



RESEARCH BRIEF

Another Argument for Carbon Tax: How Car Buyers Behave

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Do you rationalize splurging on your daily latte by bringing your lunch to work? Every day we make decisions like this that impact our diet and pocketbook. These same tradeoffs also affect the types of cars we drive, which impacts the effectiveness of fuel-efficiency policies.

In a recent study based on five years of data from the California Department of Motor Vehicles, James Archsmith and David Rapson of University of California, Davis, Ken Gillingham of Yale University and Christopher Knittel of MIT found that in two-car households, increasing the fuel economy of the first car encourages owners to demand less fuel economy in their second car. In other words, if you buy a Toyota Prius, you may be more likely to replace your second car with an SUV.

When households increase the fuel economy of their first car by 10 percent, they will reduce the fuel efficiency of the second vehicle by 5 percent, our analysis found. The result is that half the fuel economy gained from improving the first car is eaten away by a less fuel-efficient second car.

But that is only part of the story. It turns out that owners also ended up driving more total miles, which cuts fuel savings another 10 percentage points. In the end, 60 percent of the benefits of increasing the fuel economy of the first car disappear when the second car is replaced with a less efficient vehicle.

This study shows just how short-lived the impacts of incentives to buy fuel-efficient vehicles are after they expire. It also highlights the importance of consistency for these policies to be effective.

A good example is the 2008 “Cash for Clunkers” program in which the federal government gave \$4,500 to people who bought a vehicle that got higher gas mileage. Our results imply that while programs like this can lead households to increase the fuel economy of one car, they are likely to demand less fuel efficiency for the second vehicle than without the incentive.

To counter the impact of consumer behavior, programs need to continually encourage fuel economy. Instead of one-time incentives, we need policies such as fuel economy standards that get tighter over time, rather than ramping up and flattening. This is particularly relevant, as the Trump administration has paused increases in fuel economy standards.

More importantly, this study underscores the need for economy-wide measures, such as a carbon tax, that would provide a constant incentive for consumers

to purchase fuel-efficient vehicles, including electric models. Furthermore, a carbon tax would reduce miles driven.

The bottom line is that consumers make choices based on items they already own, but those decisions

are not always the most beneficial to society. As a result, we need to acknowledge and account for those choices, or we risk losing long-term benefits.

References

J. Archsmith, K. Gillingham, C. R. Knittel, and D. S. Rapson (2017). "Attribute Substitution in Household Vehicle Portfolios," MIT CEEPR Working Paper 2017-016.

About the Authors



James Archsmith is a Ph.D. candidate in Economics at the University of California, Davis specializing in industrial organization, energy/environmental economics, and applied econometrics.



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Christopher Knittel is the George P. Shultz Professor of Applied Economics in the Sloan School of Management at the Massachusetts Institute of Technology. He is also the Director of MIT's Center for Energy and Environmental Policy Research which has served as the hub for social science research on energy and the environment since the late 1970s. Professor Knittel also co-directs of The E2e Project, a research initiative between MIT and UC Berkeley to undertake rigorous evaluation of energy efficiency investments.



David Rapson joined the Economics Department at UC Davis in 2008. Rapson's research focuses on energy and environmental economics, industrial organization, and applied econometrics. His research includes several collaborative studies with regulated utilities and government agencies. These include the evaluation of dynamic pricing regimes, carbon offset programs, and the design and analysis of a large-scale randomized field experiment to test the role of information on price elasticity.

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