

The following document is supplemental to *NCHRP WebResource 2: Road Usage Charge Guide* (NCHRP Project 19-18, “Transitioning Fuel Tax Assessments to a Road Usage Charge”). The full WebResource can be found at <https://crp.trb.org/nchrpwebresource2/>.

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Driving Behavior

Description:

Adding a price to any good or service reduces demand for that good or service. Therefore, adding a per-mile charge should likewise result in decreased driving and less revenue from RUC than might otherwise be expected. Several factors complicate the ability to assess the impact of RUC on driving behavior. First, RUC has been proposed largely as a revenue-neutral replacement for fuel taxes, meaning that the average driver would pay no more or less under RUC than under the fuel tax. However, some vehicles would pay more, and some would pay less, meaning the impacts on driving could go in both directions depending on individual vehicle characteristics. Second, regardless of the actual financial impact, RUC takes a hidden tax on motor fuels and makes it transparent, or salient. Salient taxes tend to influence consumer decisions greater than hidden taxes, even when the cost is identical. Third, driving tends to have a low elasticity relative to inputs costs such as fuel prices. Although consumers may be unhappy about higher fuel prices, they absorb cost increases by decreasing other expenditures. Added together, understanding the impact of RUC on driving behavior, and specifically on total amount of driving, requires piecing together several complex factors.

Data Required:

Household travel survey results at several points in time; total VMT in a state broken down by vehicle category over time; individual calculated VMT from odometer inspections or other odometer reporting sources; various driving cost inputs over time including fuel prices.

Data Sources:

National Household Travel Survey; state-specific travel surveys (including potentially at the MPO level); Highway Performance Monitoring System (HPMS); Energy Information Administration (EIA), AAA, or other commercial sources of energy data; statewide odometer data.

Analysis Steps:

1. Survey residents about their driving habits either directly (stated preference) or via measurement (revealed preference)
 2. Calculate the amount of driving over an equivalent time period before and after implementation of RUC, ideally one year to capture seasonal variation. Measuring the driving directly via vehicle data collection (revealed preference) yields more accurate results than surveying drivers (stated preference).
 3. Aggregate across a population of vehicles sufficient to reflect the state as a whole (typically at least 400 samples), including diverse demographics, geographic locations, and vehicle types.
 4. Determine the change in driving before and after RUC.
 5. If there are other factors at play such as economic factors, fuel prices, use historical data on the relationships between driving and these factors to separate influences and determine what if any, change is due to RUC.
 6. Conduct statistical analysis of the results to determine whether the change is statistically significantly different from zero.
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Considerations/Lessons Learned:

RUC pilots to date have often asked participants via surveys whether the pilot experience impacted the amount of driving they did. Typically, a small percentage (fewer than 10%) report that the pilot experience led them to drive less than they otherwise would have, even in pilots where no real money was charged to participants. This suggests that the power of mere information about driving, and the cost of RUC can reduce the amount of driving people do.

Sample Output (Optional)

The image below summarizes findings from the 2016-2017 California Road Charge Pilot Program, which surveyed 5,000 participants about their experience and found that over 10% said the pilot program changed their driving behavior. When asked how it changed their behavior, 5% of participants said they drove less because of the pilot program, despite no money being collected. Although this stated preference result does not necessarily yield quantitative insights, and although no baseline driving data were collected from participants to measure any reduction in driving, the result nonetheless illustrates the importance of considering the impact of RUC on driving behavior. If even just 10% of drivers react by driving 10% less because of RUC compared to the status quo, the result would be a 1% drop in revenue compared to what might be otherwise forecasted.

