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A hedonic test of the effects of the Alternative Motor Fuels Act

Yimin Liu [a,*], Gloria E. Helfand [b]

[a] Department of Industrial Engineering, University of Michigan, Ann Arbor, MI 48104, USA
[b] School of Natural Resources and Environment, University of Michigan, Ann Arbor, MI 48109, USA

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ABSTRACT

Under the Alternative Motor Fuels Act (AMFA), vehicles that run on ethanol, methanol, or natural gas get extra credits in the calculation of Corporate Average Fuel Economy (CAFE). This paper uses hedonic techniques to examine the effect of production of alternative-fuel vehicles (AFVs) on the implicit price of fuel economy. This study finds that, after AFVs came to market, the marginal value of fuel economy from companies producing them decreased. This finding suggests that manufacturers who produced AFVs were willing to offer a lower price for fuel economy, because automakers had an additional way to achieve fuel economy standards beyond improving the fuel efficiency of conventional cars. These findings bolster the argument that a major role of the AMFA credit for AFVs is to allow automakers to increase their production of fuel-inefficient vehicles.

1. Introduction

In past years, domestic auto companies have advertised alternative fuel vehicles (AFVs) as an option to fulfill consumers' energy needs for gasoline, partially because of soaring oil prices. They, along with farmers and politicians, hope to promote ethanol-powered or natural gas fueled vehicles as a way out of the American addiction to oil. During the 2005 Super Bowl, General Motors kicked off its "Live Green, Go Yellow" campaign to encourage Americans to buy flexible fuel vehicles (FFVs) that run on either gasoline or E85 (a blend of 85% ethanol and 15% gasoline) (Barrionuevo, 2006). Not obvious from this increased interest in alternative fuels is the special role that AFVs play in automaker production decisions. Under the 1988 Alternative Motor Fuels Act (AMFA), the fuel economy of AFVs receives extra credits in calculation of the Corporate Average Fuel Economy (CAFE) standard; as a result, automakers have a means other than improving the fuel economy of conventional vehicles to meet CAFE requirements. The original program expired in 2004. The Energy Independence and Security Act of 2007 (H.R. 6, Section 109) extended the fuel economy incentive program to 2019.

This paper uses hedonic pricing models to examine empirically whether manufacturers took advantage of the extra credits afforded to AFVs in the CAFE standard. If an automaker used the incentive program to reduce its cost of meeting the fuel economy standards, it would be willing to offer a lower price to consumers for fuel economy. The implicit price change for fuel economy after the production of AFVs should reflect the effect of the CAFE incentive program on the mix of fuel-efficient and inefficient vehicles that the auto industry produced, and the effect on the value of fuel economy.

2. Corporate Average Fuel Economy and the Alternative Motor Fuels Act

The Corporate Average Fuel Economy (CAFE) standard is the major policy tool in the US to reduce oil consumption. Until the Energy Independence and Security Act of 2007, each auto manufacturer was required to meet a fleet average fuel econ-

* Corresponding author.
E-mail address: yiminl@umich.edu (Y. Liu).

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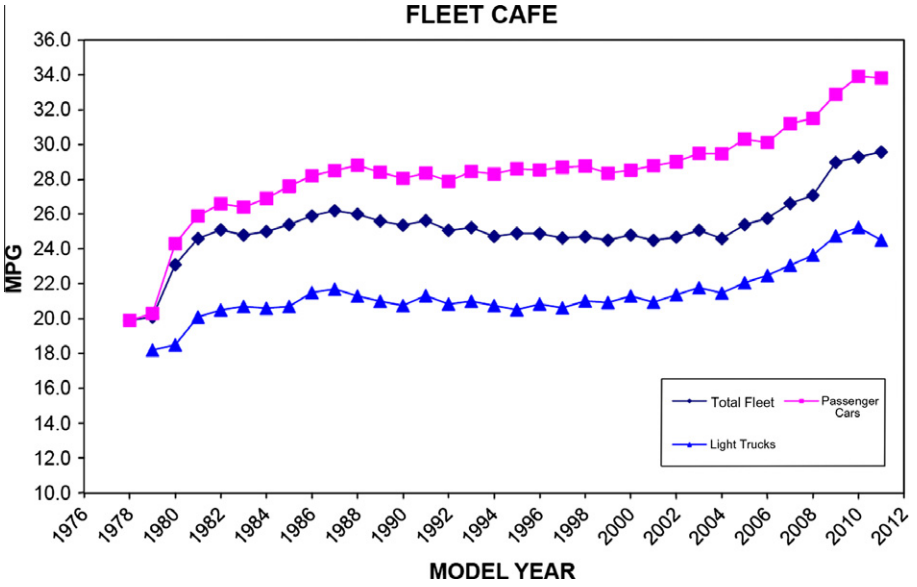

Fig. 1. Passenger car and light truck fleet fuel economy in the US. *Source:* NHTSA, Summary of Fuel Economy Performance March 2011.

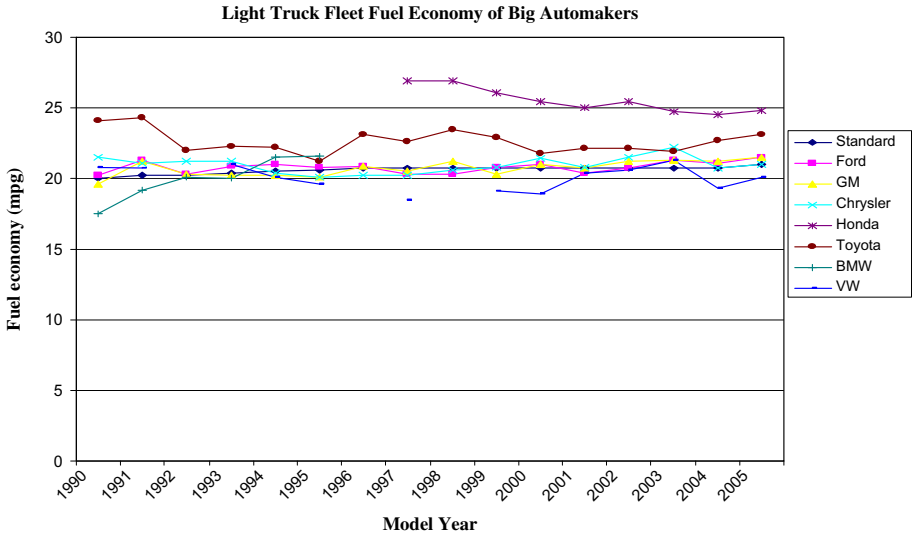

Fig. 2. Major automakers' light truck fleet fuel economy, model years 1990–2005. In model years 2008–2010, light truck manufacturers have the option to comply with the unreformed standard values or the new reformed standard values based upon each manufacturer unique vehicle fleet characteristics, so it will less confusing to report the data till 2008. *Source:* NHTSA, Summary of Fuel Economy Performance March 2008.

omy of 27.5 miles per gallon (mpg) for cars, and (until 2005) 20.7 mpg for light trucks, or face a penalty. As Fig. 1 shows, since the 1980s, the fleet average fuel economy scarcely improved (National Highway Traffic Safety Administration [NHTSA], 2005), especially for the light truck fleet. Indeed, when cars and light trucks are combined, total fuel economy in the US decreased until model year (MY) 2006, due to increased numbers of light trucks.

Fig. 2 shows the fuel economy of major automakers' fleets from the US, Japan and Europe. The fleet fuel economy of US automakers always approximates CAFE standards: for example, between 1990 and 2005, the fuel economy of Ford cars was between 26.4 and 28.3 miles per gallon. Vehicles from Asian producers had US fleet average fuel economy that exceeded the standards; it was never less than 27.9 mpg for passenger car fleets. The US vehicle fleet from European producers, on the other hand, often fell below the standards: BMW's light truck fuel economy, for example, was about 20.1 mpg before 2004 (NHTSA, 2005). The penalties that most European manufacturers have regularly paid range from less than $1 million to more than $20 million annually; Asian and domestic manufacturers have never paid a penalty.