The Effects of Heavy-Duty Vehicle Fuel Economy Standards

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The transportation sector accounts for a large and growing share of US greenhouse gas emissions, and trucks produce 20% of the sector's GHGs. This project analyzes the effects of the Heavy-Duty (HD) National Program, the first fuel efficiency standards imposed on heavy-duty trucks, adopted in 2014 to address those emissions. The implications of truck efficiency standards on producer and consumer welfare, energy use, and emissions are ambiguous and have not been examined empirically since the policy was introduced; to understand the policy effects, I estimate a discrete choice model of consumer demand, in which buyer preferences for truck amenities differ by industry, and oligopolistic vehicle manufacturers compete by choosing prices. I compile an original dataset of all heavy-duty trucks, with their attributes, sold in the US between 2010, before the policy, and 2018. This paper is the first to use fuel usage data compiled by drivers to estimate empirical fuel efficiency, data that has historically been difficult to acquire. Using this rich data, which spans the pre- and post-policy period, I am able to identify the model primitives that persist and those that change in response to the standards. Finally, I simulate counterfactual product prices and purchases in the absence of the HD policy. Preliminary results reveal that consumers are made worse off in aggregate following the imposition of the policy, but buyers in certain industries, such as freight, are more affected than those in industries that purchase specialized work trucks, like construction. There is also considerable variation in the costs to manufacturers: several firms appear to gain competitive benefits from the policy, while others lose market share and profits. In addition to improving fleetwide fuel efficiency, the policy results in changes to average vehicle weight, which can lead to unintended negative consequences for road damage and traffic safety.