

Background

- The vehicle mix in terms of fuel economy have huge impacts on GHG emission and energy consumption in the long run
- Whether consumers fully consider future fuel saving affect whether fuel tax or feebate/CAFÉ is more efficient.
- Previous studies differ on how consumers evaluate future fuel saving and only few countries have been explored.
- When gas prices decreases and electricity prices stay the same or does not change much, the comparative fuel saving advantage shrinks more for BEVs than PHEVs and HEVs. However, sales data shows the opposite trend.

Methods

- Multinomial logit discrete choice model for; nested logit model; regression on sales by model; regression on fuel economy preference by country
- $u_{jt} = \alpha \frac{P_t}{MPG_{jt}} + \beta X_{jt} + v_j + \varepsilon_{jt}$, X_{jt} includes MSRP, brand, power to weight ratio, torque to weight ratio, wheelbase, cubic size, whether the model is classified as premium and whether the transmission is automatic
- $u_{jt} = \alpha \frac{P_t}{MPG_{jt}} + \alpha_1 \cdot HEV \cdot \frac{P_t}{MPG_{jt}} + \alpha_2 \cdot PHEV \cdot \frac{P_t}{MPG_{jt}} + \alpha_3 \cdot BEV \cdot \frac{P_t}{MPG_{jt}} + \beta_1 \cdot HEV + \beta_2 \cdot PHEV + \beta_3 \cdot BEV + \gamma_1 \cdot HEV \cdot Unique + \gamma_2 \cdot PHEV \cdot Unique + \gamma_3 \cdot BEV \cdot Unique + \delta X_{jt} + v_j + \varepsilon_{jt}$

Research Questions

- Which shift (car vs. no car, between segment, within segment) is the most significant during gasoline price shocks?
- Do people in different countries value fuel economy differently?
- Do buyers of ICE/HEV/PHEV/BEVs response to fuel price differences differently?
- Do buyers of unique and derived alternative energy vehicles response to fuel price differences differently?

Data

- Month-by-month model-by-model sales data and gasoline price data since 2011 for U.S., Canada, Australia, South Africa, Argentina, and China
- Sales data for each electric vehicle model for U.S. and China

Trends

