Factors Influencing Shared vs. Private Rides

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Office of Operations
Federal Highway Administration
1200 New Jersey Avenue SE
Washington, DC 20590
## Ridehailing vs. Ridesharing

### Private Rides
- UberX
- Standard Lyft
- Taxi

### Shared Rides
- UberPool
- Shared Lyft
- Via

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**Notice**

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Why Ridesharing?

• Ridehailing occupancy impacts the number of vehicles on the road.

• Sharing may:
  – Alleviate congestion
  – Reduce vehicle miles traveled (VMT)
  – Improve travel time and travel time reliability for all road users
  – Reduce vehicle emissions
  – Support economic growth

• Private ridehailing may yield the opposite outcome.
Survey Questions to Transportation Network Company (TNC) Users:

- Trip purpose
- Personal characteristics
- Travel behavior

Appended Data:

- Trip cost and travel time
- Built environment characteristics
- City-specific data

Source: FHWA
**Which one of these choices would you have taken for your recent trip by TNC?**

<table>
<thead>
<tr>
<th>Choice</th>
<th>Time</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>17 to 20 minute shared trip</td>
<td>$8</td>
</tr>
<tr>
<td>B</td>
<td>15 to 17 minute shared trip</td>
<td>$7</td>
</tr>
<tr>
<td>C</td>
<td>11 minute private trip</td>
<td>$11</td>
</tr>
</tbody>
</table>

**Source:** FHWA
National Survey Results Usage Summary

4,365 Transportation Network Company (TNC) Users

- Last Trip was Private: 71.9%
- Last Trip was Shared: 28.1%

Source: FHWA
National Results: Market Segmentation (User, continued)

### Annual Household Income
- **< $50k**
- **$50k-$100k**
- **$100k-$150k**
- **> $150k**

### Age
- **Under 25**
- **25-45**
- **46-65**
- **Over 65**

**Frequency of Sharing Opt-In**
- Rarely
- Sometimes
- Frequently

Source: FHWA
National Results: Market Segmentation (Trip Type)

### Employer Paid
- Employer Paid
- Self Paid

### Trip Distance
- Short Distance
- Medium Distance
- Long Distance

### Traveling Party
- Party of 1
- Party of 2

### Time of Day
- Morning
- Midday
- Evening
- Night

Source: FHWA
National Results: Price Sensitivity

- Riders appear to place a very high value on their travel time/reliability, indicating an average willingness to pay of $231 per hour saved (as shown on slide 14).
- 20% of riders never selected a shared option.

### Reason I chose a private ride over a shared ride

<table>
<thead>
<tr>
<th>Reason</th>
<th>% (n=3,142)</th>
</tr>
</thead>
<tbody>
<tr>
<td>There was a chance that it was going to take a lot longer and that uncertainty is too risky</td>
<td>49.5%</td>
</tr>
<tr>
<td>The shared option was too much slower than the private option</td>
<td>29.2%</td>
</tr>
<tr>
<td>The discount was not big enough</td>
<td>24.6%</td>
</tr>
<tr>
<td>I prefer not to share my trip with a stranger</td>
<td>21.7%</td>
</tr>
<tr>
<td>I didn't see the shared option in the app</td>
<td>6.5%</td>
</tr>
<tr>
<td>I don't understand what the shared option is</td>
<td>0.0%</td>
</tr>
</tbody>
</table>

Source: FHWA
Share of respondents switching from private to shared at 11 different combinations of price difference (i.e., discount) and travel time penalty

Source: FHWA
For each additional dollar/mile price difference a rider sees between private and shared rides, they are about **8.6 percent more likely to use sharing.**

Source: FHWA
For each additional 15 seconds/mile relative travel time difference a rider sees between a shared ride and private ride, they are about **8.3 percent more likely** to use sharing.

**Source:** FHWA
The **price difference between private and shared rides** that would increase the probability of sharing for **general trips** by 25 percent (i.e., from ~30% of trips to ~37.5%):

- $0.87 per mile (at average trip length of 6.4 miles and starting price/mile of $3.30) or

The **time difference between shared ride and private rides** that would increase the probability of sharing for **general trips** by 25 percent (i.e., from ~30% of trips to ~37.5%):

- 14 seconds per mile (at average trip length of 6.4 miles and starting speed of 23.8 mph)

The **implied value of time to increase general trips by 25%** with either a $0.87 per mile price differential or 14 seconds per mile time differential:

- $3.86 per minute or $231.47 per hour

Differences that would increase the probability of sharing for **trips starting in office districts** by 25 percent:

- $0.33 per mile, or
- 13 seconds per mile
Modeling Tool – Inputs (Sample)

Scenario 1: Increase cost savings for shared TNC trips relative to private TNC trips ($/mi) - *only affects to TNC mode shares*

Scenario 2: Reduce travel time penalty for shared TNC trips relative to private TNC trips (mins/trip) - *only affects TNC mode shares*
Modeling Tool – Inputs (Sample, continued)

Shared TNC Trip Overlap Rate (%):

TNC Non-passenger Miles (%):

Source: FHWA
# Modeling Tool – Outputs
(San Francisco-$1/mile price increase)

<table>
<thead>
<tr>
<th>Mode</th>
<th>Initial Share</th>
<th>New Share</th>
<th>Initial VMT</th>
<th>New VMT</th>
<th>Change in VMT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drive Private Car</td>
<td>48.6%</td>
<td>48.6%</td>
<td>1,906,571,673</td>
<td>1,906,571,673</td>
<td>0.0%</td>
</tr>
<tr>
<td>Passenger in Private Car</td>
<td>22.0%</td>
<td>22.0%</td>
<td>N/A</td>
<td>N/A</td>
<td>0.0%</td>
</tr>
<tr>
<td>Use TNC (private)</td>
<td>1.0%</td>
<td>0.7%</td>
<td>32,919,104</td>
<td>21,393,364</td>
<td>-35.0%</td>
</tr>
<tr>
<td>Use TNC (shared)</td>
<td>0.6%</td>
<td>0.9%</td>
<td>13,319,508</td>
<td>21,560,412</td>
<td>61.9%</td>
</tr>
<tr>
<td>Use Transit</td>
<td>7.1%</td>
<td>7.1%</td>
<td>N/A</td>
<td>N/A</td>
<td>0.0%</td>
</tr>
<tr>
<td>Walk</td>
<td>18.8%</td>
<td>18.8%</td>
<td>N/A</td>
<td>N/A</td>
<td>0.0%</td>
</tr>
<tr>
<td>Bike</td>
<td>1.9%</td>
<td>1.9%</td>
<td>N/A</td>
<td>N/A</td>
<td>0.0%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100.0%</strong></td>
<td><strong>100.0%</strong></td>
<td><strong>1,952,810,285</strong></td>
<td><strong>1,949,525,449</strong></td>
<td><strong>-0.2%</strong></td>
</tr>
</tbody>
</table>

Source: FHWA
A $1/mile relative price increase between private and shared rides for SF trips beginning in the central business district saves ~3.3 million VMT/year.

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<td>22.0%</td>
<td>N/A</td>
<td>N/A</td>
<td>0.0%</td>
</tr>
<tr>
<td>Use TNC (public)</td>
<td>1.8%</td>
<td>2.7%</td>
<td>22,819,104</td>
<td>34,382,564</td>
<td>-35.0%</td>
</tr>
<tr>
<td>Use TNC (shared)</td>
<td>7.6%</td>
<td>2.0%</td>
<td>23,419,505</td>
<td>21,142,057</td>
<td>-10.9%</td>
</tr>
<tr>
<td>Use Transit</td>
<td>7.1%</td>
<td>7.1%</td>
<td>N/A</td>
<td>N/A</td>
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<td>-0.2%</td>
</tr>
</tbody>
</table>
## Benefits of VMT Reduction (San Francisco Case)

### Road Transport Externality*

<table>
<thead>
<tr>
<th>Externality</th>
<th>Cost/Mile</th>
<th>Benefit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Congestion delay</td>
<td>$0.053</td>
<td>$174,573</td>
</tr>
<tr>
<td>Accident</td>
<td>$0.100</td>
<td>$329,384</td>
</tr>
<tr>
<td>Environment/Health</td>
<td>$0.100</td>
<td>$362,321</td>
</tr>
<tr>
<td>Energy security</td>
<td>$0.007</td>
<td>$23,057</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$0.255</strong></td>
<td><strong>$889,335</strong></td>
</tr>
</tbody>
</table>

*Summary of estimates of external costs by cost category, from Delucchi 2010*
Conclusions

• Research used a novel **stated preference study** anchored off real TNC trips to simulate real decisions between taking private and shared TNC trips.

• **Higher rates of sharing** found among younger, lower-income riders, and for social trips and weekend trips.

• Users may be influenced by **time-based ridesharing incentives** or **price-based incentives**, but some users appear unmoved by price.
Conclusions (continued)

- Users taking certain types of trips are more inclined than other users to select a shared option if relatively small changes in cost and time are made in the direction that favors sharing.

- Modeling tool offers insight to policymakers and TNCs on impacts to multimodal transport system, of which TNCs are one component.
Allen Greenberg
U.S. Department of Transportation
Federal Highway Administration
Office of Operations

Allen.Greenberg@dot.gov
(202) 366-2425