

Fuel Economy Policies for Light Vehicles

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What are the key decisions?

- **Stringency of the emissions or fuel economy target**
- **Focus on technology change only, or include changing the type of vehicles purchased (mix shift)?**
- **Timing – how soon?**
- **Structure of the regulations**

All depend on society's sense of urgency



Stringency of the target emissions/fuel economy?

- **How hard should we push? What risks do we take?**
- **Alternative approaches**
 - Market basket of “Cost effective” technologies
 - “Top runner” approach – current and projected vehicles
 - Comparable rate of improvement – based on historical rates or standards elsewhere
- **Key issues**
 - Whose definition of cost effective? If not vehicle purchasers’ definition, will they buy?
 - Whither performance, luxury, size?
- **Changes in vehicle mix can increase the fleet target**



Incorporating societal urgency into the analysis:

- Discount rate for future fuel savings – private or societal?
- Lifetime fuel savings, or shorter term?
- Fuel price – with or without externality costs?
- Inclusion of developing technology, or inclusion of proven technology only?
- How much market risk is acceptable? (And how much help will government provide with complementary policies?)



Use standards to push consumers towards smaller, less powerful vehicles?

- Fleet vehicle mix is a *crucial* factor in fuel use...explains much of the difference between U.S., Europe, and Japan
- Pushing a shift may be politically impossible in the U.S., but quite possible in Europe, perhaps elsewhere
- Complementary policies (e.g., variable registration fees) can assist this effort (or be used instead of standards to push a mix shift)
- Decision affects both stringency and structure of the standard
- Developing nations – Mix shift to larger vehicles is inevitable....but perhaps it should not be made easy

Timing – how soon?

- **What does the emissions target demand?**
 - % of fleet requiring redesign
 - How extensive is the redesign?
 - Only technologies in current mass production, or requiring extensive product development?
 - Risk of consumer rejection?
- **Some key timelines:**
 - Time from lab success to first job – 2 to 3 years
 - Introduction to proliferation decision – 2 to 3 years
 - Integration into company fleet – 5 years +
- **Must the future resemble the past? (new simulation capability, changed role of suppliers, etc.)**



Structure of the regulations

■ Define Goals:

- Economic efficiency
- Focus primarily on technology or try to encourage mix shift?
- “Fairness” to competing manufacturers
- Avoid damage to individual manufacturers
- Miscellaneous: encourage safety; avoid discouraging key technologies



Uniform targets or attribute-based standards?

- Uniform targets push mix shifts, but place different technical burdens on automakers
- Attribute-based standards tend to even out burdens, are more economically efficient...but offer less (or no) incentive for mix shifts
- Weight-based standards offer most even burden.....but no incentive for weight reduction
- Size-based standards incorporate incentive for weight reduction, but burden is less equal across different automakers

Figure 2.
Automobile Fuel Consumption, gallons/100 miles, vs. curb weight, with truck trendline superimposed sales>1000

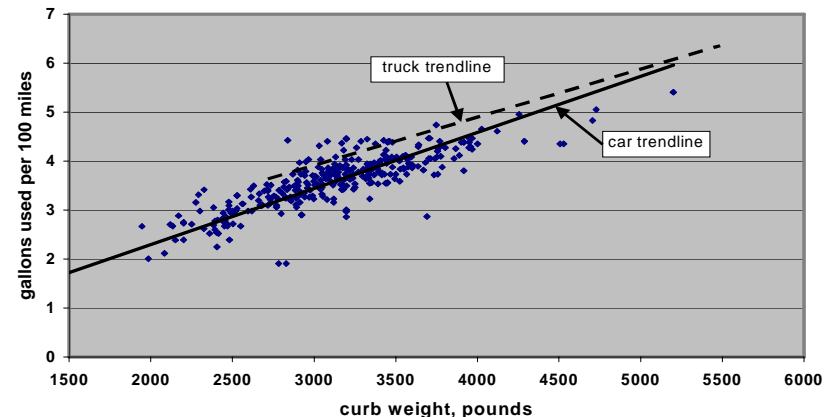
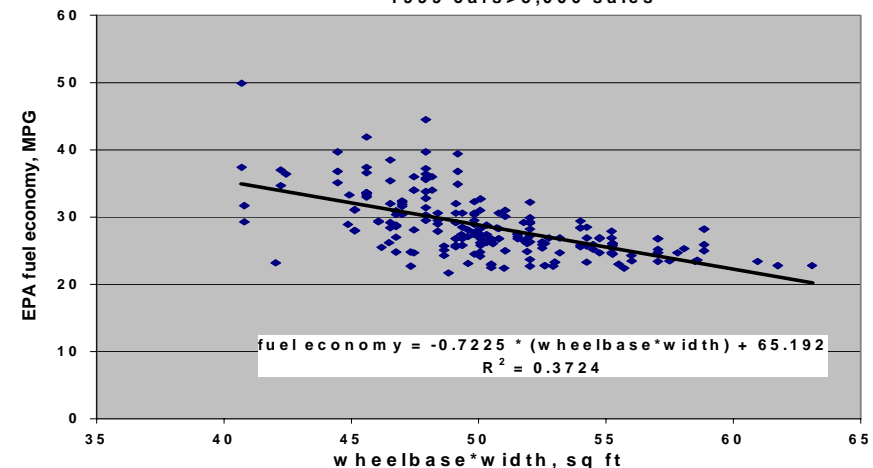


Figure 3.
Fuel economy vs. wheelbase*width, 1999 cars>5,000 sales



Do fuel economy standards make sense for developing countries?

- Among developing nations, only China has set standards but many are eager to join.
- The Chinese standard appears to be more a “floor” than a push towards higher fuel economy.
- Stringent Chinese standards for heavier vehicles may be effort to prevent backsliding rather than to promote technology advance
- Developing countries face many issues in setting standards
 - Consumers already demand high fuel economy as performance has low value and gasoline prices are high relative to incomes of car buyers, so the market is “efficient”
 - Manufacturing and service infrastructure has little experience to develop and support new technology
 - Regulators don’t have the tools & experience to set standards that local industry can meet, and results can be highly political
 - Industry and markets are changing rapidly.

One last point:

The costs of new regulations will be many billions of euros.....so getting the fine details right can have huge consequences....

**A simple thought experiment:
15.5 million cars/yr (2006)
@ 1000+ euros/car....do
the math!**