



From Tank to Odometer: Winners and Losers from a Gas-to-VMT Tax Shift

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As drivers shift to hybrid and electric vehicles, federal gas tax revenue is declining. In response, some have called for replacing the gas tax with a vehicle miles traveled (VMT) tax. Using machine learning techniques, we carry out an analysis of this tax shift at the census tract level. We find that this tax swap is modestly progressive. Our more granular geographic analysis also highlights that rural areas in the center of the country generally benefit from this tax swap, while urban and bicoastal areas generally experience higher taxation. Additionally, Republican-leaning districts gain compared to Democratic districts.

The design of transportation taxation has long been a critical issue in public finance, with policymakers seeking systems that are both efficient and equitable. In the United States, the federal gas tax—a longstanding mechanism for funding transportation infrastructure—has faced increasing scrutiny due to its declining revenues and concerns about fairness. This decline is largely driven by improvements in fuel efficiency and the accelerating adoption of electric vehicles (EVs), which do not contribute to gas tax revenues. As EV adoption grows, particularly in urban areas and coastal states, federal gas tax revenues are falling and are projected to continue falling. By law, revenues from this tax are earmarked for the Federal Highway Trust Fund, which finances a major portion of state and federal roadwork in the United States. This has led policymakers and analysts to explore options for replacing the gas tax. One option gaining traction is a vehicle miles traveled (VMT) tax, which charges drivers based on the distance they travel rather than the fuel they consume. Our research examines the winners and losers from transitioning the federal gas tax to a revenue-equivalent VMT tax, focusing on the distributional impacts across geography and political affiliation. The analysis is done at the census tract level.

For the highly disaggregated geographic analysis we undertake, we need to generate a prediction of household

travel at the census tract level. There are about 80,000 census tracts in the United States with an average of 4,000 households per tract. Unfortunately, a measure of vehicle miles traveled at the census tract level does not exist. Instead, we predict household level annual vehicle miles at the census tract level using data from the 2017 National Household Transportation Survey (NHTS 2017), a nationally representative household travel survey, that provides household-level data on annual vehicle miles traveled and other household demographic characteristics, such as income, age, race, education, and employment for about 7,000 households. The survey also includes information on the number of vehicles owned by the household, the type of vehicles, and the use of public transport to travel to work.

The 2017 NHTS only provides geographic information at the nine Census division levels. Using household-level variables common to the NHTS and to the American Community Survey (ACS 2022), we construct a best-fit model from the 2017 NHTS and use that model to predict average household vehicle miles traveled at the tract level in the 2022 ACS.

Given the large number of possible variables available to us to predict household-level vehicle miles traveled, we use machine learning techniques to identify a best-fit model to

apply to the ACS data.

Our first result is that the shift is modestly progressive in terms of income. The bars in Figure 1 report the average change from the tax swap and show that lower income groups (measured in deciles) on average gain from the tax swap while upper income groups in general pay more taxes. The whiskers report the range from the 25th to the 75th percentiles and demonstrate considerable heterogeneity within deciles while preserving the trend in negative burdens for lower-income households and positive burdens for higher-income households.

Our disaggregated analysis finds striking disparities emerge across geography, as seen in Figure 2. Rural areas and the center of the United States, which tend to experience lower average fuel efficiency, experience substantial benefits from a revenue-neutral VMT-Gas Tax swap. This effect is closely tied to the uneven geographic distribution of EV adoption: urban areas and coastal regions, where EV penetration is highest, are less reliant on the gas tax and benefit less from a shift to VMT-based taxation.

Additionally, Figure 3 shows Republican-leaning districts, which overlap significantly with rural areas, see marked advantages compared to Democratic districts. The results highlight the potential for a VMT tax to address longstanding

inequities in transportation funding while offering a politically salient narrative. By documenting the geographic and political implications of this policy shift, this study contributes to the broader debate on how to design equitable and effective transportation taxation systems in a rapidly evolving mobility landscape.

Our focus here has been on the distributional implications of a tax swap to address the ongoing erosion of the tax base of the motor vehicle fuel excise tax. We should emphasize that we have not made a case on theoretical grounds for efficiency improvements from such a tax swap. Whether we should think of the gas (or VMT) tax as a benefit tax or as an externality-correcting tax, there are a number of factors to take into consideration. A benefits perspective argues for a VMT tax on the grounds that those using roads should bear the cost of their upkeep (as financed through the Highway Trust Fund). But this begs the question of the appropriate sharing of costs between personal and commercial transportation, and especially long-haul trucking in the latter category. From an externalities perspective, considerations of local pollution, road wear, congestion, and accidents all come into play. Innovation and network failures that impede the penetration of electric vehicles are also a consideration. An ideal set of policies likely combines a VMT tax with a subsidy for EVs to address pollution, innovation, and network failures.

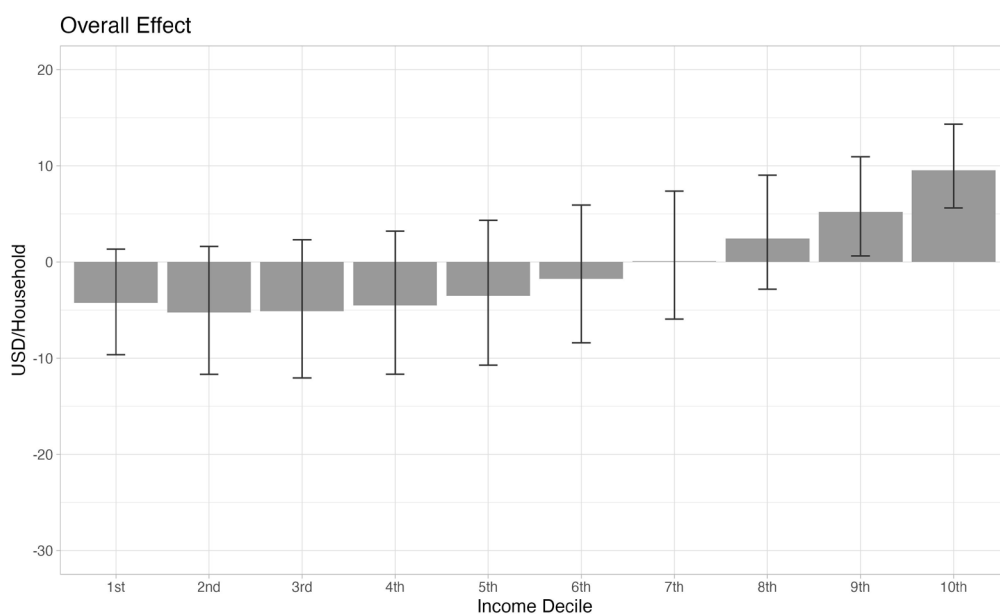


Figure 1: Change in Tax Payments by Income Decile



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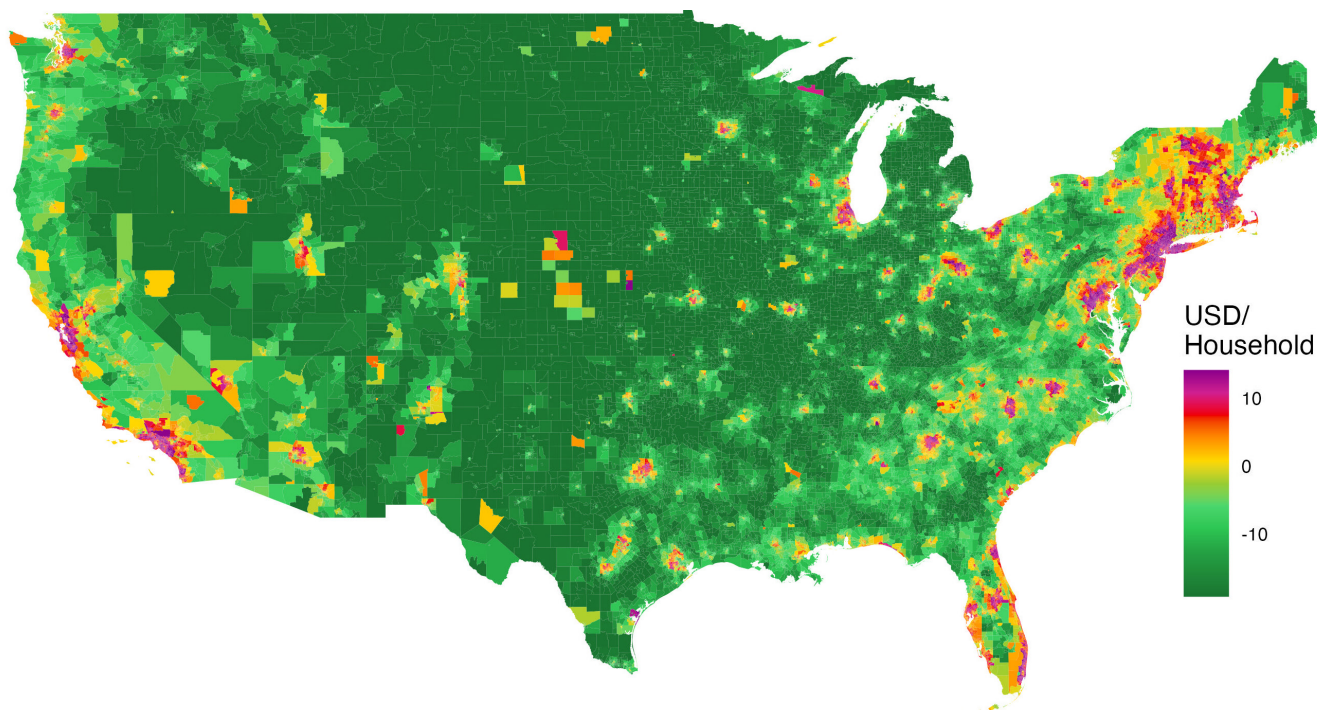


Figure 2: Changes in Tax Collections from Gas-VMT Swap.
Note: Census tract average data are winsorized at 95%.

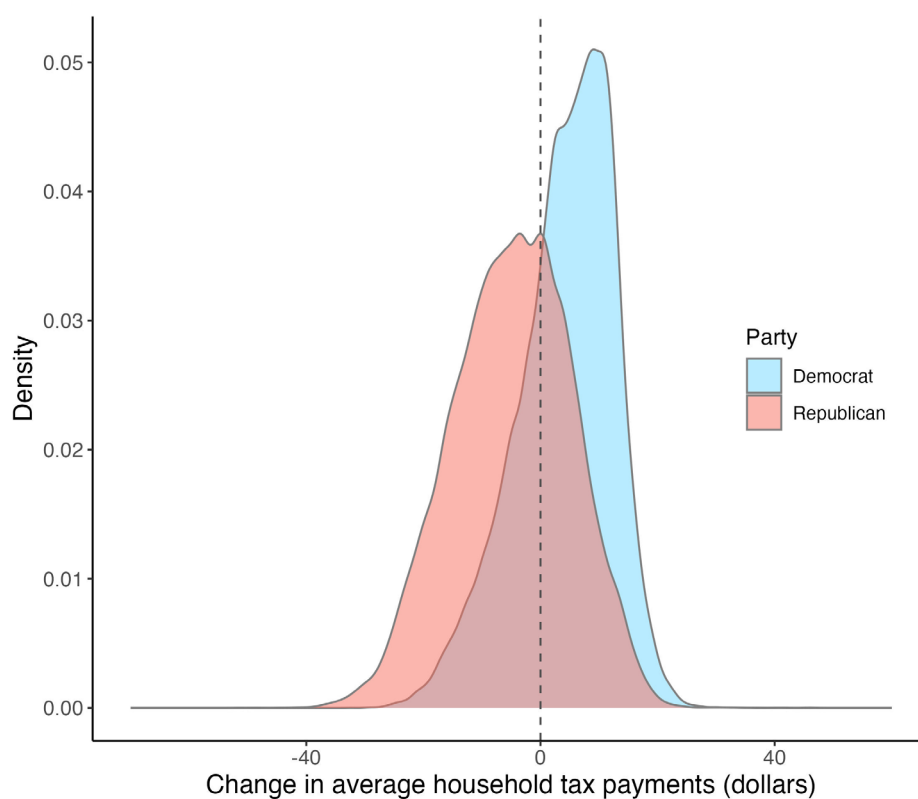


Figure 3: Change in Tax Collections from Gas-VMT Tax Swap by Political Party Affiliation.
Note: Party affiliation based on affiliation of the House Members in the 118th Congress.

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Link to the full working paper discussed in this brief:

Knittel, C.R., Metcalf, G., and Saraf, S. (2025), "From Tank to Odometer: Winners and Losers from a Gas-to-VMT Tax Shift," [MIT CEEPR Working Paper 2025-10](#), May 2025.

About the Authors



Christopher Knittel is the Associate Dean for Climate and Sustainability and the George P. Shultz Professor of Energy Economics in the Sloan School of Management at MIT. He directs the MIT Center for Energy and Environmental Policy Research and the MIT Climate Policy Center. Knittel's research studies consumer and firm decision-making and what this means for the benefits and costs of environmental and energy policy. His current work involves studying how the costs of climate change policy vary across households and firms and how this differs across policy choices. Knittel uses a variety of empirical methods for his research, including large-scale randomized control trials and machine learning techniques. Professor Knittel received his B.A. in economics and political science from the California State University, Stanislaus in 1994 (summa cum laude), an M.A. in economics from UC Davis in 1996, and a Ph.D. in economics from UC Berkeley in 1999.



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