A Perspective on Rebound Effects and Demand/Supply Equilibrium

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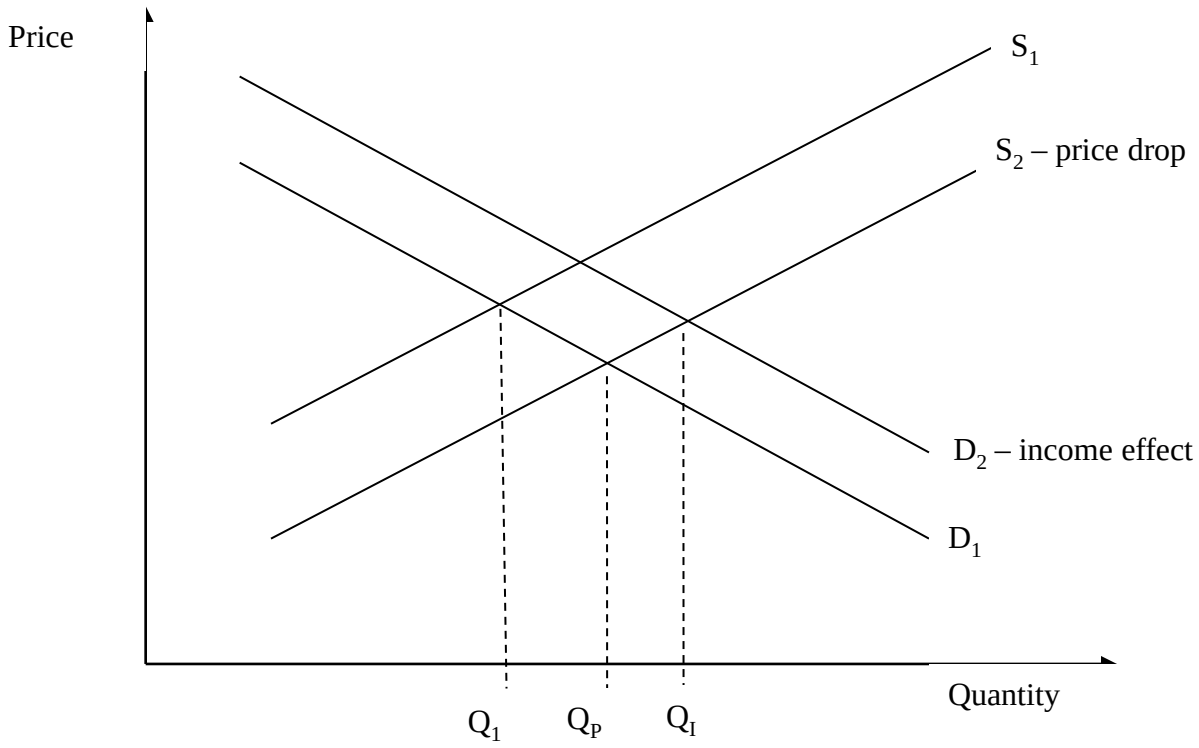
Neoclassical Economics



Brownfields and Compact City - Mashayekh

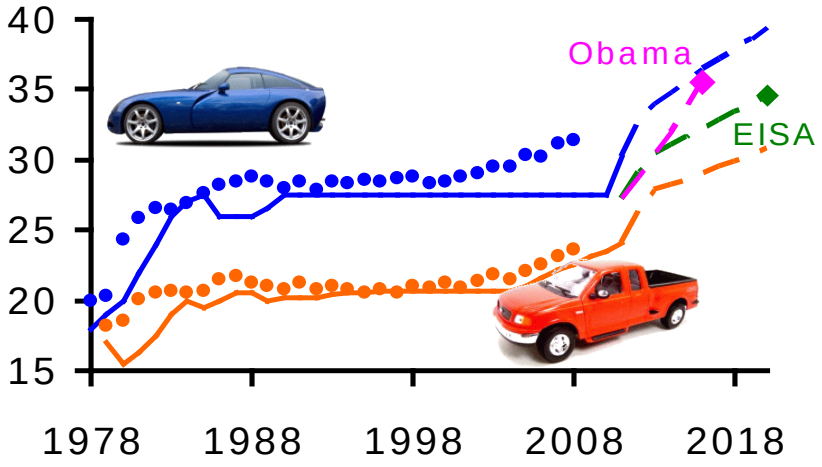
- Brownfield in-fill development incurs remediation costs and travel cost savings.
- Building and infrastructure costs depend upon design decisions.
- Travel out of pocket cost savings may have rebound effect for greenhouse gas emissions.

Vehicle Design Responses to Fuel Efficiency Standards

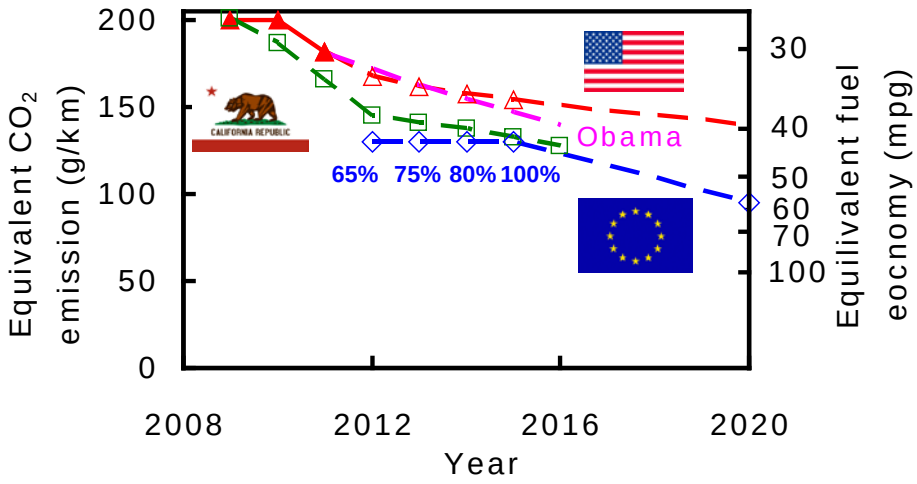
CAFE Policy

- Penalize companies for falling short of target sales-weighted average fleet fuel efficiency
- Energy Policy and Conservation Act of 1975
- Energy Independence and Security Act of 2007: 35 mpg by 2020 (administration raised to 35.5 by 2016)
- **How will firms and consumers respond to efficiency policy?**

U.S. CAFE standards and fleet history



Comparison of standards for cars

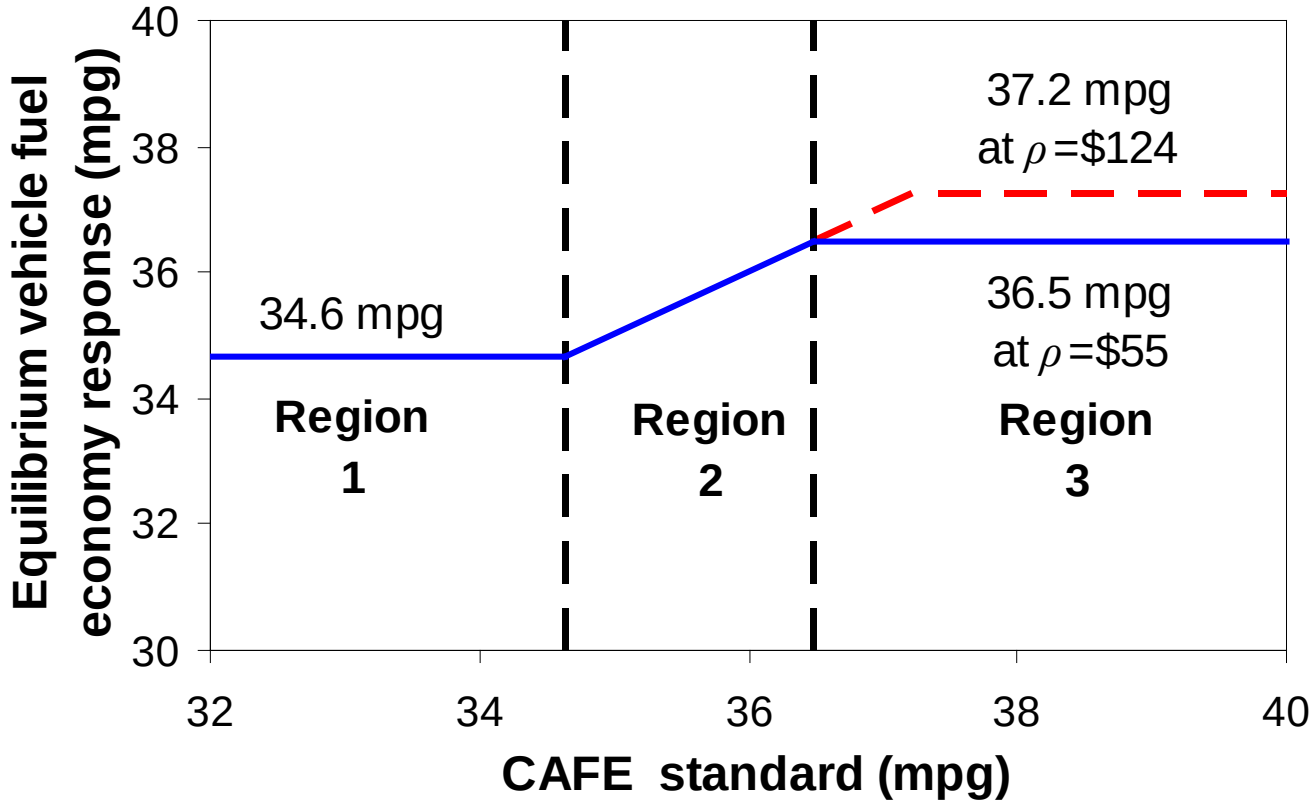


CAFE Policy

- **Energy efficiency policy:** constraints, penalties, and incentives to influence vehicle design outcomes

- **But net effect of policy on design outcomes is complicated**
  - engineering tradeoffs, consumer preferences, competition

Vehicle Design Reponses to Corporate Average Fuel Economy Policy in Equilibrium*



Standards set too high, without a corresponding increase in penalty, are ineffective

* Model for single-product firms using PSAT vehicle simulation, mixed logit demand model based on Ward's Automotive data, and fuel improvement technology costs from NHTSA

CAFE Policy

- Firm options to respond to efficiency standard
  1. Change prices to induce a change in sales mix
     - Give away golf carts so you can sell trucks
  2. Implement fuel savings technologies that increase purchase price
     - Consumers delay purchase
  3. Sacrifice other attributes to gain fuel economy (e.g.: smaller engines, lower performance)
     - Affects consumer purchase patterns
  4. R&D / Innovation
     - Leakage to other sectors (biofuels, EVs)

References

- Mashayekh Yeganeh, Chris Hendrickson, and H. Scott Matthews (2011), ‘The Role of Brownfield Developments in Reducing Household Vehicle Travel’
- Samuelson, Paul (1947), “Foundations of Economic Analysis,’ Atheneum, New York.
- Shiau, Norman, Jeremy Michalek and Chris Hendrickson (2009), ‘A Structural Analysis of Vehicle Design Responses to Average Corporate Fuel Economy Standards,’ Transportation Research A, 43(9-10).