The Consumer Market for Fuel Economy

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A year ago President Bush declared that America is addicted to oil – an addiction that poses great risks to our nation's security, economy and environment. In this year's State of the Union, he outlined a plan to reduce our projected gasoline consumption in 2017. With the new Congress, there is an opportunity to devise an effective and rational national policy on automotive fuel economy that can do more than just decrease our future projected increase in gasoline consumption. A smart set of policies can dramatically reduce our national addiction to oil, while putting Detroit automakers on more solid financial ground and Americans on the path to a safer, cleaner future.

There are many who say we should just let the market take care of it. Carmakers only make what consumers want to buy and until now consumers have not wanted fuel economy. As gasoline prices rise, consumers will move to more fuel-efficient cars, as they have over the last year.

Research and analysis conducted by the University of Michigan's Transportation Research Institute Automotive Analysis division reveals why the market has not worked over the last decade, why the market did not give consumers as much fuel economy as they were willing to buy and why the market will not push fuel economy to the extent it needs to go to significantly decrease our nation's gasoline consumption or stop the financial freefall for Detroit.

Why the market didn't work

Judging from recent public statements, advertisements, and some concept cars at this year's auto shows, it would seem that Detroit automakers now understand consumers want fuel economy. Hurricane Katrina, Rita and other oil supply disruptions sent the price of gasoline skyrocketing in the last year. Consumers reacted and stopped buying fuel inefficient SUVS and pickups. So the market works.

But the price of gasoline has risen by over 102% since 1998. Why did it take the spike in 2005 to change demand? It didn't. Our research shows for almost a decade consumers have placed a much higher value on fuel economy than Detroit automakers has given it. But Detroit automakers ignored even their own data.

Since the 1990s, the reigning conventional wisdom in Detroit has been that consumers would **not** pay for fuel economy and this view dominated Detroit's thinking about its customers so thoroughly, that any evidence that challenged it was rationalized away or ignored, even when the contradictory evidence came from Detroit's consumers themselves.

Detroit automakers spend many millions of dollars collecting data and building models of their customers' needs and wants so they can design products their customers want and build them in quantities that are profitable. To develop predictions about future market conditions that product decision makers can act upon, a market forecaster analyzes patterns in historical data and develops models and forms opinions about how the market works. New useful knowledge has only two sources: from observing new data or from thinking about historical data in new ways.

With respect to the consumer value of fuel economy, Detroit failed to recognize new knowledge of both types that it should have, and that could have helped Detroit avoid the dismal financial results of the last two years.

Detroit failed to recognize new knowledge in the form of new data about the consumer value of fuel economy.

When asked what they liked and disliked about their new vehicles, more buyers of large SUVs have said they disliked the vehicle's poor fuel economy than said they disliked any other feature. (J.D. Power and Associates, APEAL Study 1996-2005). Instead of addressing their customers' top complaint by improving the fuel economy of large SUVs, the automakers dismissed the complaint since it contradicted the conventional wisdom ("they bought a large SUV, what did they expect?"). At the same time automakers expanded their offerings of super-heavy SUVs to take advantage of a gap in CAFE (SUVs weighing over 8,500 lb do not count toward CAFE compliance until MY2011).

As a forecaster, I know that forecasting is as much an art as it is a science. The art of forecasting is what guides forecasters as they adjust the raw output from a statistical analysis to make better predictions. In nearly all of Detroit's internal and external market research studies, the raw output would imply that consumers put a fairly high value on fuel economy. However, the conventional wisdom is so strong that these raw estimates are nearly always adjusted downward.

Detroit also failed to recognize new knowledge in the form of novel patterns in historical data in the relationship between gasoline prices and vehicle sales.

By 2005 gasoline prices had been steadily rising for several years. From 1998 to 2006, the average price per gallon of regular gasoline rose from $1.27 (adjusted for inflation) to $2.57—a 102% increase over eight years. For comparison, the first oil shock, which led Congress to create CAFE standards, involved a 73% increase over eight years in the price regular gasoline. (Adjusted for inflation, a gallon of regular gasoline cost $1.76 in 1973 and $3.06 in 1981.)

The duration and magnitude of the rise in gasoline prices make the apparent lack of a consumer response until 2005 puzzling. In the face of steadily rising gasoline prices, why did consumers not change their new vehicle choices before 2005 and 2006? Is there a "tipping point" that gasoline prices must pass before consumers respond?

We addressed these questions in a research study we recently completed (forthcoming in *Business Economics*, Jan 2007). We examined the impact of the rise in gasoline prices on consumer demand for fuel economy using data on the sales, actual transaction prices, and attributes of all vehicles sold in the U.S. for the years 2002 through 2005. We used a statistical methodology called hedonic regression that models the real price paid for a vehicle as a function of the real price of gasoline, fuel economy, and other factors.

Our study found that the consumer value of fuel economy rose each year in direct proportion to the rise in the real price of gasoline. Without some action to offset this trend, demand would have shifted away from large SUVs as early as 2003. What Detroit did (starting immediately after 9/11) was cut their vehicles' prices, and the least fuel-efficient vehicles had the biggest price cuts. These cuts in prices offset the fall in what consumers would pay for their vehicles as gasoline prices rose. Consumers would have switched earlier, but Detroit kept making better and better offers they could not refuse as gasoline prices rose from 2002 to 2005. And, as a result, while sales continued to look good, Detroit was experiencing a massive erosion of profits.

Hurricanes Katrina and Rita sent regular gasoline prices shooting over $3 per gallon (nominal) in 2005 and the expectation of other supply disruptions kept the price high (nominal, year over year) for much of 2006. This time Detroit could not offer enough discounts and incentives to prevent a dramatic and sudden shift of American new-vehicle buyers from gas guzzling SUVs and large cars to fuel-efficient cars, crossover vehicles, and hybrids. For the first time since 1981, the truck share of sales fell in 2005 and 2006. (From 1981 to 2004 the truck share grew from 19% to 56%. The truck share fell to 55% in 2005 and to 52% in 2006.) More significantly, for the first time since 1991, the actual number of trucks sold fell in 2005 (by 79 thousand units) and again in 2006 (by nearly 2 million units).

This began a financial freefall for Detroit that has implications for the entire U.S. economy. Less than two years ago, UMTRI released a study that focused on Detroit's vulnerability to rising fuel prices. Both the industry and the media dismissed our findings. We predicted that if gasoline were to hit $3.37 per gallon it would cause $11 billion in losses for Detroit. We underestimated Detroit's vulnerability—so far the gasoline price spike has cost close to $25 billion in losses, along with thousands of jobs.

Why the market will not work to meet America's fuel economy needs

In theory, we could let the market simply continue replacing American vehicles with fuel-efficient foreign vehicles. There are several reasons why this theory will not lead to the kind of reductions in fuel consumption our nation needs to achieve in the time we have to achieve it.

In America, we have 240 million passenger cars and light trucks on the road which we drive 2.9 trillion miles in a year. Every car and truck produced is part of our fleet for 15 years or more. Automakers are making decisions today about the cars and trucks that will roll off the assembly line five years from today.

Detroit failed to sense and respond to the change in consumer demand before and there is a danger Detroit still doesn't understand how much consumers value fuel economy. Recently, as gas prices have drifted down, Detroit automakers have worried out loud that consumers will not want fuel-efficient vehicles. Foreign automakers may make similar mistakes about American consumers. Toyota and Nissan have been selling large SUVs and trucks in the U.S. for a number of years, and Toyota is currently launching their largest and least fuel-efficient American-assembled trucks.

Each new vehicle represents an investment of at least a billion dollars and five years of development before the first unit ("job one") rolls off the assembly line. While technologies that are under the hood today could dramatically increase fuel economy if deployed fleet wide, Detroit simply does not have the capital it needs to implement such a deployment. In the meantime, Detroit automakers are continuing to produce another generation of gas-guzzlers that will hamper efforts to reduce gasoline consumption for years to come.

Finally, if Americans import (or buy from foreign-owned automakers) advanced technology vehicles, we would just trade oil dependence for technology dependence. The national security implications of this would need to be examined to determine whether we would be more or less safe.

This fall we released a study that showed proactive fuel economy increases would strengthen Detroit financial footing and America's economic, energy and environmental future. From a greenhouse gas emissions consideration alone, there is an urgent need to reduce American fuel consumption quickly. Today it is my opinion that this cannot happen without federal leadership.

There are multiple fuel economy proposals on the table but a dearth of solid analysis on which to base sound policy decisions. The University of Michigan will be conducting this analysis in the coming months. We look forward to assisting you as you craft a powerful legacy for future generations.