



Household Income and Vehicle Fuel Economy in California

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MTI Project 1426

November 2015

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This white paper presents the

findings from an analysis of the fiscal

implications for vehicle owners of changing from the current statewide

fuel tax to a “road user charge” (RUC) based on vehicle-miles traveled (VMT). Since 1923, California’s motor vehicle fuel tax has provided revenue used to plan, construct, and maintain the state’s publicly funded transportation systems. Over time, improvements in vehicle fuel efficiency and the effects of inflation have reduced both the revenue from the fuel tax and its purchasing power. Thus, there is growing interest among policy makers for replacing the state’s per-gallon fuel tax with an RUC based on VMT.

While an RUC would not address inflation, replacing the fuel tax would prevent further erosion of the tax base by tying revenues to roadway use rather than fuel use. This study identifies the potential effects this policy change would be likely to have on households across the state. The primary goals of the research were to 1) calculate average daily VMT and fuel consumption for California households by income group and area type (urban versus rural), and 2) identify any correlations between income and area types, VMT, and fuel consumption.

Study Methods

The findings presented in this paper were developed primarily from an analysis of the 2010–2011 California Household Travel Survey (CHTS). The mileage driven by each vehicle in a surveyed household was summed to estimate the total VMT. The VMT was used to estimate the potential tax revenues generated under an RUC based on current driving habits.

To estimate the current cost of the fuel tax by household, researchers used the CHTS database to identify the vehicles (year, make, model, and number of cylinders) of each surveyed household. Mileage ratings of these vehicles were obtained from the Environmental Protection Agency’s (EPA) National Vehicle and Fuel Emissions (NVFE) dataset. The VMT for each vehicle was divided by its MPG to estimate the total number of gallons burned. This figure was multiplied by the fuel tax rate of 42.4 cents per gallon to arrive at the estimated tax currently paid by the household. The daily VMT and fuel consumption for all vehicles in each surveyed household were then totaled to create the dataset for the final analysis. Analysis was performed using descriptive and correlation statistical techniques.

Findings

The following are the main results of this study:

- Daily household fuel consumption and vehicle-miles traveled (VMT) both appear to increase with household income.
- Urban and rural households consume roughly the same amount of fuel and drive roughly the same number of miles (VMT).

Over time, improvements in vehicle fuel efficiency

- Although the analysis found the estimated costs of either program would be slightly different for different income groups and for rural versus urban households, it found no statistically significant difference in cost between the two programs in any income group.
- These results are based on sample data and are therefore subject to sampling errors in the data. Fuel efficiency for vehicles of the same make, model, model year, and engine type will differ due to a number of variables, including maintenance, driving cycles, vehicle loads, and fuel type (e.g., regular versus premium).

Estimated Average Household Daily Fuel and Road User Charge Tax Costs

Income	Cost (Cents/Day)			
	Fuel Tax		Road User Charge	
	Mean	Std Err	Mean	Std Err
\$0 - \$24,999	40	1	37	2
\$25,000 - \$34,999	42	2	43	2
\$35,000 - \$49,999	51	2	52	2
\$50,000 - \$99,999	64	1	65	1
\$100,000 and over	82	2	84	1
All income groups	56	1	56	1

Policy Recommendations

The authors recommend the following for California's policy analysts and decision makers:

- **Consider refining this research:** While the authors do not believe that additional analysis of these data would provide substantially different results, given sufficient, additional resources, several things might be done to refine the results found in this study, including:
 - More detailed weighting of the survey data.
 - Additional efforts to more thoroughly clean the data and match vehicles in the survey sample to vehicles in the EPA fuel efficiency database.
- **Consider other effects of an RUC system in addition to those investigated in this study:** This study was limited strictly to estimating the relative cost of a fuel tax versus a road user charge on households by income and area of residence (urban/rural). However, it is important to note that there are other aspects to these two alternatives that should be examined in order to provide complete information to decision makers. For example, it is readily apparent that a fuel tax is an across-the-board tax that applies equally to all vehicles, regardless of size or weight; however, a road user charge could be tiered based on vehicle class, which would more fairly assess vehicles for the actual wear and tear they impose on the road system.

About the Authors

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To Learn More

For more details about the study, download the full report at transweb.sjsu.edu/project/1426.html

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