More Mileage for Your Money: Fuel Economy Increases While Vehicle Prices Remain Stable

Prepared for Consumers Union

March 15, 2017 (corrected)

AUTHORS

Tyler Comings
Avi Allison

Synapse
Energy Economics, Inc.

485 Massachusetts Avenue, Suite 2
Cambridge, Massachusetts 02139

617.661.3248 | www.synapse-energy.com

Executive Summary

Higher fuel efficiency in cars and trucks lowers annual fuel spending. But does boosting fuel economy drive up the cost of new vehicles and put them out of reach of low-income buyers, as claimed by some opponents of fuel economy standards?

While the price of other consumer goods has risen over the past two decades, vehicle prices have remained flat, even as passenger cars and trucks go farther on every gallon of gas. Using consumer-spending data, this report details how new and used car prices have changed over the last 20 years, and examines other factors affecting affordability of new cars for low- and moderate-income households.

Across all income groups, spending on gasoline has decreased since 2005. That is partly because of lower gas prices, but it is also due to better gas mileage for passenger cars and trucks. After adjusting for inflation, the analysis found gas prices decreased by 12 percent over this period, while fuel economy for new vehicles improved by 25 percent.[1]

Highlights from the report —*More Mileage for your Money: Fuel economy increases while vehicle prices remain stable* —include the following:

- **Car buyers are enjoying higher fuel economy than before - and they are paying less for it.** The report finds that the average price of new and used cars and light-duty trucks has remained relatively flat since 1997. Over the same period of time, fuel economy of new cars and trucks has continued to improve which carries forward into the used car market.

- **Fuel efficiency improvements have been a boon for consumers.** If fuel economy had not improved from 2005 through 2015 (i.e. if it had stayed at 20 mpg), households purchasing new vehicles would have spent 25 percent more on fuel in 2015 than they actually did. By 2015, the average household buying a new vehicle saved $523 in fuel annually, based on fleet-wide efficiency gains since 2005.

- **The price of entry-level vehicles has remained approximately the same over the past 10 years.** The most affordable vehicle among the top 30 sold in 2015 cost the same (in real terms) as the most affordable top 30 vehicle sold in 2005. (It's a different story for high-end vehicles: the price of the most expensive of the top 30 vehicles increased by 40 percent over the same period).

- **While the prices of new and used cars have remained flat (or have fallen in real terms),** low-income households are under increasing financial pressure **from higher prices of other household goods and stagnant wages.** The Consumer Price Index, which

[1] Energy Information Administration (EIA). U.S. Regular All Formulations Retail Gasoline Prices (Dollars per Gallon). Average price per gallon in 2005 is $2.77 ($2015) and $2.43 in 2015.

> tracks inflation of consumer goods, finds that the average prices of all goods have increased by about 50 percent over the last 20 years. Education and gasoline prices have risen even faster. Higher prices have been accompanied by stagnant wages for the two lowest quintiles, a combination that leaves low-income households behind in an otherwise growing economy.

Low-income households, which spend more money fueling cars than buying them, are particularly sensitive to gas prices. One recent study found that "as a percent of income, savings on fuel are greatest for lower income households."[2] Specifically, the authors found that savings on fuel costs due to improved miles-per-gallon standards ranged from 4.3 percent of annual income for the lowest income quintile, to 0.9 percent for the highest income quintile.[3]

An earlier Consumers Union study found that owners of vehicles that meet the 2025 fuel economy standards could expect to save $3,200 per car and $4,800 per truck, based on today's low gas prices, over the vehicle's lifetime.[4] Those savings will increase if gas prices go back up. The benefits of improved efficiency in new vehicles also make their way to the used car market, which accounts for 70 percent of vehicle sales annually. Low-income households spend a higher share of their income on fuel, and are more likely to purchase used vehicles.

The analysis presented in this report contradicts automaker claims that the fuel economy standards are hurting low-income households and affordability of new vehicles. In fact, higher fuel economy standards lower vehicle ownership costs for all households, but particularly for low-income households, whether they buy new or used vehicles.

---

[2] Greene, D. and J. Welch. 2016. *The Impact of Increased Fuel Economy for Light-Duty Vehicles on the Distribution of Income in the United States*. Report Prepared for Oak Ridge National Laboratory and the Energy Foundation. Available at: http://bakercenter.utk.edu/wp-content/uploads/2016/09/Equity-Impacts-of-Fuel-Economy-Report_final.pdf

[3] *Id.*

[4] Consumers Union, *Fueling Savings: Higher Fuel Economy Standards Results in Big Savings for Consumers*, September 2016 Available at: http://consumersunion.org/research/fueling-savings-report/

INTRODUCTION

In January 2017, the Environmental Protection Agency finalized fuel economy standards for cars and trucks through model year 2025. These standards help consumers save money through decreased fuel consumption, even when factoring costs associated with compliance. Despite this fact, opponents of fuel economy standards blame them for driving up the costs of new vehicles and making them unaffordable for low-income buyers. The analysis featured in this new report finds that car and truck prices have actually remained steady over the last twenty years, even as fuel economy standards have increased and safety features have proliferated.[5] But, vehicle "affordability" does not rely on vehicle prices alone—buying power has fallen for low- to moderate-income buyers both because of falling incomes and rising costs of non-vehicle expenses. There is indeed continual pressure on these households' bottom line, but consumers have benefited from stable car and truck prices and lower gasoline spending. As shown below, fuel economy helps ease the burden faced by households, rather than add to it.

This report presents an analysis of recent changes in fuel economy, vehicle prices, and consumer purchasing power. Focusing on low-income households, we discuss recent trends in consumer spending, vehicle prices, and income. First, we provide evidence that vehicle prices have gone down in real terms (i.e. adjusting for inflation). Second, we show that customers are getting more fuel economy for their money than they have in the past. Third, we discuss the factors that have contributed to a reduced ability of low-income households to afford new vehicles. The report ultimately finds consumers are benefitting from fuel economy standards as fuel efficiency has improved significantly across the board, while vehicle prices remain largely unchanged.

1. Average vehicle prices have gone down, especially for used vehicles.

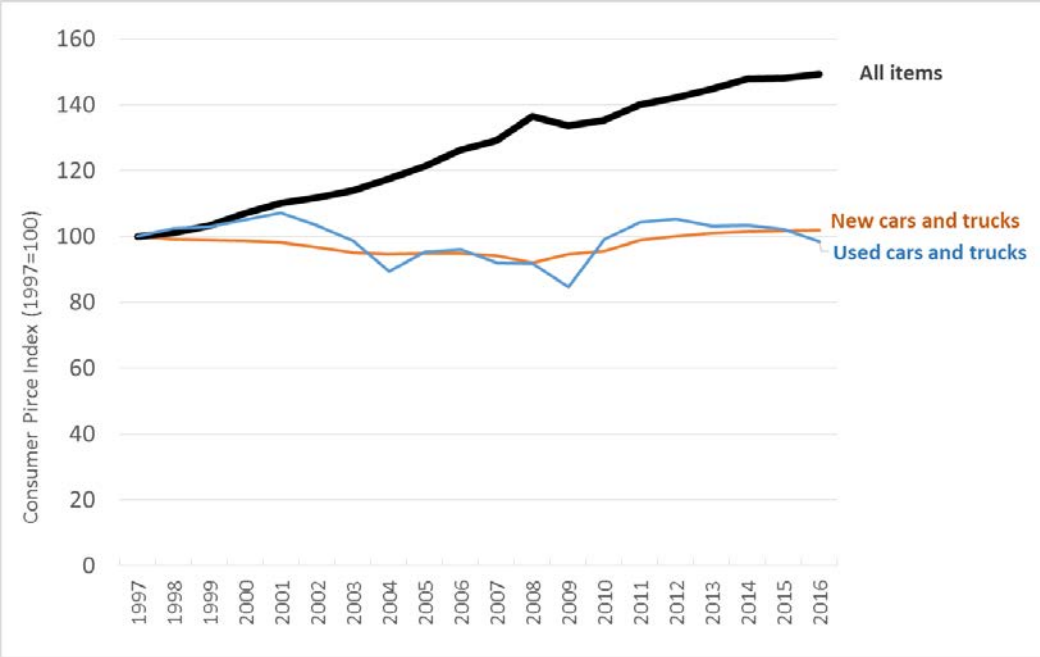
Used cars make up the bulk of automotive sales (69 percent in 2015), though its share has fallen in recent years (76 percent in 2010).[6] New vehicle sales reached an all-time high in 2015. The average price of new cars and light-duty trucks has remained relatively flat, while prices of other household goods increased significantly, according to data from the Bureau of Labor Statistics. The Bureau of Labor Statistics releases the Consumer Price Index (CPI), which is the standard measure of consumer inflation in the United States that tracks both the prices and use of household goods. The "all items" index—the most commonly reported metric—represents a typical basket of household items. This measure combines the prices of individual goods and services, which are then weighted based on a survey of household purchasing patterns. Some of the indices are reported for individual items.

[5] Even as the IIHS continues to raise the bar for its crash tests, vehicles continue to meet its more stringent requirements. Consumer Reports. *IIHS Names Safest Cars.* December 8, 2016. Available at: http://www.consumerreports.org/car-safety/iihs-names-safest-cars-2017-top-safety-picks/.

[6] Edmunds. *Used Vehicle Market Report* and *December 2015: Monthly Sales Insights*.

Figure 1 presents the CPI for "new cars and trucks" and for "all items" over the past 20 years. (Both measures were indexed to 1997, thus they do not show price trends before then.) The CPI for all items in 2016 is about 1.5 times the CPI in 1997. This indicates that the prices of household items have increased by 50 percent over the past 20 years. Meanwhile, the price of new cars and trucks has remained essentially unchanged over that same period. Hence, the price of new and used vehicles has declined in real terms. This is largely due to car manufacturers becoming more efficient. Output per worker (i.e. productivity) in this industry nearly doubled during this period.[7]

Figure 1: New car and truck prices compared to inflation



Source: Consumer Price Index. Indexed to 1997=100. Available at: https://fred.stlouisfed.org.

2. The range of vehicle prices has increased

Although average vehicle prices have been stagnant, the distribution of prices has widened in recent years. Today, more expensive trims are available than before. However, these trims are more tailored to households of larger means than low-income households—for which they are further out of reach. We reviewed a sample of the top 30 selling cars and trucks in 2005 and 2015 (the latest data available). Figure 2 presents data on manufacturer's suggested retail price (MSRP), which is reported for each top-selling make and model. The bottom of each bar below is the MSRP of the cheapest vehicle

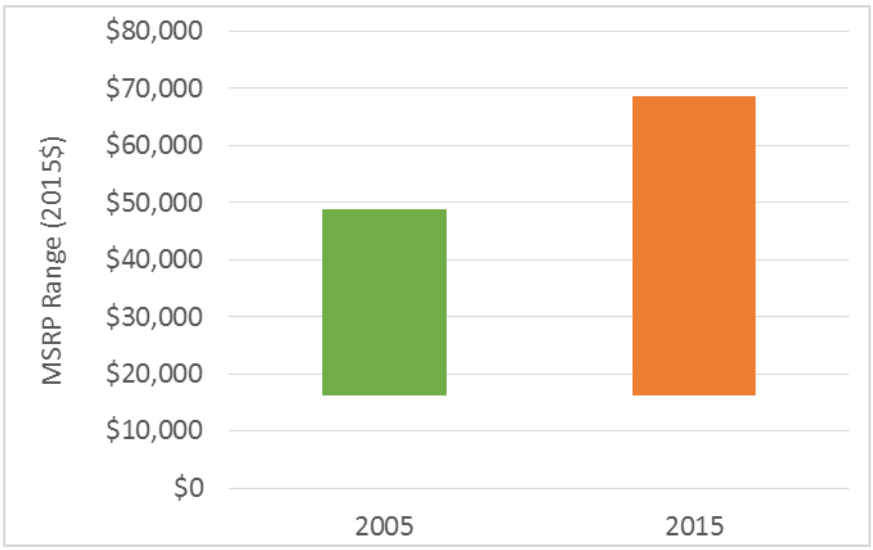
[7] Bureau of Labor Statistics (BLS), Division of Industry Productivity Studies (DIPS). Output per employee for motor vehicle manufacturing. Available here: https://www.bls.gov/lpc/#tables

(make/model/trim) available in that year. The top of each bar is the most expensive available of the top-selling vehicles.[8]

The cheapest vehicle of the top 30 sold in 2015 was almost the same price (in real terms) as the cheapest vehicle of the top 30 sold in 2005, while the most expensive vehicle has increased by 40 percent. The 2015 Chevrolet Cruze L Manual was $16,170 compared to a 2005 Honda Civic DX, which was $16,177 (both in 2015 dollars). Meanwhile, higher-end prices diverged substantially in the same period. The highest price of the top sellers in 2015 was a Jeep Grand Cherokee SRT for $68,590 whereas a 2005 Ford King Ranch Supercrew AWD truck was $48,910 (in 2015 dollars). This represents a 40 percent increase in price, after adjusting for inflation.

The higher-end prices are indicative of more "bells and whistles" and luxury features offered with new cars and trucks—including infotainment, heated seats, increased horsepower, or a nice sound system.[9] This trend also results from automakers focusing on vehicles that will provide a larger profit margin.[10] Importantly, these prices do not account for rebates or dealer incentives, which lower the price paid by consumers. The CPI for new cars and trucks (shown above) does account for these discounts for a sample of new transactions; therefore, it is a better indicator of average price trends.

Figure 2: Prices of top 30 selling cars and trucks



Source: Sales from Good Car Bad Car for 2005 and 2015. Available at: http://www.goodcarbadcar.net/2013/02/2006-usa-auto-sales-rankings-by-model.html and http://www.goodcarbadcar.net/2016/01/usa-vehicle-sales-by-model-2015-calendar-year-

[8] We know the sales by make and model (e.g. Toyota Camry) and we know the minimum and maximum MSRP for each make and model but we do not know the amount of sales for individual trims.

[9] See: Baum, Alan and Dan Luria. Ceres. *Affordability of Vehicles Under the Current National Program in 2022-2025 for Detroit Three Automakers*. December 19, 2016. Available at: https://www.ceres.org/files/analyst-brief-affordability-of-vehicles-under-the-current-national-program-in-2022-2025-for-detroit-three-automakers

[10] Id.

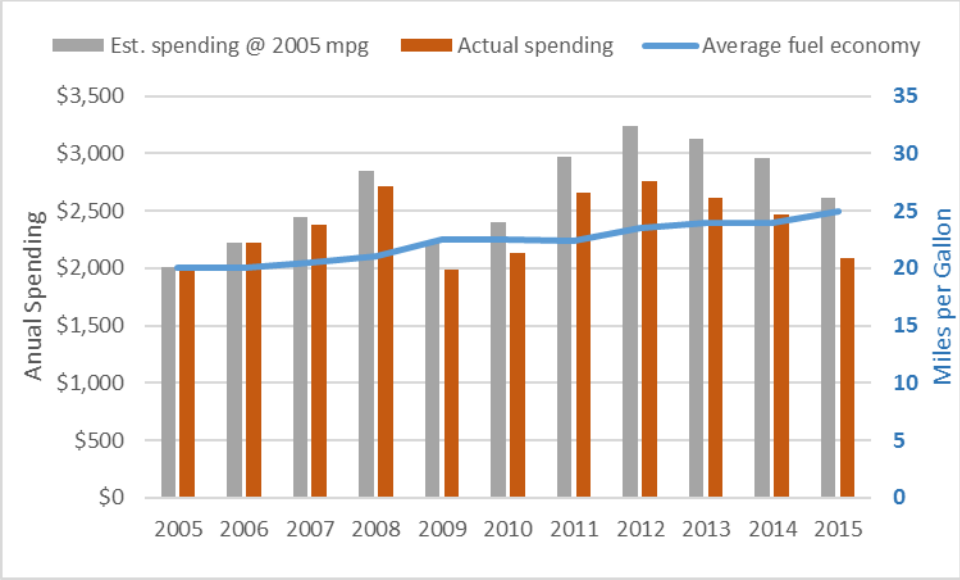
december.html. Prices from MSN Auto and Auto Trader. Available at: http://www.msn.com/en-us/autos/ and http://www.autotrader.com/.

3. Consumers are getting more fuel efficiency for their money than before

Average car and truck prices have remained flat meanwhile fuel economy has improved—and continues to rise. Buyers have access to higher fuel economy than before—and they are paying less for it. The Corporate Average Fuel Economy (CAFE) standards have led to increased fuel economy in recent years. The fuel economy for new cars and trucks, reported by the U.S. Environmental Protection Agency, shows the adjusted fuel economy (i.e. real-world performance) for 2015 at 25 mpg compared to 20 mpg in 2005—a 25 percent increase.[11] Increased fuel economy coupled with stagnant vehicle prices indicates that consumers are getting better efficiency for their money than they used to.

If fuel economy had not improved between 2005 and 2015 (i.e. stayed at 20 mpg), households purchasing new cars in 2015 would have spent 25 percent more on fuel.[12] Figure 3 shows the fuel spending with and without fuel economy improvements since 2005 for the average household. By 2015, the average household purchasing a new vehicle that year would save $523 in annual fuel costs.

Figure 3: Estimated Fuel Savings for the Average Household from Improved Fuel Economy



Source: Consumer Expenditure Survey. Available at: https://www.bls.gov/cex/. U.S. EPA. Light-Duty Automotive Technology, Carbon Dioxide Emissions, and Fuel Economy Trends: 1975 Through 2016.

[11] U.S. EPA. *Light-Duty Automotive Technology, Carbon Dioxide Emissions, and Fuel Economy Trends: 1975 Through 2016*. Available at: https://www.epa.gov/sites/production/files/2016-11/documents/420s16001.pdf.

[12] This is an estimate assuming the same miles driven in both cases.

The increased fuel economy has been a boon for consumers—including low-income households. As new and more efficient cars and trucks are put on the road, they will eventually be sold as used vehicles. This is particularly important for low-income households which purchase more used vehicles than new vehicles. This group is also more sensitive to fuel costs (as we will discuss further in the next section). When purchasing a vehicle with 2015 efficiency, the lowest income quintile group would save an estimated $235 in fuel spending. Although the absolute amount saved by low-income households is less than the amount for the average household, the savings as percentage of income is greater.

4. Low-income households are under increasing pressure—but not due to fuel economy

Purchasing power of low-income households has not kept pace with inflation

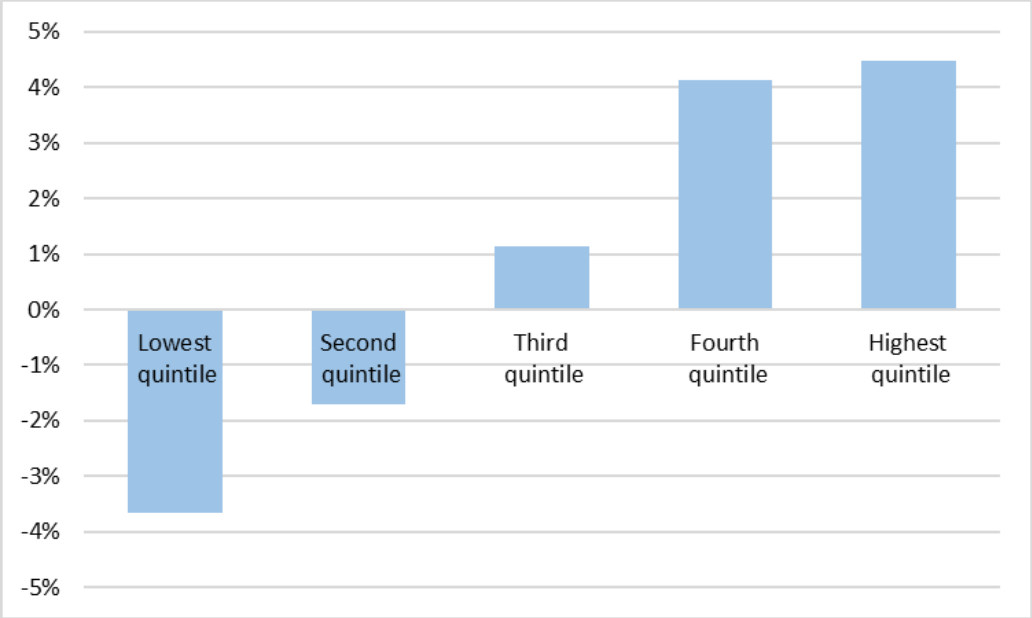
While car prices have been falling, the purchasing power of low-income households has also fallen. Table 1 shows the average U.S. household income by quintile for 2005 and 2015; each quintile represents one fifth of the distribution of household income from lowest to highest. For the bottom 40 percent of households, i.e. the lowest two quintiles, household income has decreased after adjusting for inflation—shown in Figure 4. This means that low-income households' ability to purchase household goods has gone down in the past 10 years. Meanwhile, higher-income households' purchasing power has increased.

Table 1: Household income by quintile

	Lowest quintile	Second quintile	Third quintile	Fourth quintile	Highest quintile
2005	$12,931	$33,202	$56,193	$88,385	$193,680
2015	$12,457	$32,631	$56,832	$92,031	$202,366
% change	-4%	-2%	1%	4%	4%

Source: U.S. Census Historical Income Tables in 2015$. Available at: http://www.census.gov/data/tables/time-series/demo/income-poverty/historical-income-households.html.

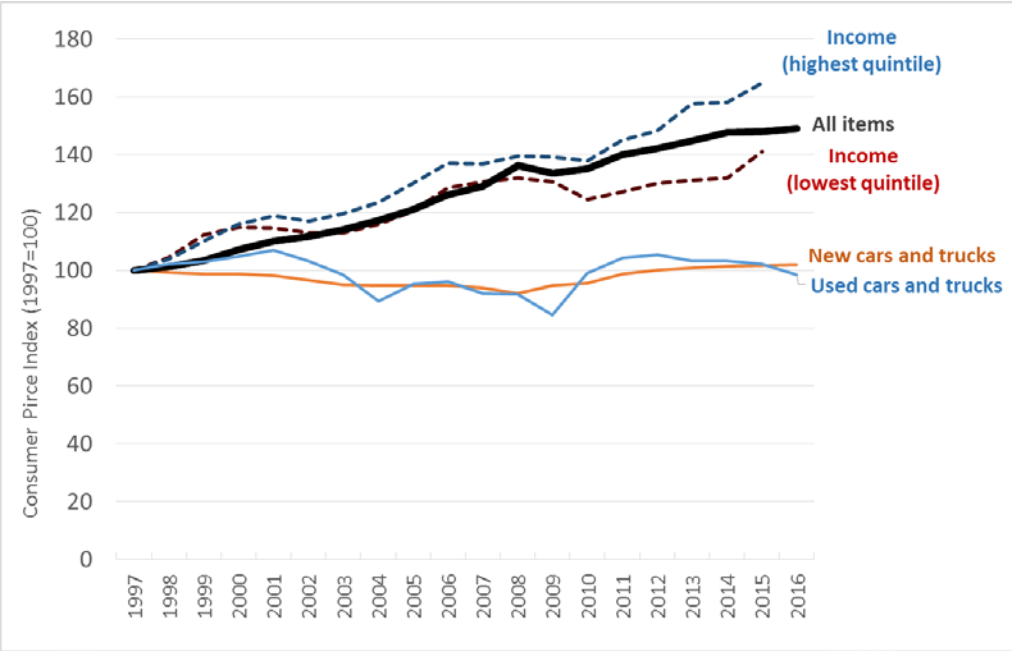
Figure 4: Household income by quintile, percentage change from 2005 to 2015



Source: U.S. Census Historical Income Tables in 2015$. Available at: http://www.census.gov/data/tables/time-series/demo/income-poverty/historical-income-households.html.

Figure 5 shows annual changes in household income for the lowest and highest quintiles from 1997 to 2015 (the latest data available), in comparison to general inflation. This shows that the lowest quintile's income was essentially keeping up with the price of household goods up until the financial crisis of 2007 and 2008, when the income for these households ceased to keep pace with inflation. Throughout the entire period, the income from the highest quintile has outpaced inflation.

Figure 5: Change in household income compared to inflation

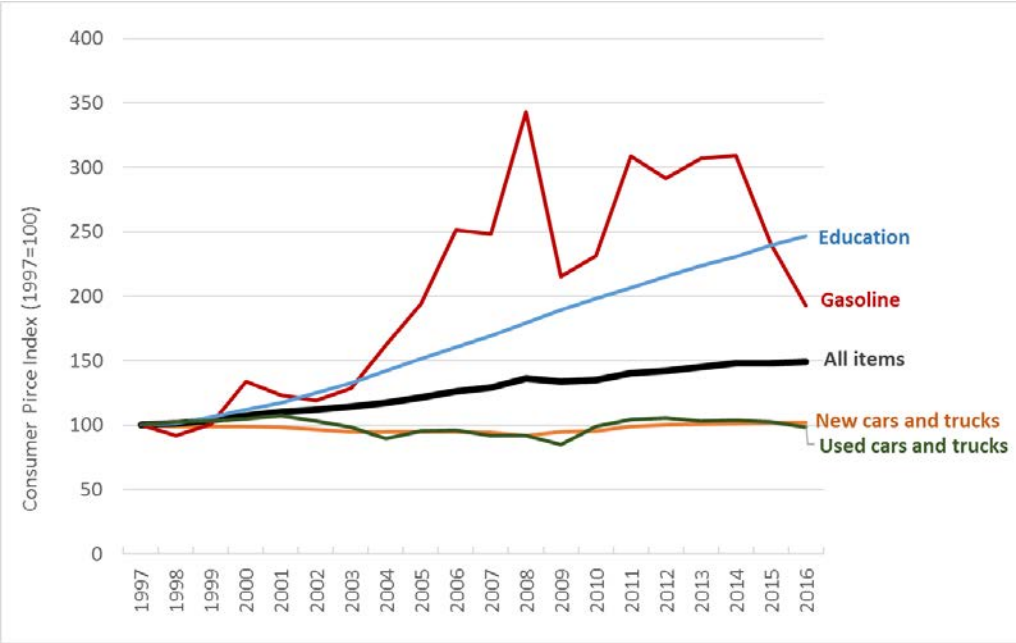


Source: Consumer Price Index. Income and CPI indexed to 1997=100. Available at: https://fred.stlouisfed.org.

Low-income households face high costs elsewhere

As demonstrated above, car and truck prices have remained significantly lower than inflation. The same story applies for used cars and trucks, which have closely tracked new vehicle price trends—as shown in Figure 6. New and used cars and trucks are a part of the calculation of general inflation. Thus, the price of other household goods must be simultaneously increasing above inflation. Figure 6 shows two of these items: gasoline and education. Gasoline is about twice as expensive as it was 20 years ago (and historically volatile), while education (including tuition and child care) has more than doubled. Not shown are the prices of food and housing, which track closely with general inflation. These two categories represent about half of household spending and, unlike education, have been stagnant in real terms.

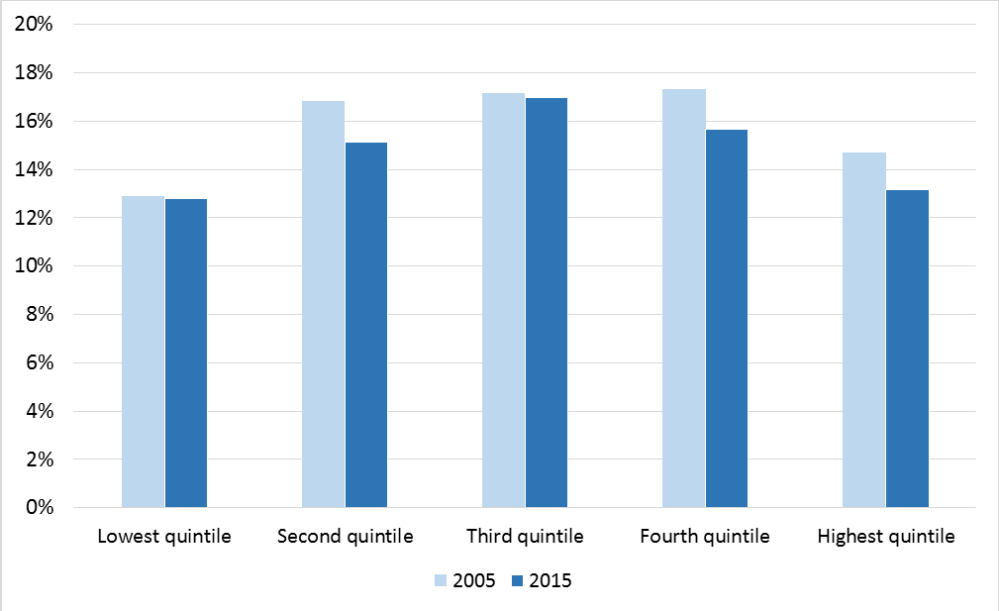
Figure 6: Select prices of household items compared to general inflation



Source: Consumer Price Index. All measures indexed to 1997=100. Available at: https://fred.stlouisfed.org.

Compared to other income groups, low-income groups spend the smallest of share on owning vehicles, including spending on new cars, used cars, vehicle finance, gasoline, maintenance and repair, and vehicle insurance. Figure 7 shows the share of each quintile's total spending that goes toward vehicle ownership. The lowest income quintile currently spends about 13 percent of its income on vehicles. This has decreased slightly from 2005. Other groups' spending has decreased as well—in large part due to decreased spending on gasoline which decreased by an average share of 0.8% across all incomes.

Figure 7: Share of spending on vehicle ownership



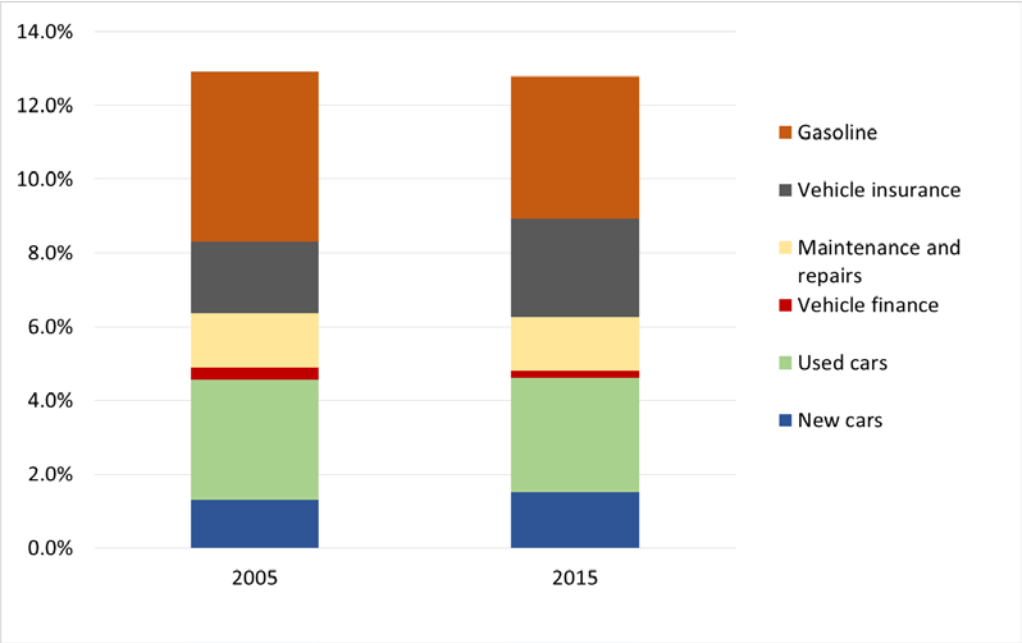
Source: Bureau of Labor Statistics. Consumer Expenditure Survey. Available at: https://www.bls.gov/cex/.

All income groups' spending on gasoline has decreased since 2005. This is largely due to improved fuel economy and lower gas prices. Even as gas prices decreased by 12 percent over the last ten years (after adjusting for inflation), fuel economy for new vehicles improved by 25 percent.[13] Low-income households are particularly sensitive to fuel cost changes. This group spends more of its income on gasoline than on used or new car purchases—as shown in Figure 8. A recent study of fuel economy standards' impact on household spending found that "as a percent of income, savings on fuel are greatest for lower income households."[14] The authors concluded that savings on fuel costs, due to fuel standards, amounted to "4.3% of annual income for the lowest income quintile but only 0.9% for the highest quintile."[15]

The breakdown in Figure 8 shows that vehicle insurance as a share of household spending increased by 1 percent for the lowest income group. Thus while fuel costs have decreased for low-income households, vehicle insurance cost increases have counteracted this—leading to relatively stagnant vehicle ownership spending.

[13] Energy Information Administration (EIA). U.S. Regular All Formulations Retail Gasoline Prices (Dollars per Gallon). Average price per gallon in 2005 is $2.77 ($2015) and $2.43 in 2015.
[14] Greene, D. and J. Welch. 2016. *The Impact of Increased Fuel Economy for Light-Duty Vehicles on the Distribution of Income in the United States*. Report Prepared for Oak Ridge National Laboratory and the Energy Foundation. Available at: http://bakercenter.utk.edu/wp-content/uploads/2016/09/Equity-Impacts-of-Fuel-Economy-Report_final.pdf
[15] *Id.*

Figure 8: Breakdown of vehicle ownership costs for lowest quintile (% of income)



Source: Consumer Expenditure Survey. Available at: https://www.bls.gov/cex/.

CONCLUSION

Low-income households indeed benefit from stable vehicle prices coupled with improved fuel economy. In recent years, the prices of cars and trucks have been flat. At the same time, fuel economy has improved, reducing consumer spending on gasoline. This is particularly helpful to low-income consumers as they spend more on gasoline than on purchasing new or used vehicles. However, this group faces increased financial pressures in other parts of their budgets. Because this group's income has not risen with inflation, low-income households find it harder to afford most things—including new cars. However, as more efficient new vehicles come on-line, this will cycle through the used car market as well. Despite criticism that fuel economy standards are weighing down consumers, there is ample evidence that these standards are easing household burdens.