

Executive Summary:

## **Automobiles on Steroids: Product Attribute Trade-Offs and Technological Progress in the Automobile Sector**

By Christopher R. Knittel

In "Automobiles on Steroids: Product Attribute Trade-Offs and Technological Progress in the Automobile Sector." (*American Economic Review*, 101(7): 3368–99. DOI:10.1257/aer.101.7.3368), Knittel estimates both the trade-offs between fuel economy, weight, and engine power characteristics and how these trade-offs have shifted out over time within the US light-duty vehicle market from 1980 to 2006.

New-vehicle fuel economy increased by only 15 percent from 1980 to 2006 despite large technological advances in the automobile standard. Much of the fuel economy benefits of these advances, instead, went into increases in weight and horsepower. Because of an increase in weight and horsepower within both cars and light-duty trucks over this time period, as well as a shift from smaller, less powerful, cars to light-duty trucks, weight increased by over 30 percent over this time period, while horsepower more than doubled.

These changes in vehicle characteristics are driven by consumer preferences and shifts in the weight/power/fuel economy trade-off function. Using detailed model-level data from 1980 to 2006, Knittel estimates the technological trade-offs that manufacturers and consumers face when choosing between fuel economy, weight, and engine power characteristics, as well as how this relationship has changed over time. The results serve as a guide as to how the market may respond to increases in CAFE standards or a carbon tax, as well as how far regulatory standards can push fleet fuel economy.

Knittel uses the empirical estimates to answer three related questions. One, how would fuel economy today compare to fuel economy in 1980 if we had held size and