Regulating Untaxable Externalities: Are Vehicle Air Pollution Standards Effective and Efficient?

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Disclaimer - The views expressed in this paper are those of the discussant and do not necessarily represent those of the U.S. EPA.
Summary

• Assemble impressive longitudinal data set to examine role of exhaust standards on emission reductions in U.S. light duty vehicle fleet

• Findings suggest 50 – 100% of reductions in new light duty vehicle emission rates (NOx, HC, CO) since the 1960s are due to exhaust standards

• Conduct several checks on this core finding:
  • Use CO₂ as a counterfactual;
  • Examine timing of standard and emission changes;
  • Account for potentially confounding policies (e.g., gas taxes; regs on fuel content & fuel economy)
  • Look at each set of standards separately
Summary

• But also find that exhaust standards have not been a cost-effective way to achieve these reductions – they do not cover used vehicles
  • Catalytic converters last ~10 years and expensive to repair ($1K - $2.5K): vehicle emissions increase with age.

• Distortions introduced by vintage-based regulation has been well documented in many contexts
  • Consumers hang onto older vehicles longer than otherwise, undercutting improvements in environmental quality

• Build structurally-based simulation model of new and used vehicle markets to examine
  • Delay or acceleration of exhaust standards
  • Policies that might better target emissions from used vehicles: fees = lifetime damages (age x vehicle type) for all vehicles, new vehicles only, revenue neutral; uniform fee

• Delay of exhaust standards would have been very costly – large increase in damages with only small gain in consumer surplus

• Registration fees proportional to environmental damages and with full coverage of new and used vehicles perform best
  • Large welfare gain because older vehicles face higher fees and therefore are increasingly scrapped as they age
Comments

• Is it possible to characterize current inefficiency of vintage-based regulation in terms of implied age subsidy for old, used vehicles that remain on the roads?
  • Or in terms of social cost of keeping a vehicle one additional year past ~10 years?

• Mention that manufacturers often over comply due to possibility that vehicles will fail emissions test when they are older
  ◦ Degree of overcompliance varies by pollutant
  ◦ Is there a way to put this in benefit-cost terms? What is WTP to reduce this uncertainty?
  ◦ How do different policies fare with respect to reducing this uncertainty/changing incentives for overcompliance?

• Not much discussion of damages/regionally differentiated air quality modeling
  • Possible to demonstrate degree to which air quality improvements are affecting the same groups of people as on cost side?
Comments

• Registration fees and vehicle property taxes typically at local jurisdiction level –
evaluate other national policies that could more effectively encourage used vehicle
retirements?

• For example, scrappage subsidies alone or in combination with tailpipe standards
  ◦ Based on age alone
  ◦ Combined with magnitude of a crash to encourage scrappage instead of repair of older vehicle
  ◦ Cost implications, potential additionality issues, compared to registration fees

• Focus mainly on welfare but can they estimate
  • Orders of magnitude on countervailing effects of different policies due to tendency of lower income
    HHs to own older, more polluting vehicles and effects of policies on resale value of used vehicles?
  • Potential interactions between policies established in CA vs. rest of US – interactions/synergies/leakage
due to differential treatment under the two policies?