Statistical Modeling of a Vehicle Miles Traveled Fee for Nevada

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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
- HTPPOPDN—Tract level population density

Model Analysis:

<table>
<thead>
<tr>
<th>Effectiveness of Tax Method</th>
<th>Annual Miles Traveled</th>
<th>% Change in Miles</th>
<th>Revenue Collected</th>
<th>% Change in Revenue</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fuel Tax</td>
<td>28,858,422</td>
<td>-</td>
<td>$383,908</td>
<td>-</td>
</tr>
<tr>
<td>VMT Fee=2.91¢</td>
<td>28,393,464</td>
<td>-0.61%</td>
<td>$246,250</td>
<td>-1.51%</td>
</tr>
<tr>
<td>VMT Fee=3.3¢</td>
<td>27,898,072</td>
<td>-3.3%</td>
<td>$202,666</td>
<td>9.75%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Equity Effects of VMT Fee</th>
<th>Average Change in HH VMT (Miles)</th>
<th>Average Percent Change in HH VMT</th>
<th>Average Change in HH Annual Cost</th>
<th>Average Percent Change in HH Annual Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>VMT Fee 2.91¢</td>
<td>-346.7</td>
<td>-1.47%</td>
<td>$9.04</td>
<td>0.18%</td>
</tr>
<tr>
<td>VMT Fee 3.3¢</td>
<td>-715.5</td>
<td>-5.53%</td>
<td>$31.57</td>
<td>0.37%</td>
</tr>
</tbody>
</table>

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%

<table>
<thead>
<tr>
<th>Effects on Hybrid Owners</th>
<th>Ave ΔMiles</th>
<th>Ave ∆Cost [$]</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.91 ¢</td>
<td>-518</td>
<td>46.37</td>
</tr>
<tr>
<td>3.3 ¢</td>
<td>-721</td>
<td>127.03</td>
</tr>
</tbody>
</table>

References:
I. M. Whit, Oregon’s Mileage Fee concept and Road User Fee Pilot Program, Final Report, Oregon Department of Transportation, November 2007

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