Statistical Modeling of a Vehicle Miles Traveled Fee for Nevada

Objective:
- Develop a model to estimate the effects of a change in road pricing for Nevada, specifically when adopting a Vehicle Miles Traveled (VMT) Fee to replace the current fuel tax
- Analyze the model with:
  - Current State Fuel Tax
  - Two 'Revenue Neutral' VMT Fees (Includes all State and Federal Taxes)

Previous Studies:
- Weatherford (2010) developed a National model with 2001 National Household Travel Survey (NHTS) Data
  - 60% of households had an increased tax burden
  - 66.5% of households traveled less
- Zhang and McMullen developed a Model for Oregon with NHTS 2001 Data
- Calculated 'Revenue Neutral' Fee of 1.2 c/mile (State Only)
  - Average change in economic burden, less than ±0.1% across all income groups

Methodology:
- 1342 total observations; Data from 2009 NHTS
- Includes data from all of Census Region 8 (Nevada, Utah, Colorado, Montana, New Mexico, Wyoming, Arizona, Idaho) similar population densities and driving habits.
- Estimated linear regression model using LIMDEP
  - Level of Significance (alpha) = 0.10
  - Adjusted R-squared = 0.63
  - Durbin Watson Statistic = 2.01

Variable Descriptions:
- LOGPMT—Log of price/mile to drive
- LOGINCA—Log of household income
- LOGVEH—Log of number of household vehicles
- URBRUR—Urban or Rural Location
- WRKCOUNT—Number of household workers
- SUB2—Presence of a more fuel efficient vehicle
- PINC—Interaction between LOGPMT and LOGINCA
- PSUB2—Interaction between SUB2 and LOGPMT
- HYBRID—Presence of Hybrid
- HINC—Interaction between LOGPMT and HYBRID
- HTPPOPDPN—Tract level population density

Model Analysis:

- **Effectiveness of Tax Methods**
  - Tax Method
    - Annual Miles Traveled
    - % Change in Miles
    - Revenue Collected
    - % Change in Revenue
  - Fuel Tax
    - 28,858,422
    - -
    - $838,908
    - -
  - VMT Fee=2.91¢
    - 28,393,464
    - -1.61
    - $826,250
    - -1.51
  - VMT Fee=3.3¢
    - 27,898,972
    - -3.32
    - $920,666
    - 9.75

- **Equity Effects of VMT Fee**
  - VMT Fee
    - Average Change in HH VMT (Miles)
    - Average Percent Change in HH VMT
    - Average Change in HH Annual Cost
    - Average Percent Change in HH Annual Cost
  - 2.91¢
    - -346.7
    - -1.47%
    - $9.04
    - 0.18%
  - 3.3¢
    - -715.3
    - -3.33%
    - $31.57
    - 0.37%

Increase in Tax Burden
- 2.91 cent/mile Fee—59.1%
- 3.3 cent/mile Fee—71.1%

Decrease in Miles Traveled
- 2.91 cent/mile Fee—65.5%
- 3.3 cent/mile Fee—85.4%

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References:
- J. W. White, Oregon’s Mileage Fee concept and Road User Fee Pilot Program, Final Report, Oregon Department of Transportation, November 2007

Methodology:
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