables beyond our atmosphere!