Do range-based subsidies provided to electric vehicle (EV) consumers incentivize EV manufacturers to invest in reducing the production cost per kilometer of range?

Questions

Present new empirical evidence demonstrating that range-based subsidies:
- Have the capability to stimulate product enhancements on the supply side by targeting consumer demand
- Continue to exert influence even after the removal of demand-side stimulations

Contributions

Background

- Chinese local automobile manufacturers had long been considered as only capable of producing low-quality products
- After 2008, the Chinese government implemented a package of industrial policies to support the EV industry:
  - Consumer subsidies (studied by this paper), financial support to the EV supply chain, infrastructure, R&D
- Chinese EVs succeeded in gaining domestic and global presence:
  - EV sales ↑ 14 times in 2016-2020
  - 65% of the global EV sales in 2022
  - EV export almost doubled in 2021-2022
  - SAIC exported 1 million vehicles in 2022

Stylized Facts

- Chinese range-based subsidies (RBS) to consumers played a substantial role:
  - Subsidy-price ratios ranged between 16-64% with a mean of 25%
  - 34% of the EVs sold (sales) received subsidies
  - The range of new EVs clustered around and moved with the thresholds

Main Results

- The estimated production cost per km of range declined in 2016-2020
- EV subsidies to consumers raised the investment probabilities of low-cost (high market-share) firms by 25-38%

Conclusion

- Range-based subsidies (RBS) to consumers ↑ the investment probabilities by up to 38%
- This impact is larger for manufacturers with lower costs and higher market shares
- This implies RBS can be used to induce technological adoption or product upgrading
- This also implies environmental benefits and welfare gains of RBS are very likely larger than the existing estimates

Methods

Use product-level data to estimate a dynamic structural model where:
- Heterogeneous multi-product firms maximize expected discounted profits in finite periods (static: prices, range; dynamic: investment)
- A static logit model of heterogeneous consumers maximizing utility

Use counterfactuals to evaluate the impact of consumer subsidies

References


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