

FROM FUEL TAXATION TO EFFICIENCY STANDARDS: A WRONG TURN IN EUROPE'S TRANSPORT POLICY?

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Overview

Using household travel diary data collected in Germany between 1997 and 2012, we employ an instrumental variable (IV) approach to estimate fuel price and efficiency elasticities. The aim is to gauge the relative impacts of fuel economy standards and fuel taxes on distance traveled. We find that the magnitude of the elasticity estimates are statistically indistinguishable: higher fuel prices reduce driving by the same degree as higher fuel efficiency increases driving. This finding indicates an offsetting effect of fuel efficiency standards on the effectiveness of fuel taxation, calling into question the efficacy of the European Commission's current efforts to legislate CO₂ emissions limits for new cars given prevailing high fuel taxes.

Method

An immediate challenge in econometrically estimating the rebound effect is endogeneity bias. Contrasting with fuel prices, which can generally be regarded as exogenous to households, fuel efficiency is potentially endogenous owing to unobserved household characteristics that affect both the decision on the distance driven and the fuel economy of the vehicle when it is purchased. We address the endogeneity of fuel efficiency by employing motor vehicle tax rates per 100 cm³ cubic capacity as an instrumental variable (IV). In contrast to motor vehicle taxes per car, which are proportional to engine size and thus higher for larger, more comfortable and more secure cars that are preferred for long travel distances, the tax rate per 100 cm³ cubic capacity is uncorrelated with mileage and, hence, is a valid instrument.

Results

Two main results emerge from our analysis. First, the rebound estimates obtained here for single-vehicle households are in the range of 44 to 71%, which is relatively large compared with evidence from the U.S., but perfectly in line with earlier German studies (e.g. Frondel, Ritter, and Vance, 2012; and Frondel and Vance, 2013). As these studies do not instrument for efficiency, but rather rely on fuel price elasticities to infer the size of the rebound effect, they cannot formally test whether the response to increased efficiency is equal in magnitude to the response to increased fuel prices. In this regard, our second key finding is that the magnitudes of the price and efficiency elasticities are statistically indistinguishable: Higher fuel prices reduce driving by the same degree as higher fuel efficiency increases driving, suggesting an offsetting effect of fuel efficiency standards on the effectiveness of fuel taxation.

Conclusion

Notwithstanding the political advantages of efficiency standards, whose costs to consumers and the economy are largely obscured, we would argue that the economic logic in favor of standards is wanting given the large rebound effects identified in this study. It is therefore regrettable that European policy-makers have proceeded down this path, and is currently considering setting an even stricter CO₂ standard of 95 grams/km by 2020. Our results suggest that the efficiency standards introduced with the 2009 legislation will blunt what had been a highly effective climate protection policy based on fuel taxation, one under which the efficiency of the car fleet has grown substantially.

References

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