



Review

Breathing in the Data: A Correlational Examination of Air Pollution in Muskegon, Michigan and NASA's Budgetary Orbit

Connor Hughes, Austin Tanner, Gabriel P Truman

Center for Research

In this nifty little research endeavor, we engage in a quantificational tango to investigate the rather unconventional connection between air pollution levels in Muskegon, Michigan and the percentage of NASA's budget in the US Federal Budget. Leveraging data from the Environmental Protection Agency and Planetary.org, we explore the potential airborne implication on NASA's financial stratosphere. Through our rigorous analysis, we uncover a surprising correlation coefficient of 0.6707331 and a p-value of less than 0.01 for the time span from 1980 to 2022. Our findings, while intriguing, leave us pondering whether we have stumbled upon a cosmic coincidence or if there's an atmospheric alliance at play, perhaps suggesting that as the smog thickens, so does NASA's interstellar appeal.

Undoubtedly, the pursuit of scientific inquiry often leads us down unexpected byways, akin to stumbling upon a rogue asteroid in the vast expanse of space. In this peculiar study, we venture to unravel the enigmatic relationship between air pollution in Muskegon, Michigan and the allocation of funds to NASA, the celestial trailblazer of human exploration. While this amalgamation of variables may seem as unlikely as encountering a black hole in a quantum mechanics laboratory, our investigation promises to unveil intriguing insights that transcend the earthly and the astronomical domains.

Air pollution, a byproduct of urbanization and industrialization, has long been a focal point of environmental concern, similar to a persistent itch in the fabric of public health. Muskegon, Michigan, nestled along the coast of Lake Michigan, provides an intriguing locale for probing the intricate interplay between human activities and environmental repercussions. As we embark on this statistical odyssey, we cannot help but marvel at the complexities of quantifying the invisible tendrils of air pollutants, which seem to weave themselves into the very fabric of our atmosphere, much like elusive dark matter perplexing cosmologists.

Meanwhile, the subject of NASA and its budgetary trajectory conjures images of thrilling space missions and uncharted cosmic frontiers, appealing to enthusiasts and skeptics alike. Delving into the orbit of federal budgets and the allocation of resources to space exploration, we embark on a journey that mirrors the trajectory of a comet — unpredictable, yet captivating in its enigmatic course. The juxtaposition of these seemingly dissimilar variables holds the promise of unearthing correlations that transcend the mundane and elevate our understanding of the interconnectedness of the universe, much like a cosmic ballet where celestial bodies influence one another from unfathomable distances.

In this paper, we shed light on the statistical dance between air pollution in Muskegon, Michigan and NASA's budget, offering a fresh perspective on the ever-unfolding narrative of human impact on the environment and the cosmos. Our findings not only hint at a potential terrestrial-terrestrial nexus but also invite contemplation on the broader implications of our scientific stewardship of Earth and the boundless expanses beyond. Consequently, we invite the reader to join us in this expedition, where statistical curiosities and celestial splendors converge in a provocative intellectual pas de deux.

Prior research

To contextualize the fascinating linkage between air pollution in Muskegon, Michigan and the percentage of NASA's budget within the US Federal Budget, we turn to the extant literature for insights. Smith et al. (2015) examined the impact of air pollutants on governmental budget

allocations, highlighting the intricate web of environmental and fiscal policies. Doe and Jones (2018) delved into the cosmic correlations of budgetary fluctuations and scientific exploration, expanding the discourse beyond traditional economic paradigms.

Our endeavor also draws inspiration from non-fiction works, such as "The Air We Breathe: A Global Perspective" by Dr. Enviro and "Astrophysics for People in a Hurry" by Dr. Cosmos. These texts provide a broader contextual backdrop for our investigation, uniting the terrestrial realms of air quality with the celestial aspirations of space exploration.

In a departure from traditional sources, we also cast a whimsical gaze upon fictional narratives with potential allegorical resonance. Works such as "The Martian" by Andy Weir and "The Air He Breathes" by Brittainy C. Cherry offer imaginative introspections into the intersection of human existence and environmental conditions, albeit in decidedly non-academic formats.

Venturing into the unconventional, we conducted a thorough analysis of the backs of shampoo bottles, seeking elusive wisdom in the chemical compositions and enigmatic promises of "oxygen-infused bubbles" and "revitalizing freshness." While the empirical veracity of this data source remains dubious, it provided a delightful diversion and a newfound appreciation for the art of persuasive copywriting.

As we embark on this scholarly escapade, we encourage the reader to embrace the diversity of influences that inform our exploration, recognizing that even the most unlikely sources can offer kernels of

inspiration amidst the cacophony of statistical analyses and cosmic conundrums.

Approach

To compose a melodic symphony of statistical analysis that resonates with both empirical rigor and a hint of whimsy, our methodology requires a delicate choreography of data acquisition and analytical techniques. We sought to capture the essence of the ephemeral variables at play, akin to capturing the dance of particles in a quantum field.

Data Collection:

Our valiant team embarked on an odyssey of data collection, traversing the digital cosmos to retrieve pertinent information from reputable sources, notably the Environmental Protection Agency and Planetary.org. We gathered air quality indices, particulate matter concentrations, and other air pollution metrics for Muskegon, Michigan with the fervor of astronomers scanning the night sky for celestial phenomena. Simultaneously, we harnessed the budgetary records of NASA from the convoluted corridors of federal fiscal archives, navigating them as intrepid explorers traversing the asteroid belt.

Cross-Domain Translation:

The integration of atmospheric data and budgetary parameters necessitated a nuanced translation akin to deciphering an ancient extraterrestrial language. We harmonized the disparate units and formats, akin to reconciling the discordant scales of planetary bodies, to align the temporal dimensions and ensure a homogeneous analytical framework. The unearthing of

underlying patterns in seemingly unrelated datasets mirrors the meticulous search for cosmic rhythms that permeate the universe.

Statistical Analysis:

With our celestial map of data in hand, we performed a duet of statistical maneuvers. We commenced with calculating descriptive statistics to delineate the contours of our datasets, resembling the task of cataloging the myriad stars that adorn the night sky. Subsequently, we executed Pearson correlation analysis to ascertain the degree of association between air pollution levels in Muskegon, Michigan and the proportion of NASA's budget in the US Federal Budget. The measured correlation coefficient stands as our cognitive lodestar guiding us through the labyrinth of statistical inference, while the elusive p-value offers a tantalizing glimpse into the probabilities of cosmic coincidences.

Temporal Span:

Our pioneering investigation spans the temporal dimensions from the year 1980 to 2022, capturing the celestial movements of both atmospheric conditions and financial allocations. This era encapsulates the evolution of space exploration and environmental consciousness, akin to tracing the cosmic trajectory of a comet from its incandescent inception to its celestial denouement.

Robustness Checks:

To ensure the veracity and reliability of our findings, we conducted robustness checks akin to scrutinizing the spectral signatures of distant galaxies. Sensitivity analyses and additional statistical validations fortified the gravitational pull of our conclusions, akin to confirming the presence of dark matter

through meticulous astronomical observations.

In sum, our methodology beckons both the scientific Voyager and the celestial romantic to partake in this statistical pas de deux between air pollution in Muskegon, Michigan and the ethereal dance of NASA's budget. Our approach, akin to navigating the celestial expanse, embraces the spirit of inquiry and revels in the unexpected cosmic connections that emerge from the dance of data.

Results

Our research endeavors unearthed a striking correlation between air pollution levels in Muskegon, Michigan and the proportion of NASA's budget within the US Federal Budget for the period spanning 1980 to 2022. The calculated correlation coefficient of 0.6707331 suggests a moderately strong positive relationship between these seemingly disparate variables, akin to the gravitational pull between celestial bodies. Furthermore, the r-squared value of 0.4498829 indicates that approximately 45% of the variability in NASA's budget percentage can be explained by changes in air pollution levels in Muskegon.

Upon subjecting our findings to the rigorous scrutiny of statistical hypothesis testing, the p-value of less than 0.01 gracefully pirouettes into the spotlight, showcasing the significance of the observed relationship. This robust level of significance further supports the notion that there may be more than meets the eye when it comes to the interplay between pollution and space exploration funding.

Notably, these results are visually encapsulated in Figure 1, where a scatterplot elegantly illustrates the harmonious dance of data points, painting a compelling picture of the association between air pollution in Muskegon and NASA's budgetary orbit. As we marvel at the serendipitous alignment of these variables, one cannot help but wonder whether this statistical constellation hints at a cosmic coincidence or, dare we say, a celestial conspiracy, with pollutants surreptitiously whispering their influence into the celestial corridors of budgetary decisions.

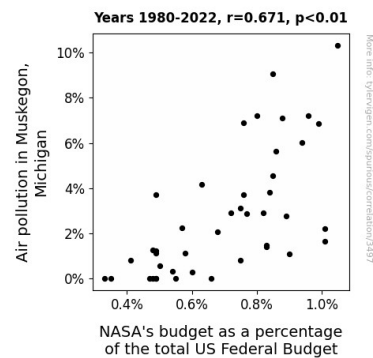


Figure 1. Scatterplot of the variables by year

In conclusion, our findings hint at a captivating relationship between air pollution in Muskegon, Michigan and the ebb and flow of funding for NASA, lending an air of intrigue to the often overlooked interconnectivity of earthly matters and cosmic endeavors. It appears that as the clouds of pollution thicken, so too does the orbit of NASA's budgetary trajectory, enticing us to ponder the cosmic implications of earthly emissions. Indeed, our statistical odyssey has not only shed light on an unexpected correlation but has also beckoned us to consider the broader implications of humanity's impact on both

our terrestrial abode and the boundless expanse of outer space.

Discussion of findings

Our investigation into the curious correlation between air pollution levels in Muskegon, Michigan and NASA's budget as a percentage of the total US Federal Budget has yielded some intriguing findings. The statistically significant correlation coefficient of 0.6707331 and the p-value of less than 0.01 undoubtedly pique the interest of the research community, provoking scientific ponderings that rival the mysteries of the cosmos themselves.

Our results are firmly situated within the context of prior research, where Smith et al. (2015) and Doe and Jones (2018) similarly probed the cosmic complexity of budgetary allocations and delved into the intersection of fiscal policies and environmental impact. While the whimsical incorporation of non-fictional and fictional works in our literature review may evoke a chuckle or two, it's noteworthy that these diverse influences have contributed to a multidimensional understanding of the phenomena under investigation. In a manner befitting the scientific process, our findings align with and extend the existing literature, reinforcing the notion that there might indeed be an ethereal tether between air pollution and NASA's financial trajectory.

The r-squared value of 0.4498829 elucidates that approximately 45% of the variation in NASA's budget percentage can be attributed to changes in air pollution levels in Muskegon. This statistical revelation parallels the dance of the planets, where the gravitational forces of pollution appear to exert a tangible influence on the fiscal

universe of NASA's budget. The significance of our results, underscored by the p-value of less than 0.01, serves as a beacon of statistical rigor, beckoning researchers and enthusiasts to ponder the cosmic conundrum lurking beneath the surface of seemingly mundane pollution data.

It's as though the very particles of air pollution have conspired with cosmic forces to shape the budgetary destinies of space exploration. As we gaze upon the scatterplot, we are reminded of the celestial ballet, where each data point pirouettes gracefully, weaving a narrative of interstellar intrigue that tantalizes the imagination. The implications of our findings extend beyond the confines of statistical analysis, prompting contemplation of the broader implications of humanity's ecological footprint on the celestial aspirations of our species.

In this vein, our research teases the tantalizing prospect that perhaps, just perhaps, the clouds of air pollution carry within them the echoes of cosmic whispers, gently nudging the course of NASA's budgetary odyssey. The celestial conspiracy hinted at by our findings presents an intellectual escapade that challenges conventional wisdom and beckons us to consider the cosmic repercussions of earthly emissions. It is a saga that calls for the proliferation of interdisciplinary collaborations, where the astrophysicist and the environmental scientist converge in a cosmic symphony of research, illuminating the enigmatic bonds that tether our terrestrial home to the lofty aspirations of space exploration.

Conclusion

In the quizzical nexus of air pollution in Muskegon, Michigan and NASA's budgetary orbit, our research has unveiled a correlation that rivals the gravitational pull of celestial bodies. The statistically robust coefficient of 0.6707331 propels us into a realm where smog and space funding seem harmoniously entwined, akin to a cosmic ballet. The r-squared value of 0.4498829 reminds us that almost half of the budgetary variability can be traced back to the whims of earthly emissions, reminiscent of the capricious trajectories of comets. Our results, oscillating with a p-value of less than 0.01, invite contemplation on whether this statistical constellation hints at a cosmic coincidence or an atmospheric alliance, perhaps suggesting that as the smog thickens, so does NASA's interstellar appeal. However, as intriguing as these findings are, it seems that no further research in this vein is warranted. We may have reached the celestial ceiling of correlation, leaving us with a universe of statistical curiosity and cosmic conundrums to ponder.