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THE EFFECT OF CORPORATE AVERAGE FUEL ECONOMY STANDARDS ON CONSUMERS

by Julian Morris
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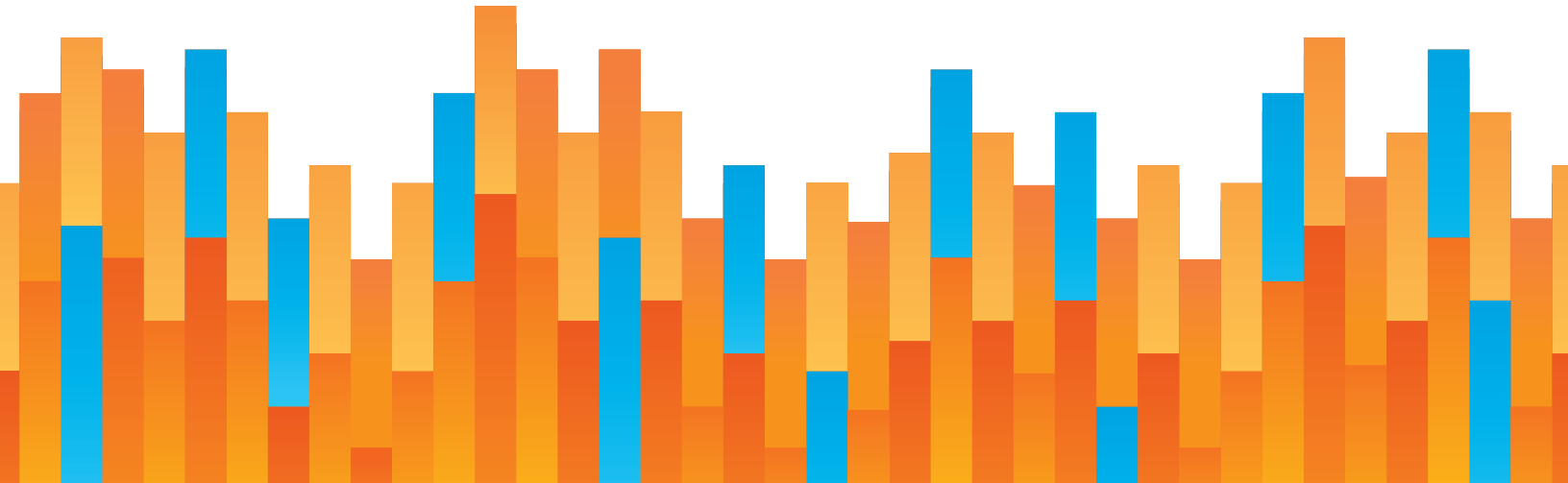

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PART 1

INTRODUCTION

Corporate Average Fuel Economy (CAFE) standards require manufacturers to meet minimum fuel economy requirements for their fleets of vehicles sold in the U.S. As a result, manufacturers adjust certain vehicle attributes in order to comply with these standards. Among the many vehicle attributes that a manufacturer may adjust are: weight, power, and drivetrain. Such adjustments have consequences for the cost and performance of vehicles, which affects consumers.

In their assessment of the likely effects of CAFE standards, the National Highway Traffic Safety Administration (NHTSA) and the Environmental Protection Agency (EPA) claim that the new standards introduced since 2011 generate substantial benefits for consumers. Underlying that claim is an assumption that consumers fail adequately to take into consideration the economic benefits of more fuel-efficient vehicles when making purchasing decisions.[1] However, a slew of recent studies questions the assumptions made by NHTSA and EPA. This brief assesses the effects of CAFE standards on consumers.

[1] The EPA and NHTSA also claim other benefits for the new standards, such as lower emissions, which were the subject of another brief. See: Morris, Julian and Arthur Wardle. *CAFE and ZEV Standards: Environmental Effects and Alternatives.* Los Angeles: Reason Foundation, 2017.

PART 2

IS THERE AN ENERGY EFFICIENCY PARADOX?

In 2012, NHTSA and EPA set new fuel economy standards for "light duty vehicles" (i.e. cars, SUVs, minivans and pickup trucks) for the period 2017–2021.[2] The agency also proposed so-called "augural" standards for 2022–2025, which were intended as indicative of the standards that would be set in a future rulemaking.

In their midterm review of the 2022–2025 greenhouse gas emissions and CAFE standards, NHTSA, EPA, and the California EPA estimate that the average discounted incremental cost of a new vehicle complying with the augural 2025 standards (i.e. the cost increase over vehicles complying with 2024 augural standards) ranges from $974 to $1055 (in 2013 dollars).[3] In spite of this large increase in cost, the agencies estimate that consumers will on average achieve savings due to lower fuel expenditures. They estimate that on average consumers' discounted lifetime net savings will be between $879 and $1679.[4]

In aggregate, the agencies estimate that the lifetime benefits of the 2021 and augural 2022–2025 standards resulting from reduced fuel use are between $48.7 billion and $88.8

[2] Environmental Protection Agency and National Highway Traffic Safety Administration. *2017 and Later Model Year Light-Duty Vehicle Greenhouse Gas Emissions and Corporate Average Fuel Economy Standards*. Federal Register. Vol. 77, No. 199. Monday, October 15, 2012, 62624 – 63200. Available at: https://www.gpo.gov/fdsys/pkg/FR-2012-10-15/pdf/2012-21972.pdf

[3] Environmental Protection Agency. National Highway Traffic Safety Administration and California EPA. "Draft Technical Assessment Report: Midterm Evaluation of Light-Duty Vehicle Greenhouse Gas Emission Standards and Corporate Average Fuel Economy Standards for Model Years 2022–2025." Section 12. Tables 12.51 to 12.58.

[4] Ibid, Table 12.59.

billion.[5] Meanwhile, they estimate that the aggregate costs of new vehicles resulting from implementation of the standards, including the additional costs of vehicle maintenance, range from $27.5 billion to $39.2 billion.[6] The implication is that the standards are a net win for consumers, who stand to gain at least $20 billion in aggregate from the actions of far-sighted regulators forcing car manufacturers to sell more fuel-efficient vehicles.

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But if consumers would save money by purchasing more fuel-efficient vehicles, the question arises as to why the agencies assume that they would not purchase such vehicles in the absence of CAFE standards. The agencies explain their case as follows:

> *[F]uel-saving technologies … pay for themselves within a few-year payback period, and thus save consumers money. Despite this, development and uptake of energy efficiency technologies lags behind adoption that might be expected under these circumstances. The implication is that private markets do not provide all the cost-effective energy-saving technologies identified by engineering analysis. The phenomenon is documented in many analyses of energy efficiency, and is termed the “energy paradox” or “energy efficiency gap.”*

Since at least the late 1970s, some economists have argued that consumers are slow to adopt more energy-efficient technologies even when those technologies could save them

5 Ibid at 12.67. 68.

6 Ibid.

money.[7] As the agencies note,[8] this phenomenon has been dubbed the "energy paradox"[9] or the "energy efficiency gap."[10]

2.1 ARE CONSUMERS SELECTIVELY MYOPIC?

In the case of vehicles, the energy paradox is often alleged to result from consumers failing adequately to take into account the benefits, in terms of reduced future expenditures on fuel, of more fuel-efficient vehicles. In essence, the argument is that consumers are selectively myopic, discounting future expenditures on fuel at a higher rate than other costs, such as payments on vehicle leases or loans. But are consumers actually selectively myopic with regard to fuel economy? Until recently, there was little good empirical evidence either way. However, in the past few years several careful studies have sought to investigate the extent of such myopia.

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In a 2013 paper published in the *American Economic Review*, Meghan Busse, Christian Knitttel and Florian Zettelmeyer investigated the effect of a change in the price of gasoline on prices of and demand for new and used cars with different fuel economy ratings.[11] They found that a $1 per gallon change in gas prices increased the price differential between the highest and lowest fuel economy quartiles of used cars by $1,945. For new cars, the effect on price differentials was smaller, at $354, however they found that when gas rose by $1 in

7 Hausman, Jerry. "Individual Discount Rates and the Purchase and Utilization of Energy-Using Durables." *Bell Journal of Economics*. Vol. 10 (1). (1979). 33–54. Avraham Shama, "Energy conservation in US buildings, solving the high potential/low adoption paradox from a behavioral perspective." *Energy Policy*. Vol. 11 (2) (1983). 148–167.

8 Environmental Protection Agency and National Highway Traffic Safety Administration. *2017 and Later Model Year Light-Duty Vehicle Greenhouse Gas Emissions and Corporate Average Fuel Economy Standards*. 62624–63200, at 62914.

9 Jaffe, Adam and Robert Stavins. "The Energy Paradox and the Diffusion of Conservation Technology." *Resource and Energy Economics*. Vol. 16 (1994). 91–122.

10 Jaffe, Adam and Robert Stavins. "The Energy-Efficiency Gap: What Does It Mean?" *Energy Policy*. Vol. 22 (1994). 804–810.

11 Busse, Meghan R., Christopher R. Knittel, and Florian Zettelmeyer. "Are Consumers Myopic? Evidence from New and Used Car Purchases." *American Economic Review* 2013. Vol. 103(1): 220–256.

price, the market share of the most fuel-efficient quartile rose by 21.1%, while the market share of the least fuel-efficient quartile fell by 27.1%. Based on these findings, the authors then estimated the implicit discount rates applied by vehicle purchasers to the cost of gas usage and concluded that they "correspond reasonably closely to interest rates that customers pay when they finance their car purchases." In other words, they find little evidence that consumers are selectively myopic with regard to vehicle fuel economy.

In a 2014 paper published in the *Review of Economics and Statistics*, Hunt Alcott and Nathan Wozny used data from 86 million sales of used vehicles at auto dealerships and wholesale auctions to evaluate the relationship between expected changes in gas prices (using the price of oil futures contracts as a proxy) and changes in the price of vehicles of different fuel economy.[12] They found that "vehicle prices move as if consumers are indifferent between one dollar in discounted future gas costs and only 76 cents in vehicle purchase price." In other words, consumers seem to show mild myopia regarding the prospective savings from purchasing more fuel-efficient vehicles.

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However, the authors found that most of this myopia was a result of consumers who purchased much older vehicles. As they note: "We show that the result that consumers undervalue gas costs is largely driven by older vehicles: prices for vehicles aged 11–15 years appear to be highly insensitive to gasoline prices, while prices for relatively-new used vehicles move much more closely to the theoretical prediction." (The "theoretical prediction" being that prices of vehicles would move one-to-one with the present discounted cost of future gas purchases.) This is not surprising, for two reasons: first, there are far fewer vehicles older than 10 years on the road, so consumers would be less able to make direct comparisons between such vehicles based on fuel economy. Second,

[12] Allcott, Hunt and Nathan Wozny. "Gasoline prices, fuel economy, and the energy paradox." *Review of Economics and Statistics.* 2014. Vol. 96 (5). 779–795.

purchasers of older vehicles are more likely to face financial constraints that effectively raise their discount rate above the 6% rate assumed by the authors: for lower-income consumers, low-cost car loans may not be available, so the relevant discount rate would be the cost of financing using a credit card or other higher-cost form of financing, such as a payday loan.

In a 2016 paper published in the *Journal of Public Economics*, James Sallee, Sarah West and Wei Fan used data from wholesale used car auctions, comparing prices of vehicles of identical types and vintages but different mileage (and hence different life expectancies), at various points in time. This enabled the authors to evaluate the effects of changes in gas prices on the sale prices of vehicles with different fuel economy characteristics. The authors conclude, "Our data suggest that used automobile prices move one for one with changes in present discounted future fuel costs, which implies that consumers fully value fuel economy."[13]

Based on these carefully constructed studies, there is little reason to believe that the majority of consumers are myopic when it comes to evaluating the relative costs of future gasoline expenditures.

Based on these carefully constructed studies, there is little reason to believe that the majority of consumers are myopic when it comes to evaluating the relative costs of future gasoline expenditures. In their midterm review, the agencies acknowledge the conclusions of these studies and note: "Thus, consumers appear to take fuel economy into account when buying vehicles, but how precisely they do it is not yet clear."[14] But the agencies then went on to cite an analysis of surveys referenced in a National Academy of Sciences report, which found that "consumer willingness to pay for fuel savings implies average payback periods of 2-3 years."[15] However, this survey evidence is at odds with the studies cited earlier, which indicate that consumers apply similar discount rates—and hence payback periods—to vehicle purchases and fuel savings. It is unclear why the agencies would choose

[13] Sallee, James M., Sarah E. West, Wei Fan. "Do consumers recognize the value of fuel economy? Evidence from used car prices and gasoline price fluctuations." *Journal of Public Economics*. 2016. Vol. 135. 61–73.

[14] Midterm review. Section 6-7.

[15] Ibid.

to give prominence to these surveys, which are based on stated preferences, i.e. what people *say* they are willing to pay, and are thus less reliable and relevant than the other studies described above (i.e. Busse et al, Alcott and Wozny, and Sallee et al), which relied on revealed preferences, i.e. what consumers are *actually* willing to pay.

2.2 ARE PRODUCERS FAILING TO SUPPLY MORE-EFFICIENT VEHICLES THAT CONSUMERS WANT?

An alternative explanation for the existence of an energy efficiency paradox offered by the agencies is that the market for automobiles is uncompetitive and producers are using their market power to limit the supply of vehicles that offer higher fuel economy in order to generate excess profits. The agencies offer two complementary explanations as to how this might arise.

First, the agencies argue in their midterm review that, due to fixed costs in vehicle production,

> *…automakers strive to differentiate their products from each other [and] … fuel economy of a vehicle can become a factor in product differentiation rather than a decision based solely on cost-effectiveness of a fuel-saving technology … For instance, automakers may emphasize luxury characteristics in some vehicles to attract people with preferences for those characteristics, and they may emphasize cost and fuel economy for people attracted to frugality. By separating products into different market segments, producers both provide consumers with goods targeted for their tastes, and may reduce competition among vehicle models, creating the possibility of greater profits. … [Thus, the] structure of the automobile industry may inefficiently allocate car attributes—fuel economy among them—and help to explain the existence of an energy efficiency gap.*

While it is true that there are high fixed costs in vehicle production and that automakers strive to differentiate their products from one another, it is not at all clear that these two things are linked. All manufacturers seek to differentiate their products in order to make them appealing to consumers. This is equally true of manufacturers facing high fixed costs and those facing low fixed costs. What the agencies may be referring to here is the high fixed costs associated with *each individual product*, which means that the range of products will be limited. To the extent that this is true, the question then is why such high product-specific fixed costs exist?

In principle, given the flexibilities of modern production lines, manufacturers could offer consumers the ability to choose from a range of drivetrains, engine configurations, chassis, interiors, and so on.[16] Thus, consumers wishing to purchase a large, powerful, luxurious vehicle with high fuel economy could do so—at a price. (After all, automobile manufacturers already offer customization in many of the details of vehicles, including color, trim, audio equipment, etc.) One major obstacle to such flexible configurations is the requirement that all vehicles offered for sale must comply with NHTSA and EPA regulations, and that any substantively different vehicle must undergo separate regulatory review. As a result, automobile manufacturers produce a smaller range of vehicles than might otherwise be the case.

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Regulatory barriers to competition in the U.S. automobile market are compounded by differences in regulatory standards in the U.S. and internationally. An automobile designed to comply with European standards often will not also comply with U.S. standards—and vice versa—as a Congressional Research Service report from 2014 notes:

> *Even though similar cars are sold in both markets, there are widely different transatlantic standards and testing requirements for many parts, including wiper blades, headlights, light beams, and seat belts. According to one U.S. trade association, a U.S.-*

[16] Neil, Stephanie. "A Flexible Assembly Line." *Automation World*. April 19, 2015. https://www.automationworld.com/article/industries/automotive/flexible-assembly-line; Lampón, Jesús F., Pablo Cabanelas and Javier González-Benito. "The impact of modular platforms on automobile manufacturing networks." *Production Planning & Control: The Management of Operations*. Volume 28 (4). 2017. 335–348.

> *based producer of light trucks found that a popular U.S. model the manufacturer wanted to sell in Europe required 100 unique parts, an additional $42 million in design and development costs, incremental testing of 33 vehicle systems, and 133 additional people to develop—all without any performance differences in terms of safety or emissions. EU manufacturers face similar issues in reverse when selling an EU-designed model in the United States.*[17]

Second, the agencies argue that, in the absence of fuel economy standards, vehicle producers are more likely to focus on incremental improvements to existing technologies rather than investing in "major" innovations. The reasons that the agencies give for this are: (1) high fixed costs in the development of "major" innovations resulting in "first mover disadvantages"; (2) "dynamic increasing returns" to the adoption of "major" new technologies, due to network effects or learning by doing; (3) synergies that might result from multiple companies working on similar technologies at the same time.

While such barriers to investment in "major" innovations probably do exist, they are hardly unique to vehicle fuel economy. Indeed, they exist in practically every field, from agriculture to microprocessors and from nanotechnology to xenotransplants. New major agricultural technologies, such as those involving the use of modern biotechnology, for example, involve very high fixed costs due to the need for lengthy and expensive field trials.[18]

Moreover, it is not clear that the imposition of fuel economy standards is an efficient or even an effective way to overcome such barriers. The problem of high fixed costs can be addressed at least in part through the use of trade secrets, patents and design rights, which in principle create first mover advantages. However, it is possible that the current patent system creates perverse incentives to over-invest in incremental improvements by granting protection to such innovations, rather than limiting protection to "major" innovations. (If such limits were imposed, a new type of engine or engine configuration attaining significant efficiency improvements might be patentable,[19] whereas a tweak to an existing type of engine through the application of new materials already in use in other applications

[17] Akhtar, Shayerah and Vivian Jones. *Proposed Transatlantic Trade and Investment Partnership (T-TIP): In Brief.* Washington, DC: Congressional Research Service, June 2014. 8.

[18] Anderson, Benjamin C. and Ian M. Sheldon. "R&D Concentration under Endogenous Fixed Costs: Evidence from the Agricultural Biotechnology Industry." *American Journal of Agricultural Economics.* Vol. 99 (5). 2017. 1265–1286.

[19] Such as this: http://icappatentbrokerage.com/sites/icappatentbrokerage.com/files/AB%20Engine%20Incorporated_Portfolio%20Description.pdf and this: https://www.google.com/patents/WO2011074002A1?cl=en

might not.[20]) If that is the case, then the solution is to limit patents to "major" innovations (i.e. change the criteria for meeting the "non-obviousness" test so that incremental innovations are not patentable). However, most innovation is in fact incremental, so identifying the appropriate boundary is fraught with difficulty.[21]

The second and third problems arise in some sense from the opposite problem: weak incentives to share innovations. In other industries, competing manufacturers have collaborated to develop various voluntary standards, licensing agreements, patent pools, and other solutions that have helped them to overcome such barriers.[22] For example, the developers of the MP3 audio codec created a simple and relatively inexpensive license, enabling many companies to include it in their software, resulting in a profusion of innovative MP3 players and widespread use.[23] While the automotive industry has adopted some of these solutions, it is possible that more could be done. One potential barrier to such collaboration between firms is the possibility that it would be found to breach anti-trust rules, as occurred previously when U.S. automobile manufacturers entered into an agreement to share intellectual property relating to pollution abatement equipment.[24]

CAFE standards themselves create high fixed costs that raise prices, impede competition, and undermine incentives to develop a wide range of vehicle choices for consumers.

CAFE standards themselves create high fixed costs that raise prices, impede competition, and undermine incentives to develop a wide range of vehicle choices for consumers. As such, they impede the development of vehicles that effectively match consumer preferences.

20 For an example, see: https://www.google.com/patents/US4341826

21 Scotchmer, Susan. "Standing on the Shoulders of Giants: Cumulative Research and the Patent Law." *Journal of Economic Perspectives*. Vol.5 (1). 1991.29–41. Available at: http://pubs.aeaweb.org/doi/pdfplus/10.1257/jep.5.1.29

22 See e.g. Todeva, Emanuela and David Knoke. "Strategic Alliances & Models of Collaboration." *Management Decision*. Vol 43 (1), 2005; Devi R.Gnyawali, and Byung-Jin (Robert) Park. "Co-opetition between giants: Collaboration with competitors for technological innovation." *Research Policy*. Vol. 40 (5). 2011. 650–663.

23 See e.g.: https://www.mp3-history.com/

24 *U.S. v. Automobile Association of America, Inc.* (1969) and *U.S. v. Automobile Association of America, Inc.* 643 F.2d 644, 1981. https://openjurist.org/643/f2d/644/united-states-v-motor-vehicle-manufacturers-association-of

PART 3

FUEL ECONOMY AND CONSUMER PREFERENCES

It is often claimed that fuel economy increased little during the 20th century prior to the introduction of CAFE standards. This is largely true, inasmuch as "fuel economy" refers to the amount of fuel required to propel a vehicle a certain distance. The original 1909 Model T Ford is reputed to have achieved about 25 mpg—similar to many of today's cars.[25] However, it is not true with respect to the efficiency of propulsion. Competition and innovation tend to result in increased efficiency in the use of resources. That was certainly true with regard to engine efficiency throughout the 20th century, which increased dramatically prior to the introduction of fuel economy standards as a result of improvements in both engines and fuels.[26] The Model T weighed about 1,200 lbs., had a 2.9-liter, 4-cylinder engine that developed about 20 brake horse power (bhp), and had a top speed of about 45 mph.[27] By contrast, the 1955 Chevrolet Bel Air Sport Coupe Powerglide weighed about 3,500 lbs., had a 3.5-liter V8 engine that developed 136 bhp, had a top

25 MacKenzie, Angus. "The 25 Mpg Model T: Why Haven't We Done Better?" *Motor Trend*. April 4, 2008. http://www.motortrend.com/news/the-25-mpg-model-t-why-havent-we-done-better-1751/

26 Splitter, Derek, Alexander Pawlowski and Robert Wagner. "A Historical Analysis of the Co-evolution of Gasoline Octane Number and Spark-Ignition Engines." *Frontiers in Mechanical Engineering*. 06 January 2016. https://www.frontiersin.org/articles/10.3389/fmech.2015.00016/full

27 Ibid.

speed of 102 mph, had a two-speed automatic transmission, and achieved "fuel economy" of about 18 mpg.[28] As this comparison demonstrates, the reason "fuel economy" did not increase (it may even have fallen during the 1950s) is that the power, size, and weight of vehicles rose, as manufacturers added features that made them faster, more luxurious and safer.

Early CAFE standards didn't change the situation much. A 2003 Congressional Budget Office analysis found that although CAFE standards for passenger cars rose from 22 mpg to 27.5 mpg between 1981 and 2003, average fuel economy of passenger vehicles and light trucks rose only slightly, from 20.5 to 20.8 mpg. What did change was average power, which nearly doubled from 102 to 197 bhp, average weight, which rose by nearly 25% from 3,201 lbs. to 3,974 lbs., and average time to accelerate from 0 to 60 mph, which fell by nearly 30%.[29]

Consumers have consistently demonstrated a preference for more powerful, heavier, more luxurious vehicles that accelerate more rapidly.

Consumers have consistently demonstrated a preference for more powerful, heavier, more luxurious vehicles that accelerate more rapidly. CAFE standards cannot change consumer preferences, but they can—and do—restrict consumers' choices. As Part 2 demonstrated, consumers choose more fuel-efficient vehicles when they expect the cost of gasoline to be higher. CAFE standards force manufacturers to sell vehicles that are more fuel-efficient than those consumers would otherwise purchase. Since more fuel-efficient vehicles are more expensive, this means consumers are forced either to pay more for a vehicle with all the other attributes they want (power, speed, luxury, etc.), or purchase vehicles that lack some of those attributes. Either way, consumers are harmed by CAFE standards.

[28] Data from Automobile Catalog: http://www.automobile-catalog.com/auta_perf1.php

[29] Congressional Budget Office. *The Economic Costs of Fuel Economy Standards Versus a Gasoline Tax*. U.S. Congress: Washington, DC, 2003. 8. Available at: https://www.cbo.gov/sites/default/files/cbofiles/ftpdocs/49xx/doc4917/12-24-03_cafe.pdf

PART 4

THE EFFECTS OF CAFE STANDARDS ON LOW INCOME CONSUMERS

CAFE standards have a particularly pernicious effect on lower-income consumers, especially those in rural areas for whom pickup trucks are especially valuable. Such standards increase the price of both new and used vehicles. The price of used vehicles rises because the increase in price of new vehicles results in consumers, on average, keeping vehicles for longer periods of time, reducing the supply of used vehicles, and causing more vehicle purchasers to choose used vehicles compared with new vehicles for cost reasons. This behavior drives up demand for and the price of used vehicles. As noted above, this is particularly true for larger, more powerful vehicles such as pickups. As such, lower-income consumers end up paying more for vehicles with the characteristics they want.

As Figure 1 shows, based on national data collected by cargurus.com, the average price of used pickups has increased by about 25% since 2013. Meanwhile, based on EPA data, the fuel economy of the most popular pickup (and best-selling vehicle in America), the Ford F-150 rose from 19 mpg (combined) in 2011[30] to 21 mpg in 2016.[31] So, a consumer who drives their pickup for 12,000 miles per year (about the average according to the

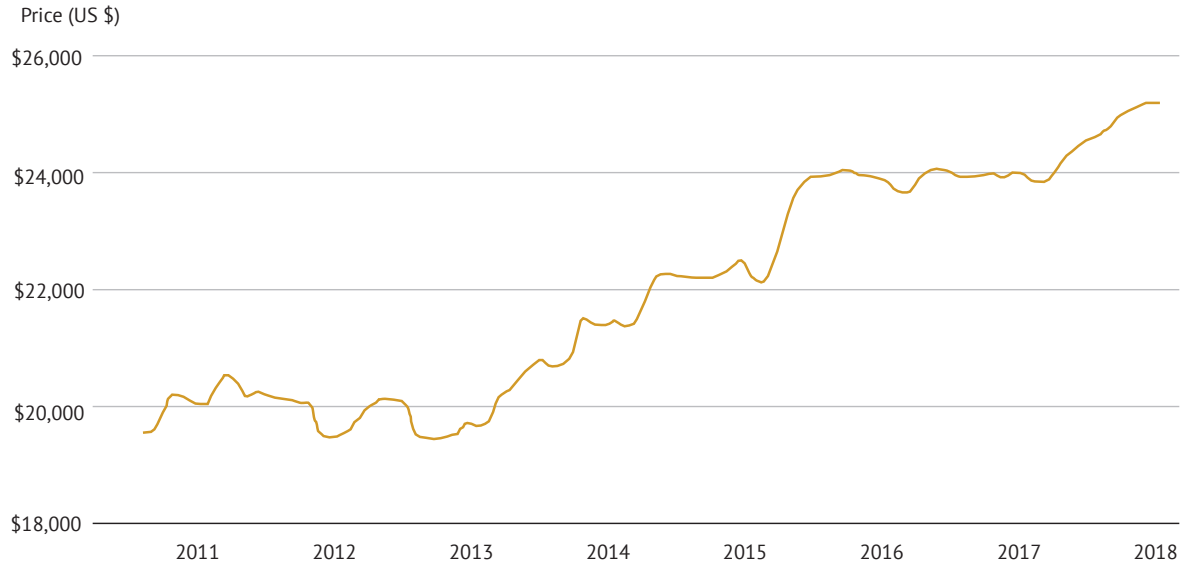
[30] https://www.fueleconomy.gov/feg/bymodel/2011_Ford_F150_Pickup.shtml

[31] https://www.fueleconomy.gov/feg/bymodel/2016_Ford_F150_Pickup.shtml

Department of Energy[32]) purchasing a two-year old Ford F-150 in 2018 would have paid about $5,000 extra for a vehicle that saves them, on average, $150 per year in gas (at a gas price of $2.50/gallon).[33] Assuming that the consumer pays interest at 5% on the vehicle (about the current rate for a 36-month loan on a used car according to bankrate.com[34]), that means they effectively lose $100 per year as a result of the increase in price, which is more-or-less directly attributable to the new CAFE standards.

Assuming that the consumer pays interest at 5% on the vehicle (about the current rate for a 36-month loan on a used car according to bankrate.com), that means they effectively lose $100 per year as a result of the increase in price, which is more-or-less directly attributable to the new CAFE standards.

FIGURE 1: AVERAGE PRICES OF USED PICKUP TRUCKS, AUGUST 2010–JANUARY 2018



Source: https://www.cargurus.com/Cars/price-trends/

32 https://www.afdc.energy.gov/data/10309

33 Assuming the price of used Ford F-150s rose at a rate similar to that of the average pickup.

34 https://www.bankrate.com/loans/auto-loans/current-auto-loan-interest-rates/

PART 5

CONCLUSIONS AND RECOMMENDATIONS

Proponents of CAFE standards claim that they benefit consumers by reducing the total costs of purchasing and using vehicles. The evidence contradicts this claim. Consumers generally purchase vehicles with characteristics that meet their needs, including their expectation of the total cost of future gas purchases. CAFE standards distort manufacturers' incentives, forcing them to produce new vehicles with lower gas consumption than would be preferred by consumers. As a result, the range of vehicle options available to consumers is limited and many consumers are effectively forced to purchase vehicles that are less able to meet their preferences.

Among the most adversely affected consumers are those, predominantly in rural areas, who seek to purchase used pickups. The distortions created by CAFE standards artificially raise the cost of these vehicles by more than the average savings from reduced gas usage, increasing the total cost of ownership. Given the steep rise in the price of used pickup trucks that resulted from CAFE standards for the 2012–2016 period and current increases occurring as the 2017–2021 standards are implemented, it is likely that prices would rise at an even faster rate if the agencies were to implement standards along the lines of those proposed as "augural" for 2022–2025.

In addition, as noted in a previous paper, fuel economy and greenhouse gas emissions standards for vehicles are a very inefficient way to address issues related to fuel consumption and emissions.[35]

> *Ideally, the federal government would scrap the federal CAFE and greenhouse gas emissions standards. However, this option is not currently on the table.*

Ideally, the federal government would scrap the federal CAFE and greenhouse gas emissions standards. However, this option is not currently on the table. Nonetheless, the agencies implementing the standards do have the option of setting future greenhouse gas emissions and CAFE standards at the same level currently set for model year 2021. That would certainly be preferable to the alternative of raising the standards further.
In addition, to the extent that other extant EPA and NHTSA regulations serve as barriers to the introduction of vehicles that better suit consumer preferences, it behooves the agencies to seek ways to remove these barriers. One example noted herein are the essentially arbitrary and unnecessary differences between U.S. and international standards for a variety of vehicle parts. Harmonization of these standards would likely result in the production of vehicles that better serve consumers at a lower price. In addition, to the extent that the threat of anti-trust action impedes collaboration between manufacturers in the development of new technologies, a simple process for the granting of anti-trust waivers could facilitate more rapid innovation, not only of more-efficient vehicles but also in many other aspects of automotive technology.

[35] Morris, Julian and Arthur R. Wardle. *CAFE and ZEV Standards: Environmental Effects and Alternatives.* Los Angeles: Reason Foundation, 2017. Available at: https://reason.org/wp-content/uploads/2017/08/cafe_zev_standards_environment_alternatives.pdf

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