What does improved fuel economy cost consumers and taxpayers? Some illustrations

Philippe Crist and Kurt Van Dender

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Green Growth in Transportation

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What does improved fuel economy cost consumers and taxpayers? Some illustrations

1. Context and Scope
2. An example
   - Highlights from results
3. Discussion
Context and Scope

Green growth in transport?

One element: reduce fossil fuel use (F)

\[ F = M \times E \]

\( (l = \text{km} \times l/\text{km}) \)

Reduce driving M and/or reduce fuel intensity E
Context and Scope

Reduce fuel intensity E

- Reduce greenhouse gas emissions (benefit)
- More expensive or less desired car, cheaper driving (all else equal)
- Reduction in fuel tax revenues (all else equal)
Context and Scope

Reduce fuel intensity $E \rightarrow$ Reduction in fuel tax base
An example: “modal French car”, reduce GHG emissions from 160g/km to 130g/km

Lower E ➔ more expensive or less desired car

• Technology costs to reduce fuel intensity
  ex ante: [1,000€ - 2,500€]; ex post: zero?

• Payback for investment: hidden amenities or not? [3y, 15y]
An example: “modal French car”, reduce GHG emissions from 160g/km to 130g/km

Lower E ➔ cheaper driving ➔ more driving?

Rebound effect [0, 20%]
An example: “modal French car”, reduce GHG emissions from 160g/km to 130g/km

Lower E $\rightarrow$ lower F $\rightarrow$ lower fuel tax revenue

Cost per € of lost fuel tax revenue $[1€, 1.3€]$  

1.3€ ?!? 

All taxes carry efficiency costs, but these of transport taxes are relatively low. Why? “relative complementarity to leisure” (C&H, 1953)
An example: “modal French car”, reduce GHG emissions from 160g/km to 130g/km

Middle case: payback 9y, rebound effect 10%, MCPF 1.15

→ Effect of better fuel economy on consumer surplus and tax revenue?

Increase in consumer surplus (+1,226€) and reduction in fuel tax revenue (-1,133€) just about cancel out.
An example: “modal French car”, reduce GHG emissions from 160g/km to 130g/km

→ Effect of better fuel economy on consumer surplus and tax revenue: about neutral
→ Probably bad idea after accounting for external costs and technology costs.
→ So can we do better?

...introduce kilometre tax
An example: “modal French car”, reduce GHG emissions from 160g/km to 130g/km

→ Effect of better fuel economy and revenue neutral kilometre tax on consumer surplus and tax revenue: no change in revenue, increase in consumer surplus

→ Better balance, but still a bad deal in a broader sense.

... Let’s increase the kilometre tax to 0.05€/km, to reflect driving related marginal external cost (excl. congestion).
An example: “modal French car”, reduce GHG emissions from 160g/km to 130g/km

→ Effect of better fuel economy and 0.05€ kilometre tax on consumer surplus and tax revenue

→ Consumer surplus declines (-3,363€) but weighted revenues increase (+6,187€), so net gain – also after accounting for technology and marginal external costs.
Discussion

- Proposed fuel economy improvement does not look too appealing, unless:
  - Long paybacks, low rebounds, low technology costs, high implicit values of carbon.
  - Combined with kilometre tax.

- But:
  - Kilometre taxes are expensive to raise;
  - Driving may decline ("saturation")

Bottomline: greening is costly, no easy win-win policies.