

# The Moderating Effect of Fuel Prices on the Market Value of Fuel Economy, Driving Intensity, and CO<sub>2</sub> Emissions

Keywords	Fuel efficiency; hedonic price; revealed preferences; vehicle purchase decision; willingness-to-pay
JEL	C14; C21; D12; D90; M31; Q41
Authors	Vlada Pleshcheva <sup>1</sup> , Daniel Klapper <sup>1</sup>
Institutions	(1) Institute for Marketing, School of Business and Economics, Humboldt-University Berlin

## Description

In this paper, we explore co-movements of the vehicle price sensitivity to fuel economy with changes in fuel prices. Previous literature has investigated the responsiveness of vehicle prices to fuel prices or fuel economy. We are interested in an interaction effect of fuel prices and fuel economy and answer a question of how exactly the market value of fuel economy depends on the fuel price. By looking at the role of fuel prices as a moderator for the market value of fuel economy, we are able to differentiate between consumers' valuation of fuel economy versus their reaction to changes in fuel prices.

For this purpose, we apply a hedonic price model to the German automobile market by using data on detailed technical specifications of high-sales vehicles of three sequential model years (2011 to 2013). We evaluate effects that the fuel price has on consumers' willingness-to-pay for improvements in car fuel economy, driving intensity, and subsequent total carbon dioxide emissions for both, diesel and gasoline cars. In contrast to previous research, where the marginal benefit of driving a car with a particular fuel economy remained fixed, we allow it to vary with fuel prices. It allows us to investigate two sources of changes in the consumers' willingness to-pay for fuel economy. The first source, as in previous studies, corresponds to changes in the budget for driving a car, whereas the second source reflects changes in capital investments into a better fuel economy. The total effect of these two sources may lead to either a decrease or increase in the vehicle distance traveled. Our results indicate that there are significant differences in the market values of fuel economy between diesel and gasoline vehicles and their responsiveness to changes in fuel prices. Diesel cars are characterized by a larger elasticity of the price gradient of fuel economy to fuel

prices compared to gasoline cars. The recovered high responsiveness of the market value of fuel economy to fuel prices results in an optimal annual driving intensity that is an increasing function of fuel prices. It implies that the marginal benefits of driving a car of a specific fuel efficiency are still higher than the corresponding fuel price effect on the consumers' budget for driving.

The current study presents an empirical application of statistical analysis to a topic of interest to readers in the areas of economic policy and quantitative economics.