# Bond Case Briefs

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## The Effect of Environmental Regulations on Municipal Bonds.

Air pollution regulations in the United States are intended to protect public health, but a new study has found that they also carry an unexpected cost: higher interest rates on the bonds used by counties to fund schools, hospitals, and infrastructure. When a county falls out of compliance with the ozone standards set by the U.S. Environmental Protection Agency (EPA), borrowing becomes costly. As a result, the municipality faces higher costs to fund public infrastructure like schools, hospitals, and roads.

The study, published in Management Science, was conducted by Akshaya Jha, assistant professor of economics and public policy at Carnegie Mellon's Heinz College of Information Systems and Public Policy. Nicholas Z. Muller of Carnegie Mellon's Tepper School of Business and Stephen A. Karolyi of George Mason University's Costello College of Business coauthored the study; Karolyi previously taught at Carnegie Mellon.

"In our work, we present two findings on how uncertainty in environmental policy affects municipal bond returns," explains Jha. "We found evidence that ties these short-run municipal bond market reactions to long-term changes in pollution and housing prices. Our findings suggest that increases in either regulatory stringency or uncertainty over future environmental policy boost the cost of municipal debt raised to fund schools, hospitals, and critical infrastructure."

Counties that are noncompliant with the Clean Air Act, which sets thresholds for pollutants like ozone, face repercussions. Past research has found that federal standards produce considerable health benefits relative to the costs of complying. But for municipal bonds investors, this raises two concerns: a higher risk of default as a result of strained county finances and uncertainty over how regulations will change.

In their study, researchers considered announcements related to when the EPA proposes and finalizes new standards for ozone and when the agency releases its annual list of counties that are in or out of attainment. These announcements produce information shocks, which provide an opportunity to track how bond markets update their expectations.

In this study, researchers analyzed more than 140 million trades between 2005 and 2019, measuring changes in municipal bond yields around these types of announcements. Among their findings:

- When new standards were proposed, yields increased 1% to 4%, reflecting a rise in investor-perceived uncertainty.
- Once the EPA announced the final standard, the estimated yields declined approximately 0.5% to 1.3% as a result of a corresponding decrease in uncertainty.
- Based on an analysis of the EPA's annual compliance announcements, counties that slipped into nonattainment saw yields rise nearly 1% more than counties that maintained their status or newly achieved attainment.The study has significant implications for policymakers, local officials, and investors, say the authors. For policymakers and local officials, the findings highlight the

repercussions of environmental regulations for public finance. For investors, the results suggest that traditionally safe assets like municipal bonds are sensitive to risks associated with environmental policy.

The authors plan to continue their work, focusing on areas in which environmental rules affect local finance, such as commercial real estate.

“By examining how financial markets respond to environmental regulation, we hope to shed light on the hidden economic tradeoffs and potential unintended consequences of well-intentioned policies,” says Nicholas Z. Muller, Lester and Judith Lave Professor of Economics, Engineering, and Public Policy at Carnegie Mellon’s Tepper School of Business. “While past studies have shown that more stringent air quality standards have generated billions of dollars in public health improvements, our work shows that these benefits occur partly as a result of investors anticipating the effects of standards and the costs of noncompliance.”

**by Carnegie Mellon University’s Heinz College**

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