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#TheHighCostofFreeDriving
The future of funding for transportation infrastructure

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University of California, Davis
Two large disruptors for funding infrastructure

Much of the road infrastructure in the United States is paid for by the gasoline tax, a “use fee” for driving on the road.

The landscape of transportation has led to shortfalls in funding due to:
1. Improvements in fuel efficiency
2. Increased share of electric vehicles
The adoption of electric vehicles

- California’s ZEV mandate and governor’s goals will mean high adoption of plug-in electric vehicles (PEVs)
- Electric vehicles do not pay any fuel taxes towards funding infrastructure that they use
California’s Senate Bill 1

• On April 28, 2017 the California legislature and governor passed SB1:
  • $0.12 per gallon increase in the motor vehicle fuel (gasoline) tax (Nov 1, 2017)
  • $0.20 per gallon increase in the motor vehicle fuel (diesel) tax (Nov 1, 2017)
  • $25-$175 annual transportation improvement fee (Jan 1, 2018)
  • $100 annual registration fee for zero-emission motor vehicles (Jul 1, 2020)

• An additional complicating factor is that there is a repeal measure for SB1 on the ballot this November.
Expected shortfall from gasoline efficiency gains

<table>
<thead>
<tr>
<th>Year</th>
<th>Revenue (millions of $)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2020</td>
<td>0</td>
</tr>
<tr>
<td>2025</td>
<td>800</td>
</tr>
</tbody>
</table>

Type
- Shortfall from efficiency

Model
- Linear Growth
- Optimistic
What about alternative fuel vehicles?

The Institute of Transportation Studies at UC Davis is current conducting a study to assess the following pricing schemes on the its ability to provide sustainable funding, the complexity of the policy, and how difficult it is to implement:

• Electricity charge, $/kWh
• Energy fee, $/gas equivalent
• Road charge, uniform mileage fee, $/mi
• Advanced road charge, incorporating other pricing mechanisms  
  • Potential mechanisms include: efficiency, occupancy, congestion, etc.
Pilot program: California Road Charge (SB 1077)

9 month road charge pilot
JULY 2016 MARCH 2017
5000+ vehicles statewide

The California Road Charge Pilot Program achieved many firsts:
• Maintained over 5,000 participating vehicles over a nine-month pilot
• Demonstrated six reporting and recording methods
• Offered no-tech, low-tech, and high-technology
• For the first time included heavy commercial vehicles and light commercial vehicles
• Gathered mileage data and simulated collection of a road charge through third-party vendors

6 mileage reporting methods

Note: The heavy vehicle mileage meter used by our heavy vehicles represented in the pilot makes up 1% of the total of 5,129 enrolled vehicles.

Top 3 Participating Vehicles

Participating Vehicles (By Region)

Private Vehicle Enrollment (By Region)

Out-of-State Vehicles:
- Arizona (1)
- Nevada (2)
- Oregon (2)
- Washington (1)

Out-of-State: 13%
Out-of-State: 46%
Out-of-State: 13%
Out-of-State: 41%

All mileage reporting methods worked:
- Manual options have the highest degree of privacy but are most difficult to enforce and costly to administer
- Higher technology options show great promise but need further refinement

Participant Feedback

73% think a road charge is more fair than a gas tax

Experience and education during the pilot lead to an increase in acceptance among participants
- 60%+ participant response rate for all surveys
- The number of participants agreeing that a road charge is “more fair” than a gas tax increased over the pilot
- Website and newsletters were vital to pilot communications
- 81% think road charge should continue to be researched
- 91% would participate in another road charge program

Communications and Acceptance

WHAT’S NEXT?
FAST ACT RESEARCH: PAY-AT-THE-PUMP
EDUCATION & OUTREACH

85% Satisfied with the overall pilot program
87% Satisfied with the opportunity to provide feedback
61% Are more aware of the amount they pay for road maintenance
83% Satisfied with clarity of communications
Rolling out road charges on a PEV platform

• Road charge only for electric miles (e-miles)
• Our study has constraints of operationalizing pricing exclusively for PEVs, but this actually offers several benefits:
  • No need to get rid of gasoline tax
  • Addresses fuel transition issue
  • Gradual rollout is easier to implement since PEVs are lower volume
  • Lower administrative costs: no need for refund checks
Key Takeaways

- The actual difference between fees (electricity versus energy versus mileage) is relatively marginal, the fees can be structured to provide similar revenues.
- Key considerations are political feasibility, complexity of implementation, and costs.
- Roll out on the electric vehicle platform can avoid many of the above issues.
Demand-responsive parking pricing

SPUR Forum: The High Cost of Free Driving
July 12, 2018
Goals of project

- Reduce congestion
- Make parking easier to find
- Reduce circling for parking
- Help small businesses
- Transparent, data-driven rate-setting process
SFpark pilot
Demand-responsive pricing

- Transparent, data-driven process
- Adjustments every quarter based on occupancy
  - 80% or above: +$0.25/hour
  - 60-80%: no change
  - Below 60%: -$0.25/hour

- Prices vary by block, time of day, weekday v. weekend

<table>
<thead>
<tr>
<th>Duration</th>
<th>Price Per Hour</th>
</tr>
</thead>
<tbody>
<tr>
<td>9AM – 12AM</td>
<td>$0.50</td>
</tr>
<tr>
<td>12AM – 3PM</td>
<td>$3.50</td>
</tr>
<tr>
<td>3PM – 6PM</td>
<td>$2.00</td>
</tr>
</tbody>
</table>
SFpark pilot evaluation

Hourly parking rates in SFpark areas
Before vs. after (10 rate changes)
On- and off-street rates

<table>
<thead>
<tr>
<th></th>
<th>On-street</th>
<th>Off-street</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before</td>
<td>$2.69</td>
<td>$3.45</td>
</tr>
<tr>
<td>After</td>
<td>$2.58</td>
<td>$3.03</td>
</tr>
</tbody>
</table>
SFpark pilot evaluation

Parking search time (minutes)
Reported search times, before vs. after
Pilot vs. control areas | Weekdays 9am to 6pm

- **Pilot**
  - 11:36
  - 6:36
    - 43% decrease

- **Control**
  - 6:24
  - 5:36
    - 13% decrease
SFpark pilot evaluation

How often are blocks too full?
Before vs. After; 90-100% occupancy, hourly frequency
Pilot and Control Areas
Weekdays 9am to 6pm

Pilot
Blocks were full
16% less often

Control
Blocks were full
51% more often

Percentage of time
SFpark pilot evaluation

How often do blocks meet target occupancy?
Before vs. After; 60-80% occupancy
Hourly frequency; Pilot and Control Areas
Weekdays 9am to 6pm

- **Pilot**: Target occupancy met 31% more often
- **Control**: Target occupancy met 6% more often
SFpark pilot evaluation

Fillmore District
Weekday Hourly Rates
3PM-6PM

Rate Effective July 2017

- $0.50 - $2.25
- $2.50 - $4.75
- $5.00 - $6.75
SFpark pilot evaluation

Change in sales tax revenue, FY2006–2013

Food product, general retail and miscellaneous; chain stores excluded
# SFpark pilot evaluation

**Daily greenhouse gas emissions (metric tons)**

<table>
<thead>
<tr>
<th>Metric</th>
<th>Before</th>
<th>After</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pilot</td>
<td>7.0</td>
<td>4.9</td>
<td>30% decrease</td>
</tr>
<tr>
<td>Control</td>
<td>2.7</td>
<td>2.5</td>
<td>6% decrease</td>
</tr>
</tbody>
</table>

Before vs. after  
Pilot vs. control areas  
Weekdays 9am to 6pm
Citywide demand-responsive pricing
Answering important questions

• **Question:** will the City start to charge $8 per hour everywhere?

• **Answer:**
  - No
  - In SFpark areas, no blocks are $8/hour
  - About 11% of rates are at $0.50/hour,
    < 0.5% have reached $7/hour
  - Average rates went down during the pilot
  - Test of citywide rate adjustment: small overall average reduction in rates
Answering important questions

• **Question:** is this “surge” pricing?
• **Answer:**
  - No
  - Surge pricing only goes up—here, prices go up/down/same depending on demand
  - Surge pricing is a sudden, unexpected change in price—this is regular, gradual price adjustments, announced in advance
  - Surge pricing can be 1.5x or 2x—this is small, incremental price adjustments (no more than $0.25/hour each quarter)
Answering important questions

• **Question:** doesn’t this just limit parking to those with more money?
• **Answer:**
  - No
  - Average rates went down during the pilot
  - Usually much cheaper rates within a block
  - Test of citywide rate adjustment: overall average rate will not change
Answering important questions

- **Question:** is this just a way for SFMTA to generate more revenue?
- **Answer:**
  - No
  - Overall average rate will not change
  - Revenue impact expected to be minimal
  - Data-driven, rather than budget-driven, approach to setting rates
Answering important questions

• **Question:** how will people know meter prices before they park at a meter?

• **Answer:**
  - Interactive, mobile-friendly webmap on SFMTA.com shows all rates
  - Regular users will learn where the rates differ
Thank you

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The high cost of free driving

July 12, 2018
Overview

1. What kind of costs are we talking about?
2. What exactly are the high costs of free driving?
3. What can we learn from grocery bags?
4. How could we make transportation better with pricing?
5. Can pricing be equitable?
The kind where the ones who pay did not create the problem in the first place.
Five high costs of free driving
1. Congestion in San Francisco costs drivers over $2,000 a year in lost time.

For the whole Bay Area, jobs and population have grown 14% since the late 90’s, while congested delays per worker have grown by nearly 60%.

2. Emissions from passenger cars is our region’s single biggest contribution to climate change

Share of MMTCO2e for the Bay Area in 2014

3. Cars contribute to local air quality problems and hospitalizations from asthma

Asthma hospitalization rates by county: 0-4 year olds, per 10,000 (2013)

<table>
<thead>
<tr>
<th>County</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sonoma County</td>
<td>19.3</td>
</tr>
<tr>
<td>Solano County</td>
<td>14.6</td>
</tr>
<tr>
<td>Santa Clara County</td>
<td>17.3</td>
</tr>
<tr>
<td>San Mateo County</td>
<td>14.2</td>
</tr>
<tr>
<td>San Francisco County</td>
<td>23.7</td>
</tr>
<tr>
<td>Napa County</td>
<td>15.1</td>
</tr>
<tr>
<td>Marin County</td>
<td>16.7</td>
</tr>
<tr>
<td>Contra Costa County</td>
<td>23.8</td>
</tr>
<tr>
<td>Alameda County</td>
<td>20.4</td>
</tr>
<tr>
<td>California</td>
<td>20.4</td>
</tr>
</tbody>
</table>

Source: Kidsdata.org
4. The more we drive the higher our collective risk of injury and death from collisions

Source: MTC: http://www.vitalsigns.mtc.ca.gov/fatalities-crashes
5. Traffic is noisy

Source: http://bayareanoisecontrol.com/san-francisco-street-noise-map/#lightbox/0/
What can we learn from grocery bags?
Which part of driving shouldn’t be free to drivers? What priding tools do we have so far?

<table>
<thead>
<tr>
<th>Policy</th>
<th>Description</th>
<th>The margin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gas tax</td>
<td>A charge on gasoline paid at the pump</td>
<td>Extra gallon of gas</td>
</tr>
<tr>
<td>VMT fee</td>
<td>A fee on each mile driven</td>
<td>Extra mile</td>
</tr>
<tr>
<td>Toll</td>
<td>A fee to use a piece of infrastructure</td>
<td>Extra trip through a particular place</td>
</tr>
<tr>
<td>Cordon fee</td>
<td>A fee to cross into a congested area, usually a downtown business district</td>
<td>Extra car to enter congested area</td>
</tr>
<tr>
<td>Parking fee</td>
<td>A fee on parking (by the hour)</td>
<td>Extra hour parked</td>
</tr>
</tbody>
</table>
## Different pricing polices are more suited to different goals

<table>
<thead>
<tr>
<th></th>
<th>Reduced congestion</th>
<th>Reduced GHG and pollution</th>
<th>Increased safety</th>
<th>Lower VMT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gas tax</td>
<td><img src="gas_tax_icon" alt="" /></td>
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<tr>
<td>VMT fee</td>
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<td></td>
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<tr>
<td>Toll</td>
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<tr>
<td>Decongestion fee</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parking fee</td>
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- Little to no marginal effect
- Possible effect in some areas
- Possible effect with right policy design
- Positive indirect effect
- Positive marginal effect
Asking everyone to pay the full costs of their driving can change how people travel

Driving
- 1 hour
- $4.60 in gas (+ free parking)

Caltrain
- 1 hour 15 mins
- $5.75 (+ getting to / from train)

Driving with pricing
- 45 mins
- $12.60 in gas, toll and charged parking
Equity must be considered across income levels, geography and mode