

Vehicle Lifetime Trends and Scrappage Behavior in the U.S. Used Car

Market

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Executive summary

Understanding the market for used vehicles is necessary to evaluate public policy attempting to reduce carbon from the automobile market. The aim of our study is threefold. First we examine vehicle lifetime and how it has changed over the last 50 years. Second to estimate the scrappage elasticity with respect to vehicle price, and finally to explore the implications of these parameters for key policies targeting the automobile market.

Our primary findings are that vehicle lifetime has increased, nearly 27% from 1969 to 2014, and that the scrappage elasticity with respect to vehicle price is very low compared with prior estimates, ranging from -0.01 to -0.51 with a value of -0.36 in our preferred specification. Broadly speaking researchers have paid little attention to how vehicle lifetime changes might affect their results and what scrappage elasticity with respect to vehicle price is best suited to the evaluation at hand. Prior research has relied on assumed values that differ substantially from the values estimated here.

We demonstrate the importance of these parameters for three key areas of policy analysis: CAFE standards, gasoline taxes, and the energy efficiency paradox. First we show that outdated estimates of vehicle lifetime will be overly optimistic about the pace at which new vehicle regulation like CAFE can affect the used car market. For gasoline taxes we show, that a scrappage elasticity that is inelastic with respect to operating cost is more pessimistic about the removal of inefficient vehicles from the road compared with than the typical values used. Finally we show that changes in vehicle lifetime may account for up to 7% of the undervaluation in future gasoline costs of vehicles that has concerned policy makers in recent years. We also compare the scrappage responses due to changes in vehicle prices and gasoline prices and find that our estimates generally suggest they undervalue changes in gasoline price changes. Our estimates suggest consumers may only be recognizing between \$0.22 and \$0.96 of a \$1 increase in future gasoline cost..

Keywords Automobiles, Scrappage, Technology Innovation, Pollution Controls, Used Vehicles.

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