

Urban rail reduces carbon monoxide air pollution

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The opening of a major urban rail system in Taiwan caused a meaningful reduction in air pollution, according to a forthcoming study by two professors at the University of California, Merced.

"Despite the importance of the [transportation sector](#) for [air](#) pollution, little work has examined the air pollution effects of [transportation infrastructure](#) directly," professors Alexander Whalley and Yihsu Chen wrote in the paper. "This paper seeks to fill the gap by examining the effects of one major type of transportation infrastructure — urban rail transit — on [air quality](#)."

Researchers have disagreed about whether investment in urban rail infrastructure would improve air quality by taking cars off the road or harm it by encouraging more travel. The UC Merced study, "Green Infrastructure: The Effects of Urban Rail Transit on Air Quality," helps to answer that question. It has been accepted for publication in the *American Economic Journal: Economic Policy*.

Whalley is an economist in the School of Social Sciences, Humanities and Arts (SSHA). Chen is an environmental and energy economics professor with a dual appointment in SSHA and in the School of Engineering. The research is an example of UC Merced faculty members taking an interdisciplinary approach to creating new knowledge.

The Taipei Metro opened in 1996 as a new urban rail transit system, the

culmination of an effort to improve the city's transportation and air quality. From the 1970s to the 1990s, Taipei had some of the worst air among the world's largest cities, with a significant amount coming from automobiles.

Whalley and Chen used hourly air quality data from Taiwan to quantify how the new rail transit system impacted the air quality. There have been two schools of thought when it comes to the impact of rail transit infrastructure: Some argue that a large and well-run system decreases [air pollution](#) by encouraging people to take the train rather than a car, while others say investing in infrastructure increases people's likelihood for traveling, reducing any benefits.

The UC Merced researchers found that the system's opening caused a meaningful reduction of carbon monoxide, between 5 and 15 percent. They also found some evidence that there was a reduction in the nitrogen oxides in the air. The public health impacts implied in the findings are an important beneficial aspect of mass transit [infrastructure](#) often not taken into account by policy makers, according to the study.

The rail transit system, however, had little detectable impact on ground-level ozone, which is indirectly related to automobile emissions, but whose formation is not completely understood by scientists. Whalley and Chen also found little evidence suggesting that automobile travelers adjusted their time or route of because of the availability of rail transit.

Provided by University of California, Merced

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