Comparing Consumer Preferences for Electrified Vehicles in China the U.S.

Acknowledgements

China is the world's largest new car market.
- 1 out of every 4 new cars in the world were made in China in 2011.
- The U.S. & China consume ~1/3 of global oil consumption.

Research Questions

How do existing vehicle preferences shape the adoption of electrified vehicles in China & the U.S.?
- Under what conditions would mainstream adoption of electrified vehicles occur?
- What are the implications of these changes for energy security & emissions reductions?

Approach: Conjunct Analysis

- Field identical choice-based conjoint surveys in China & the U.S. (Summer 2012).
- Estimate willingness-to-pay for specific vehicle attributes: technology type, brand, fuel economy, acceleration time.

China Sample

Partnered with the State Information Center Fielded on-the-ground in 4 major cities:
- Tier 1 cities.
- Largest car markets.
- All urban.
- Gov’t focus areas for EVs.
- Geographically diverse.

U.S. Sample

Fielded both online and on-the-ground.
- Amazon Mechanical Turk.
- Pittsburgh Auto Show.
Weights added to match car-buying demographics.

Discrete Choice Models

Use random utility framework and mixed logit model to relate vehicle attributes to consumer choice.

Would you buy the Ford Focus BEV over CV?

Average Value of BEV over CV

<table>
<thead>
<tr>
<th>Attribute</th>
<th>BEV Focus</th>
<th>CV Focus</th>
<th>AVG Value (China)</th>
<th>AVG Value (USA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Price</td>
<td>$23,500</td>
<td>$28,500</td>
<td>$15,000</td>
<td>$25,000</td>
</tr>
<tr>
<td>Brand</td>
<td>American</td>
<td>American</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Op. Cost (kWh/mile)</td>
<td>3.5</td>
<td>3.5</td>
<td>$13,000/mile</td>
<td>$11,000/mile</td>
</tr>
<tr>
<td>0-60 mph Acceleration</td>
<td>9.6</td>
<td>9.6</td>
<td>$700</td>
<td>$1,100</td>
</tr>
<tr>
<td>Federal Subsidy</td>
<td></td>
<td>$10,000</td>
<td>$28,500</td>
<td>$18,500</td>
</tr>
</tbody>
</table>

Chinese More Willing to Adopt BEVs

Simulate market competition between gas and plug-in counterparts in China and the U.S.

Policy Implications

Results suggest car buyers in the U.S. and China prefer smaller battery HEVs and PHEVs to larger battery BEVs. Preferences may align with social benefits:
- USA: HEVs & PHEVs have more emission and oil displacement benefits on average than BEVs (Michalek et al., 2011).
- China: HEVs & PHEVs emit less on average than BEVs.

Interaction of subsidies & preferences:
- USA: Subsidies sufficient for PHEVs, insufficient for BEVs.
- China: Subsidies more sufficient for BEVs than PHEVs.