

Environmental policy, pollution and economic growth

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As the global population continues to urbanize in pursuit of a higher quality of life, the need to investigate the trade-off between the economic benefits and environmental costs of urbanization has never been greater. More than half of the world's population currently lives in urban areas, and the United Nations projects another 2.5 billion people will move to cities by 2050. While firms cluster in cities to recruit talent and realize higher productivity gains, how pollution scales with population growth remains unknown. This scaling relationship is crucial for policymaking: do environmental regulations that reduce the pollution emissions from urbanization also decrease the economic benefits from this urbanization?

A new study suggests that air pollution policy reduces the extent to which [population growth](#) in metropolitan areas results in increased pollution emissions without disrupting the economic growth from this [urbanization](#). The study, led by researchers at Carnegie Mellon University, appears in the multidisciplinary journal *PLOS ONE*.

"We find that the relationship between urbanization ([population](#)) and economic output (GDP) is not affected by environmental policy," said Nicholas Muller of the Tepper School of Business. "This has profound implications for the current policy debate that frames environmental goals and economic goals as at odds with each other."

Muller and his co-author, Akshaya Jha from the Heinz College of Information Systems and Public Policy, used annual data provided by the

Environmental Protection Agency (EPA) to determine whether a county within the United States was compliant with the National Ambient Air Quality Standards (NAAQS)—air pollution standards established by the Clean Air Act Amendment of 1990. These standards are set at the national level, and a county is deemed to be "out of attainment" if monitored pollution levels within the area are above the standard. The NAAQS are calibrated annually according to average or maximum pollution targets. Using this information as well as annual, county-level data on economic indicators, pollution levels, and population, the authors assessed the economic and environmental impacts of pollution regulation.

"When a county is found to be non-compliant with NAAQS, it is subject to stricter regulation than compliant counties," said Jha. "By comparing the outcomes of compliant and non-compliant counties, we can determine how the stringency of environmental regulation affects both economic output and environmental damages."

The authors found that stricter NAAQS criteria imposed on non-compliant counties reduced pollution damages (health impacts expressed in monetary terms) but did not slow the rate of economic growth relative to compliant counties. Furthermore, pollution did not scale linearly with population- pollution per person decreases as population grows. The findings suggest that environmental policy can dramatically reduce the adverse pollution consequences of urbanization without hindering production, innovation, and growth.

"Well-designed, actively enforced environmental policy and [economic growth](#) are not mutually exclusive," said Muller. "We find evidence that environmental [policy](#) significantly reduces the per-capita [pollution](#) emissions in American cities without adversely affecting GDP per capita."

More information: *PLOS ONE* (2017). [journals.plos.org/plosone/arti...journal.pone.0181407](https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0181407)

Provided by Carnegie Mellon University

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