Sticker Shock:
Uncovering the Real Drivers of Rising Vehicle Prices

February 2026

NATIONAL CONSUMERS LEAGUE

Executive Summary

The American people do not have to choose between vehicle affordability and safety, energy independence, public health, and environmental stewardship. Compliance with federal fuel economy and safety standards accounts for a small fraction of vehicle expenditures, but it generates thousands of dollars in benefits per household and trillions of dollars in societal benefits. Moreover, average household expenditures on new and used vehicles have generally risen more slowly than inflation and other essential household expenses (i.e., healthcare, housing, groceries, and education), easing budgetary pressures.

Since 2002, nominal average expenditures per new vehicle (i.e., transaction prices not adjusted for inflation) have increased $23,349.83. Improvements in fuel economy and safety standards account for only a modest share of this increase.

- Federal **safety standards** that first required compliance between 2002 and 2019 account for only $628.98, or 2.7 percent, of the increase in average expenditures per new passenger vehicle since 2002.
- **Equipment upgrades**—which include changes in comfort, convenience, durability, fuel economy, nonmandatory safety improvements, and safety standards that first require compliance after 2019—account for only $3,040.20, or 13 percent, of the increase in average expenditures per new passenger vehicle since 2002.
- **Trimflation**—the rise in expenditures attributable to the sale of more high-quality models—accounts for $5,863.32, or 25.1 percent, of the increase in average expenditures per new passenger vehicle since 2002.
- Shifting **vehicle mix**—automakers and dealers selling more light trucks than cars—accounts for $3,998.54, or 17.1 percent, of the increase in average expenditures per new passenger vehicle since 2002.
- **Dealer markups and margins** account for $1,810.78, or 7.8 percent, of the increase in average expenditures per new passenger vehicle since 2002.

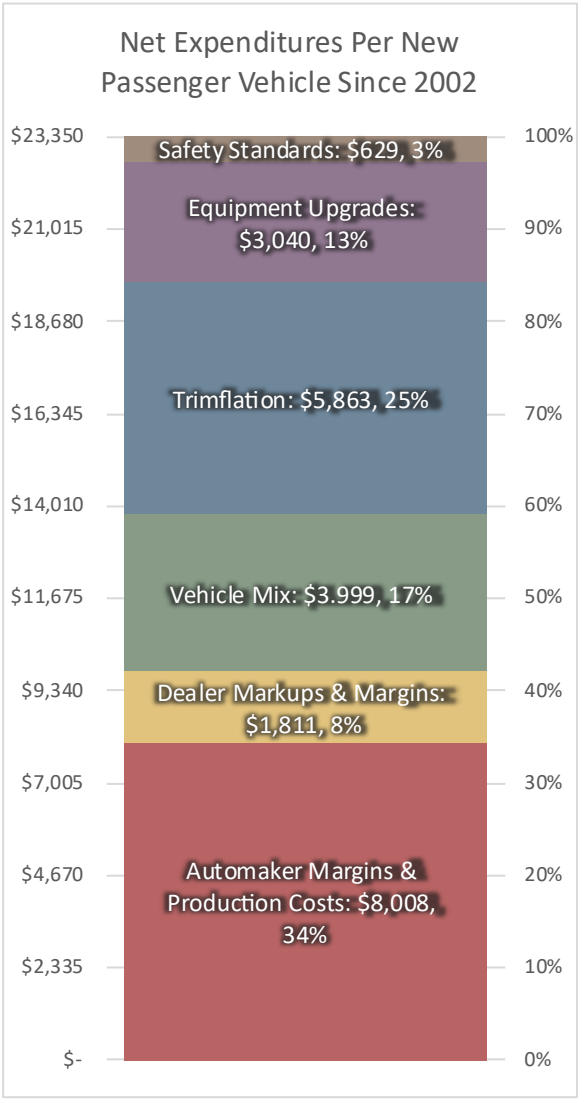

Figure 1: The National Consumers League.

- **Automaker margins and production costs** account for $8,008.03, or 34.3 percent, of the increase in average expenditures per new passenger vehicle since 2002.

Vehicle affordability remains strong. When adjusted for inflation, average expenditures per new car have fallen 14.7 percent since 2002, a decrease of $5,772.60 per transaction. Over the same period, the real average expenditure per new light truck rose 8.2 percent, an increase of $3,867.81. The real average expenditure per new passenger vehicle (i.e., cars and light trucks combined) rose 10.4 percent, an increase of $4,501.53. The real price of used vehicles was approximately 5.8 percent higher in 2025 than in 2002.

Purchasing power for new and used passenger vehicles has improved over the last two decades. Purchasing power measures whether household disposable income rises faster than passenger vehicle expenditures, thereby leaving more income for other goods and services. Since 2002, purchasing power for new cars has increased 34.9 percent, purchasing power for new light trucks has risen 17.4 percent, purchasing power for new passenger vehicles has grown 15.7 percent, and purchasing power for used passenger vehicles has increased 19.2 percent.

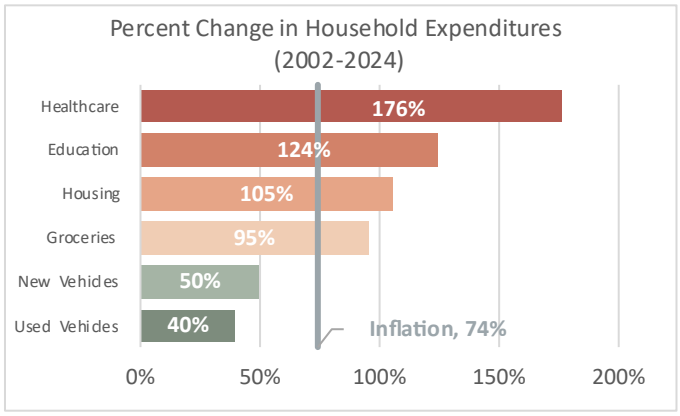

Figure 2: The National Consumers League.

Despite increases in nominal average expenditures per vehicle, spending on new and used passenger vehicles constitutes a shrinking portion of household budgets. As durability and longevity improve, households are purchasing passenger vehicles less frequently, spreading the costs of new and used vehicles over longer periods of time. Since 2002, average household expenditures on new and used vehicles rose 50 percent and 40 percent, respectively, well below the 74 percent increase in inflation over that period. Average household expenditures on healthcare, education, housing, and groceries rose far faster, putting a significant strain on household budgets.

All the while, today's cars and light trucks are far more fuel efficient and come equipped with vital, lifesaving features like advanced driver assistance systems, sophisticated airbags, and electronic stability control, saving consumers thousands of dollars over the life of a vehicle. Between 2002 and 2024, the real-world miles per gallon (mpg) of new cars rose from 22.8 mpg to 36.6 mpg, a 60.5 percent improvement. Over the same period, the real-world mpg of light trucks increased from 16.5 mpg to 24.6 mpg, a 49.3 percent increase. Because of fuel-economy improvements, owners of model year 2024 cars save, on average, $9,099.75 in avoided gasoline expenditures. Owners of model year 2024 light trucks save, on average, $9,920.23 in avoided gasoline expenditures. In addition, federal safety standards established between 1968 and 2019 have generated an estimated $12.8 trillion in net societal benefits, including $5,164.51 per household in 2025 alone.

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Factors Affecting Vehicle Prices

Vehicle prices are on the rise. In 2002, the average price of a new vehicle was $24,101.63, while the average price of a used vehicle was $8,828.[1] In 2025, *Kelley Blue Book* reported that the average new vehicle transaction price eclipsed $50,000, while the average used vehicle was listed for $25,825.[2]

Our analysis and the prevailing economic literature suggest that six main factors drive changes in vehicle expenditures: (1) safety standards, (2) equipment upgrades, (3) vehicle mix, (4) trimflation, (5) dealer markups and margins, and (6) automaker margins and production costs. In this section, we detail these factors and estimate the extent to which each contributes to the increase in nominal average expenditures per vehicle (i.e., expenditures not adjusted for inflation). *Figure 3* depicts the share of average new car and light truck expenditures attributable to these factors since 2002. *Figure 4* depicts the change in safety standards, equipment upgrades, vehicle mix, trimflation, dealer markups and margins, and automaker margins and production costs for new passenger vehicles between 2002 and 2025.

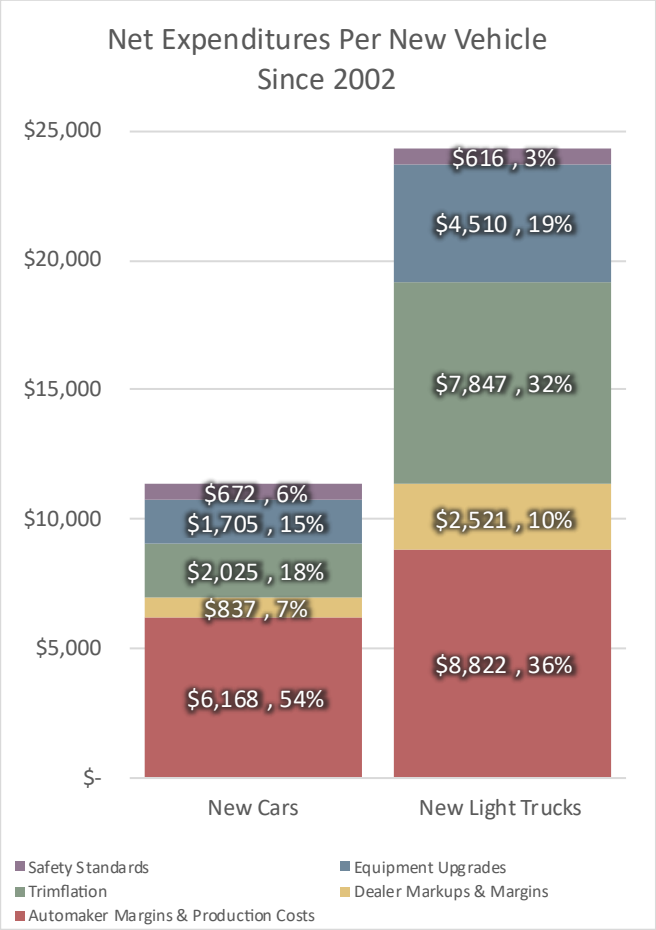

Figure 3: The National Consumers League. Net expenditures are measured in nominal dollars.

[1] Department of Energy, "Fact #744: September 10, 2012 Average New Light Vehicle Price Grows Faster than Average Used Light Vehicle Price," accessed December 24, 2025, https://www.energy.gov/eere/vehicles/fact-744-september-10-2012-average-new-light-vehicle-price-grows-faster-average-used; Bureau of Economic Analysis, "Table 7.2.5S. Auto and Truck Unit Sales, Production, Inventories, Expenditures, and Price," Department of Commerce, December 23, 2025, https://apps.bea.gov/iTable/?categories=underlying&isuri=1&nipa_table_list=2055&reqid=19&step=3.

[2] Cox Automotive, "Kelley Blue Book Report: New-Vehicle Average Transaction Price Hits Record High in September, Surges Past $50,000 for the First Time Ever," October 13, 2025, https://www.coxautoinc.com/insights-hub/sept-2025-atp-report/; Kelley Blue Book, "Average Used Car Price Rose in September," October 21, 2025, https://www.kbb.com/car-news/average-used-car-price-rose-in-september/.

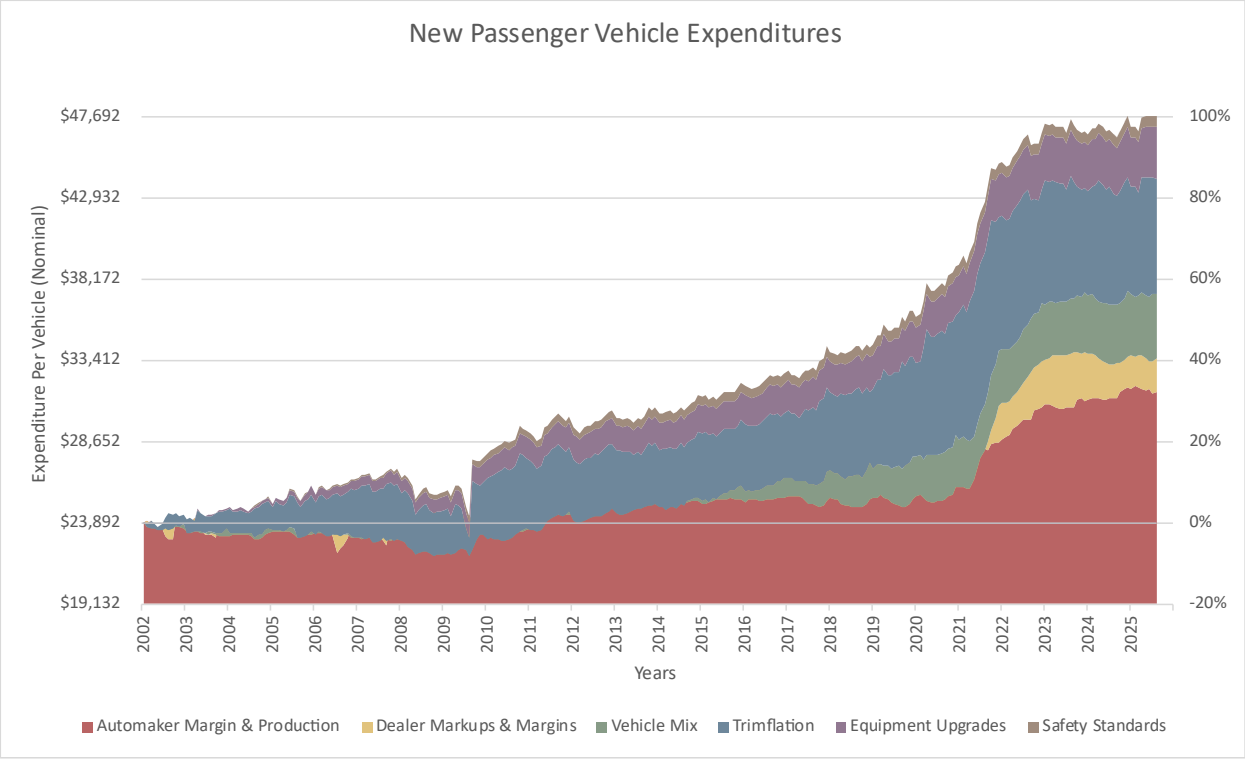

Figure 4: The National Consumers League. Net expenditures are measured in nominal dollars.

Vehicle Mix

Overview

Over the past 25 years, manufacturers have increasingly sold a higher percentage of light trucks than cars, raising average expenditures per new passenger motor vehicle. Cars include sedans, coupes, and station wagons.[3] Light trucks include sport utility vehicles (SUVs), crossovers, minivans, and trucks with a gross vehicle weight of less than 14,000 pounds.[4] Passenger vehicles are all cars and light trucks. We derive estimates of new car and light truck transactions and average expenditures from the Bureau of Economic Analysis (BEA).[5] Expenditures are the value of goods or services purchased by consumers, a good proxy for total price.[6]

Figure 5 depicts the percentage of passenger vehicle transactions attributable to new cars and light trucks over time. Between 2000 and 2012, the ratio of cars to light trucks remained relatively constant, with approximately half of transactions attributable to new cars and half of

[3] Moody's Analytics, "United States - New Vehicle Sales: Autos and Light Trucks," accessed December, 24 2025, https://www.economy.com/united-states/new-vehicle-sales-autos-and-light-trucks.

[4] Ibid.

[5] Bureau of Economic Analysis, "Concepts and Methods of the U.S. National Income and Products Accounts," Department of Commerce, December 2024, https://www.bea.gov/resources/methodologies/nipa-handbook/pdf/chapters-01-04.pdf.

[6] Bureau of Economic Analysis, "Consumer Spending," Department of Commerce, December 23, 2025, https://www.bea.gov/data/consumer-spending/main.

transactions attributable to new light trucks. Since 2012, the proportion of new car transactions has steadily decreased, falling from approximately 50 percent to just over 17 percent of passenger vehicle transactions. Over the same period, light trucks have accounted for a growing share of transactions, rising from approximately 50 percent to just under 83 percent.

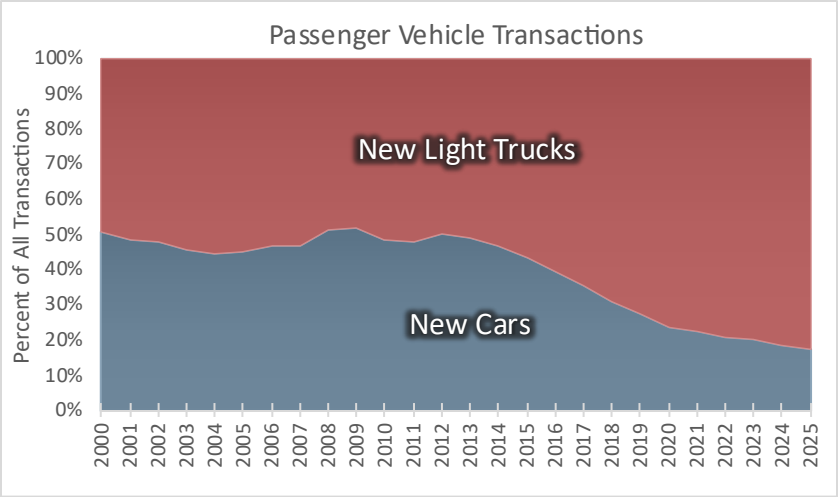

Figure 5: The National Consumers League.

Profit seeking by dealers and manufacturers has contributed to the explosive growth in light truck sales. SUVs, crossovers, and trucks are more profitable than cars, creating powerful financial incentives to increase the production and sale of light trucks.[7] Automakers' annual reports to investors reveal that manufacturers rely on light truck transactions to pad profits. For fiscal year 2024, General Motors states that the company "currently recognize[s] the highest profit margins on our full-size [internal combustion engine (ICE)] SUVs and full-size ICE pickup trucks."[8] General Motors also disclosed that "our near-term success is dependent upon our ability to sell higher margin vehicles in sufficient volumes."[9] Ford Motor Company reports that the company's financial performance is "dependent on sales of larger, more profitable vehicles, particularly in the United States."[10] Stellantis states that "[o]ur larger vehicles…have historically been more profitable on a per vehicle basis than smaller vehicles."[11] Industry analysts also indicate that vehicle mix plays a significant role in dealer profitability.[12]

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[7] Petar Djekic, "The Unchecked Rise of Trucks and SUVs in America," Cornell Journal of Law and Public Policy, The Issue Spotter, November 25, 2024, https://jlpp.org/the-unchecked-rise-of-trucks-and-suvs-in-america/; The Washington Post. "The Real Reason Trucks have Taken Over U.S. Roadways," April 7, 2023, https://www.washingtonpost.com/business/2023/04/07/trucks-outnumber-cars.

[8] General Motors Company, "Annual Report Pursuant to Section 13 or 15(D) of the Securities Exchange Act of 1934 For the Fiscal Year Ended December 31, 2024," January 28, 2025, https://investor.gm.com/static-files/80738255-1f59-4f20-9b33-c6f958d50256.

[9] Ibid.

[10] Ford Motor Company, "Annual Report Pursuant to Section 13 or 15(D) of the Securities Exchange Act of 1934 For the Fiscal Year Ended December 31, 2024," February 6, 2025, https://www.sec.gov/Archives/edgar/data/37996/000003799625000013/f-20241231.htm.

[11] Stellantis, "Annual Report for the Year Ended December 31, 2024," February 27. 2025, https://www.stellantis.com/content/dam/stellantis-corporate/investors/financial-reports/Stellantis-NV-20241231-Annual-Report.pdf.

[12] Haig Partners, "New Vehicle Gross Profits Rebound in Q2 2025: What It Means for the Future of Dealership Valuations," accessed December 24, 2025, https://haigpartners.com/resources/new-vehicle-gross-profits-rebound-in-q2-2025-what-it-means-for-the-future-of-dealership-valuations/; MotorTrend, "How a Car Dealership Really Makes Money From You: Car Salesman Confidential," July 29, 2025, https://www.motortrend.com/features/how-a-car-dealership-really-makes-its-money.

Dealers and manufacturers have engaged in aggressive marketing tactics to encourage consumers to purchase light trucks. For decades, slick advertisements branded light trucks as safe, luxurious, and high-performing vehicles suitable for all households, making SUVs, minivans, trucks, and crossovers ideal replacements for the sedans and station wagons that once dominated America's roadways.[13]

The marketing of light trucks has far outpaced advertisements for cars. In the last quarter of 2017, nine of the ten most heavily advertised vehicles were pickup trucks or SUVs.[14] In 2024, eight of the top-ten most seen vehicle advertisements on television featured light trucks.[15] International research suggests that light truck advertisements have a substantial effect on consumer preferences. A study in the United Kingdom found that exposure to SUV advertisements is significantly associated with a greater desire to purchase an SUV.[16]

As the share of light trucks grows, owners of cars are more likely to purchase larger vehicles due to perceived safety benefits.[17] The resulting "arms race" exacerbates the shift to more expensive light trucks.[18]

Expenditures

The average expenditure per new passenger vehicle rises as households increasingly purchase more expensive light trucks rather than less expensive cars. Since 2002, new light trucks have been more expensive than new cars, and the gap has widened over time. In 2002, average expenditures per new light truck were $4,275.00 higher than average expenditures per new car. By 2025, average expenditures per new light truck were $17,184.25 higher than average expenditures per new car. *Figure 6* depicts nominal average expenditures per new car, light truck, and passenger vehicle.

[13] Petar Djekic, "The Unchecked Rise of Trucks and SUVs in America," Cornell Journal of Law and Public Policy, The Issue Spotter, November 25, 2024, https://jlpp.org/the-unchecked-rise-of-trucks-and-suvs-in-america/; Dealer Marketing Magazine, "Navigating Tier 3 Marketing: Insights from Industry Leaders," May 9, 2024, https://www.dealermarketing.com/articles/navigating-tier-3-marketing-insights-from-industry-leaders.

[14] CNBC, "Sexy Ads Created Hot Demand for SUVs. Now Automakers Are Using Those Preferences to Weaken Fuel Efficiency," April 5, 2018, https://www.cnbc.com/2018/04/05/sexy-suv-ads-created-demand-now-being-used-to-attack-fuel-standards.html.

[15] Wards Auto, "2024's Most-Seen Auto TV Ads, Via iSpot.tv," December 30, 2024, https://www.wardsauto.com/news/2024-s-most-seen-auto-tv-ads-via-ispot-tv/798795/.

[16] Tim Kasser, et al. "Advertising and Demand for Sports Utility Vehicles," New Weather Institute and KR Foundation, December 2021, https://static1.squarespace.com/static/5ebd0080238e863d04911b51/t/61afb58d8288363328e3f8f9/1638905230408/Advertising+and+demand+for+SUVs_Kasser+et+al.Badvertising+2021.pdf.

[17] Road to Zero Coalition, "How Bigger, Heavier Light Trucks Endanger Lives on American Roads," October 2024, https://www.nsc.org/getmedia/18f9c2b1-eb20-4a3e-b916-8f96161a9a26/rtz-light-trucks-report.pdf.

[18] Ibid.

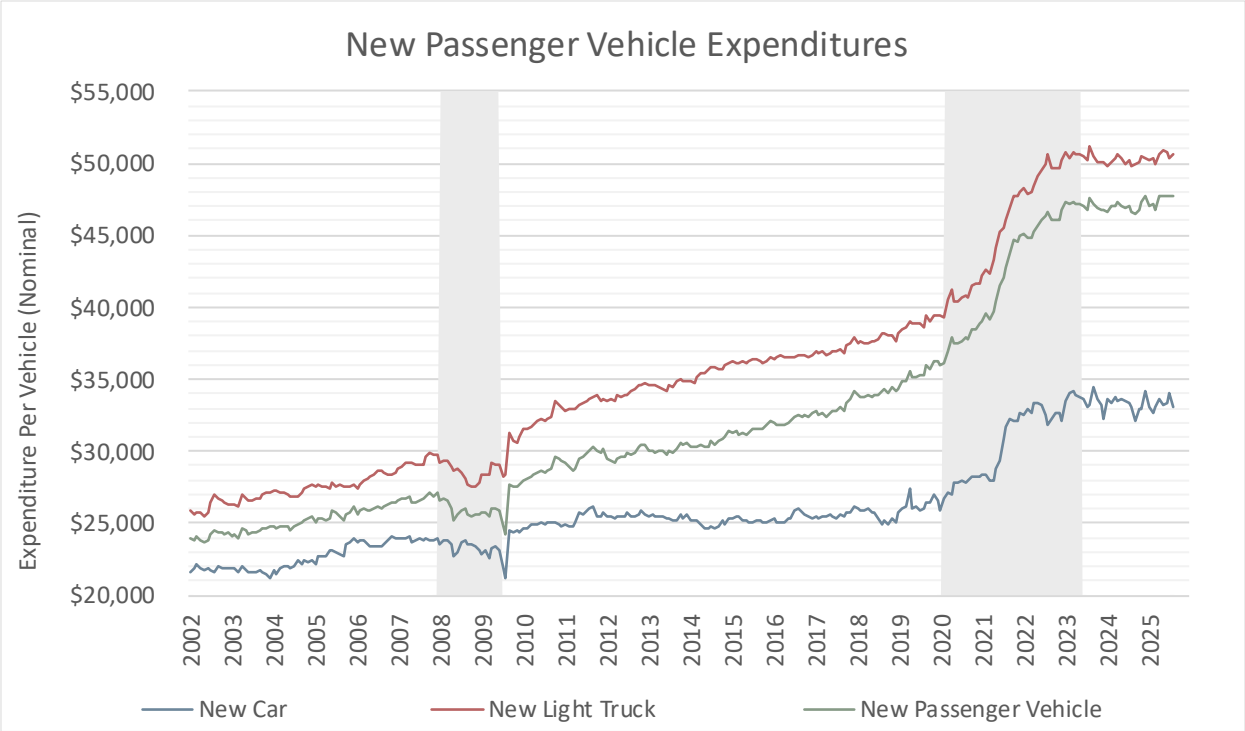

Figure 6: The National Consumers League. Average expenditures are measured in nominal dollars.

To evaluate the effect of the shifting vehicle mix on average expenditures, we estimate the change in average expenditures per new passenger vehicle if the ratio of new car to new light truck sales remained unchanged. The results of our analysis are depicted in *Figure 7*.

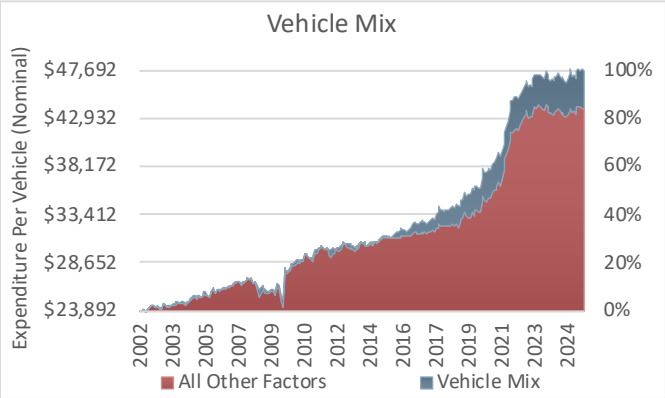

Figure 7: The National Consumers League. Average expenditures are measured in nominal dollars.

The shift in vehicle mix accounts for 17.1 percent of the net change in average expenditures per passenger vehicle since 2002. Had the proportion of new car and light truck transactions remained constant, average expenditures per new passenger vehicle in 2025 would have amounted to $43,452.92, which is $3,998.54 lower than the actual average expenditures per transaction. The shift in vehicle mix accounts for 8.4 percent of total average expenditures per transaction in 2025.

Safety Standards

Overview

The National Highway Traffic Safety Administration (NHTSA) is charged with reducing deaths and injuries associated with traffic crashes, including by establishing and enforcing Federal Motor Vehicle Safety Standards (FMVSS).[19] While FMVSS generate substantial societal benefits (see the *Federal Standards* section on pg. 46), compliance with federal safety standards can increase expenditures per passenger vehicle.

Research published by NHTSA estimates the cost of safety technologies attributable to FMVSS.[20] Cost estimates are derived from tear-down studies of countermeasures and Final Regulatory Impact Analyses.[21] Safety technologies attributable to FMVSS are those that were added or modified primarily to comply with federal safety standards. In total, the cost of all safety technologies voluntarily supplied or attributable to FMVSS in effect by 2019 amounts to

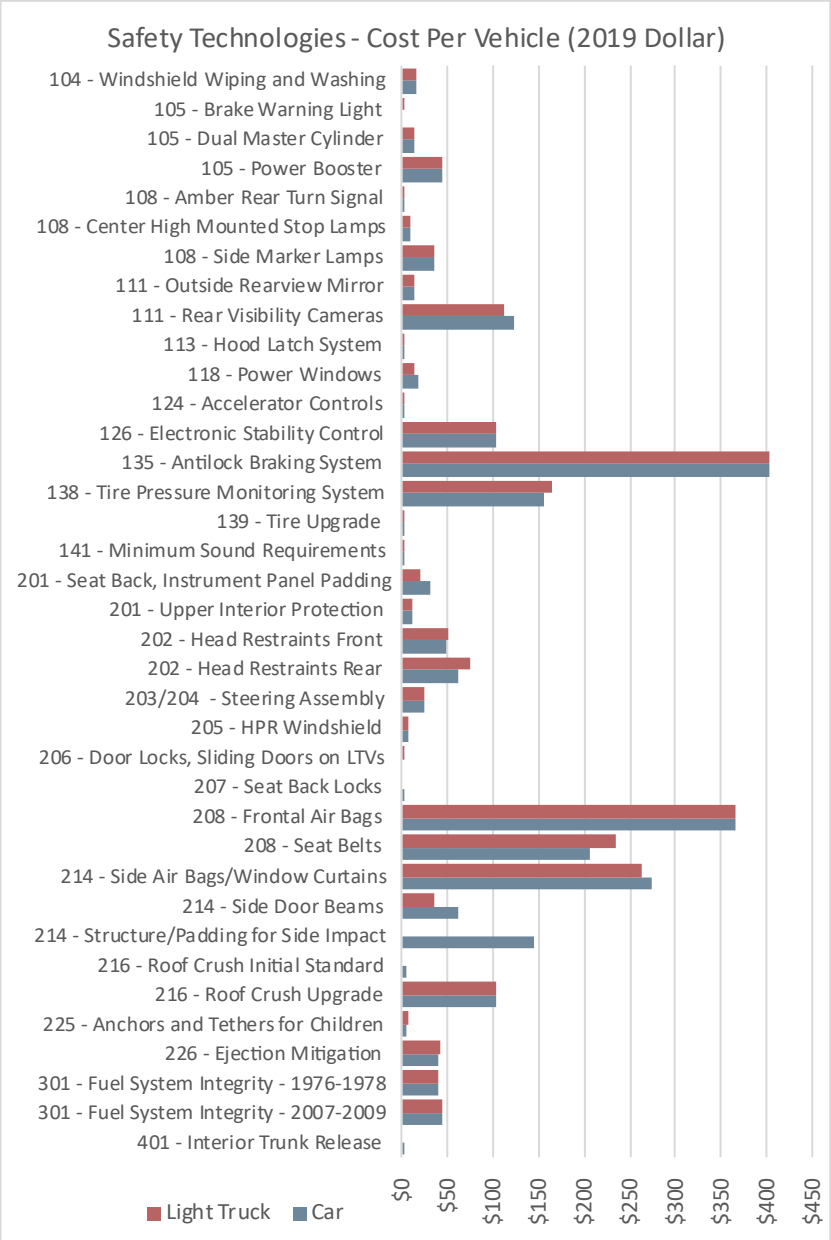

Figure 8: The National Consumers League. FMVSS standard numbers and the safety technologies mandated by FMVSS are listed in the left column. All costs are valued in 2019 dollars.

[19] Congressional Research Service, "Motor Vehicle Safety: Issues for Congress," January 26, 2021. https://www.congress.gov/crs-product/R46398; Department of Transportation, "National Highway Traffic Safety Administration: Key Grant Programs," March 17, 2025, https://www.transportation.gov/rural/grant-toolkit/usdot-competitive-grants-by-agency/nhtsa.

[20] J. F. Simons, L. J. Blincoe, and C. J. Kahane, "Historical Analysis of Costs and Benefits of FMVSS for Passenger Cars and LTVs on a Calendar-Year Basis," *National Highway Traffic Safety Administration*, Report No. DOT HS 813 647, December 2024.

[21] Ibid.

$2,427.98 per car and $2,269.23 per light truck, valued in 2019 dollars.[22] *Figure 8* depicts the cost, in 2019 dollars, of safety technologies attributable to FMVSS.[23]

Between 2002 and 2019, NHTSA established several new and modified safety standards, resulting in the deployment of new and better safety technologies.[24] *Table 1* includes all safety technologies attributable to FMVSS that both first required compliance between 2002 and 2019 and reduce fatalities, injuries, or crashes involving a passenger vehicle.[25]

Table 1: New and Updated FMVSS That First Required Compliance Between 2002 and 2019

FMVSS	Safety Technology	Cars			Light Trucks		
		Initial Launch Year	Median Adoption Year	FMVSS Compliance Date	Initial Launch Year	Median Adoption Year	FMVSS Compliance Date
105	Four-wheel anti-lock braking systems	1986	1994	2009-2012	1989	1995	2009-2012
111	Rear-visibility cameras	2008	2015	2016-2019	2008	2014	2016-2019
126	Electronic stability control	1998	2010	2009-2012	1999	2007	2009-2012
138	Tire pressure monitoring systems	2001	2007	2006-2008	2001	2007	2006-2008
139	Tire upgrade	1994	2000	2007	1994	2000	2007
201	Head impact upgrade (padding)	1999	2001	1999-2003	1999	2002	1999-2003
202	Head restraint upgrade for outboard front seats	2010	2010	2010-2011	2010	2010	2010-2011
206	Improved locks, sliding doors, and full-size vans	N/A	N/A	N/A	1985	2006	2009
208	Three-point belts for center rear seat passengers	1994	2001	2006-2008	1998	2003	2006-2008
214	Curtain and side airbags for front seats	1996	2006	2011-2015	1998	2008	2011-2015
214	Curtain and side airbags for rear seats	1998	2007	2011-2015	2001	2008	2011-2015
216	Roof crush resistance upgrade	2004	2013	2013-2016	2004	2015	2013-2017
225	Child restraint anchorage system updates	2000	2002	2000-2003	2000	2002	2000-2003
226	Rollover curtains	2003	2015	2014-2017	2002	2009	2014-2017
301	Fuel system integrity: rear impact upgrade	2006	2008	2007-2009	2006	2007	2006-2009

[22] Ibid.
[23] J. F. Simons, "*Cost and weight added by the FMVSS for model years 1968 to 2019 for passenger cars and LTVs*," *National Highway Traffic Safety Administration*, Report No. DOT HS 813 619, December 2024.
[24] C. J. Kahane, and J. F. Simons, "Fatalities, Injuries, and Crashes Prevented by Vehicle Safety Technologies and Associated FMVSS, 1968 to 2019 – Passenger Cars and LTVs," *National Highway Traffic Safety Administration*, Report No. DOT HS 813 611, December 2024.
[25] Ibid.

Expenditures

Figure 9 depicts average expenditures per new car, light truck, and passenger vehicle attributable to FMVSS that first required compliance between 2002 and 2019. For new cars, such safety standards are attributable to $671.79 in additional expenditures, which is 2 percent of total average expenditures in 2025 and 5.9 percent of the net increase in average expenditures since 2002. For new light trucks, such safety standards are attributable to $616.44 in additional expenditures, which is 1.2 percent of total average expenditures in 2025 and 2.5 percent of the net increase in average expenditures since 2002. For new passenger vehicles, such safety standards are attributable to $628.98 in additional expenditures, which is 1.3 percent of total average expenditures in 2025 and 2.7 percent of the net increase in average expenditures since 2002.

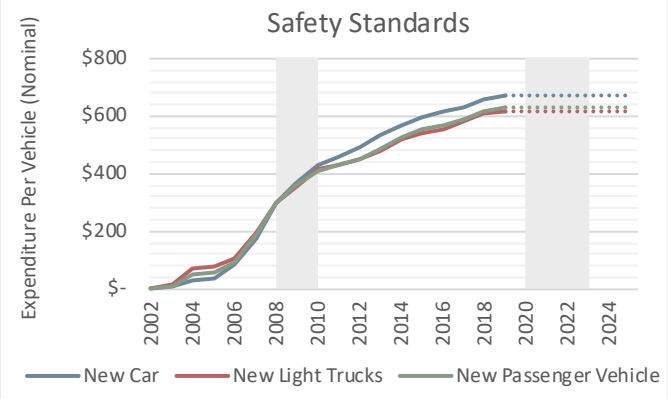

Figure 9: The National Consumers League. Average expenditures are measured in nominal dollars.

Data for the cost of safety technologies attributable to FMVSS after model year 2019 are not available in NHTSA's published retrospective cost analysis. As such, we do not provide estimates for the change in the cost of FMVSS beyond 2019. Such costs may have risen, perhaps due to COVID-19-related supply chain disruptions and the resulting inflation. Such costs could have decreased, as production costs tend to decline when scale is reached and manufacturers become more efficient.[26] Furthermore, we do not have specific cost estimates from safety technologies required by FMVSS that became effective between 2020 and 2025, though such costs are included in the equipment upgrade estimate.

Equipment Upgrades

Overview

Equipment upgrades include improvements in comfort, convenience, durability, fuel economy, nonmandatory safety features, and safety technologies attributable to FMVSS that first required compliance between 2020 and 2025. New and redesigned vehicles have steadily improved in quality over the last two decades, providing unparalleled comfort, amenities, reliability, fuel efficiency, and safety.

Manufacturers are increasingly equipping their models with sophisticated technologies and features once reserved for high-end vehicles.[27] In many vehicle models, multidisc stereos

[26] J. F. Simons, "*Cost and weight added by the FMVSS for model years 1968 to 2019 for passenger cars and LTVs*," *National Highway Traffic Safety Administration*, Report No. DOT HS 813 619, December 2024.

[27] Capital One Auto Navigator, "Trickle-Down Tech: From Luxury to Mainstream in Two Decades," https://www.capitalone.com/cars/learn/finding-the-right-car/trickledown-tech-from-luxury-to-mainstream-in-

have been replaced by advanced touchscreen infotainment systems, memory seats have taken the place of manually adjustable seats, and panoramic sunroofs have supplanted hardtops.[28] Further, automakers are offering greater volumes of luxury vehicles. Between September 2012 and September 2022, luxury vehicle sales steadily rose from 12.6 percent to 17.99 percent of all transactions, ultimately reaching 19.6 percent of total sales in January 2023.[29]

Due to significant improvements in design, construction, and materials, modern vehicles are far more durable than their predecessors. Today's sophisticated computerized ignition systems support proper powertrain performance and improve engine longevity.[30] New synthetic lubricants are more heat-resistant, stable, and rugged.[31] Galvanized steel has improved vehicles' resistance to corrosion and wear.[32] Due to such improvements, the average lifespan of vehicles has increased dramatically. Between 2002 and 2025, the average age of cars in operation rose from 9.8 years to 14.5 years, a 48 percent increase.[33] During the same period, the average age of light trucks in operation rose from 9.4 years to 11.9 years, a 26.6 percent increase.[34]

New vehicles consume less fuel per mile while producing more horsepower. Aerodynamic improvements, such as lowering ride heights and sleeker bodies, have reduced drag, requiring less fuel to reach and maintain the desired speed.[35] Lighter materials like high-strength steel, aluminum, and other advanced materials have reduced vehicle weight without sacrificing strength and durability.[36] More efficient engines have better maximized the amount of propulsion generated from fuel.[37] Hybrid electric vehicles (HEVs) and plug-in hybrid electric vehicles (PHEVs), which utilize electric motors and regenerative braking to supplement propulsion, are being deployed in increasing numbers.[38]

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two-decades/3149; yahoo!tech, "Luxury Car Features That Are Now Available in Affordable Vehicles," April 7, 2025, https://tech.yahoo.com/articles/luxury-car-features-now-available-160826374.html.

[28] cars.com, "Which Cars Have Panoramic Moonroofs or Sunroofs?" April 1, 2024, https://www.cars.com/articles/which-cars-have-panoramic-moonroofs-437306/; Wards Auto, "Offering power seats with memory can boost automakers' customer satisfaction: JD Power," August 21, 2023, https://www.wardsauto.com/news/archive-auto-JD-Power-automakers-power-seats-memory-seat-quality/691385/; U.S. News & World Report, "Cars With the Best Infotainment Systems for 2025," October 23, 2025, https://cars.usnews.com/cars-trucks/advice/cars-with-the-best-infotainment-systems?onepage.

[29] Kelley Blue Book, "Americans Keep Buying More Luxury Cars," November 3, 2022, https://www.kbb.com/car-news/americans-keep-buying-more-luxury-cars/; Cox Automotive, "Luxury Share of U.S. Market Sets New Record in January, as Transaction Prices Remain up 5.9% Year Over Year, According to Kelley Blue Book," February 13, 2023, https://www.coxautoinc.com/insights-hub/kbb-atp-january-2023/.

[30] Forbes, "Why Do Today's Cars Last Longer Than They Used To?" June 11, 2023, https://www.forbes.com/sites/michaelharley/2023/06/11/why-do-todays-cars-last-longer-than-they-used-to/.

[31] Ibid.

[32] Ibid.

[33] The Bureau of Transportation Statistics, "Average Age of Automobiles and Trucks in Operation in the United States," accessed December 24, 2025, https://www.bts.gov/content/average-age-automobiles-and-trucks-operation-united-states.

[34] Ibid.

[35] Environmental and Energy Study Institute, "Vehicle Efficiency," accessed December 24, 2025. https://www.eesi.org/topics/vehicle-efficiency/description.

[36] Ibid.

[37] Ibid.

[38] Congressional Research Service, "Electric Vehicles: A Primer on Technology and Selected Policy Issues," February 12, 2020, https://www.congress.gov/crs-product/R46231.

As a result, the fleet's fuel efficiency has reached an all-time high. Between 2002 and 2024, the real-world miles per gallon (mpg) of new cars rose from 22.8 mpg to 36.6 mpg, a 60.5 percent improvement.[39] Over the same period, the real-world mpg of light trucks increased from 16.5 mpg to 24.6 mpg, a 49.3 percent increase.[40] All the while, powertrains have improved.[41] Between 2002 and 2024, the average horsepower of new cars rose 36.5 percent, while the average horsepower of new light trucks rose approximately 27.5 percent.[42]

Battery electric vehicles (BEVs) have taken a larger share of the new vehicle market, improving the quality of the average car sold in the United States. BEVs have electric motors powered solely by a battery pack that must be charged by an external power source.[43] BEVs do not consume gasoline and require far less maintenance than vehicles with internal combustion engines.[44] Due to their unique powertrains and lower centers of gravity, BEVs have quicker acceleration, smoother throttle response, and superior handling than gasoline-powered vehicles.[45] Between 2011 and 2024, annual BEV sales rose from 10,092 units to 1,247,656 units, a 124-fold increase in sales volume.[46] BEVs now constitute approximately 10 percent of new light-duty vehicle sales.[47]

Today's vehicles are far safer than older models, reducing the risk and severity of crashes through better crash-avoidance features, occupant protection, and alerts. For example, advanced driver assistance systems (ADAS) are a suite of proven safety technologies that counteract driver mistakes and save lives. Automatic emergency brakes (AEB) have been shown to reduce injuries associated with front-to-rear crashes with injuries by 56 percent.[48] Lane departure warnings have been shown to reduce single-vehicle, sideswipe, and head-on crashes causing injury by 21 percent.[49] Blind spot detection has been shown to reduce lane-change crashes resulting in injuries by 23 percent.[50]

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[39] Environmental Protection Agency, "Explore the Automotive Trends Data," March 27, 2025, https://www.epa.gov/automotive-trends/explore-automotive-trends-data.

[40] Ibid.

[41] Ibid.

[42] Ibid.

[43] Congressional Research Service, "Electric Vehicles: A Primer on Technology and Selected Policy Issues," February 12, 2020, https://www.congress.gov/crs-product/R46231.

[44] National Laboratory of the Rockies, "News Release: Research Determines Financial Benefit from Driving Electric Vehicles," June 22, 2020, https://www.nrel.gov/news/detail/press/2020/research-determines-financial-benefit-from-driving-electric-vehicles.

[45] American Lung Association, "Why Drive an Electric Vehicle?," September 16, 2020, https://www.lung.org/blog/why-drive-electric-vehicles.

[46] The Bureau of Transportation Statistics, "Hybrid-Electric, Plug-in Hybrid-Electric and Electric Vehicle Sales," accessed December 24, 2025, https://www.bts.gov/content/gasoline-hybrid-and-electric-vehicle-sales.

[47] Alliance for Automotive Innovation, "Alliance for Automotive Innovation Reports New U.S. Electric Vehicle Data," October 1, 2025, https://www.autosinnovate.org/posts/press-release/2025-q2-get-connected-press-release; Cox Automotive, "Record High: Electric Vehicle Sales Hit 438,000 in Q3 as Buyers Rushed to Beat Expiring Incentives," October 10, 2025, https://www.coxautoinc.com/insights-hub/q3-2025-ev-sales-report-commentary/.

[48] IIHS-HLDI, "Crash Avoidance Technologies," July 2025, https://www.iihs.org/media/290e24fd-a8ab-4f07-9d92-737b909a4b5e/_mTwzA/Topics/ADVANCED%20DRIVER%20ASSISTANCE/IIHS-HLDI-CA-benefits.pdf.

[49] Ibid.

[50] Ibid.

Automakers are voluntarily deploying ADAS features, which are quickly becoming common in new vehicles. According to one study covering approximately 80 percent of the automobile market, 10 ADAS features surpassed 50 percent market penetration in model year 2023 vehicles. Between model year 2015 and model year 2023, AEB penetration increased from 4 percent to 94 percent, penetration of lane departure warning increased from 12.6 percent to 92.5 percent, and penetration of blind spot warning increased from 25.1 percent to 73.3 percent.[51]

A few new and modified FMVSS took effect between 2020 and 2025, further improving passenger vehicle safety. FMVSS 141 requires HEVs, PHEVs, and BEVs to emit sounds enabling pedestrians, including the blind, to detect the presence of such vehicles.[52] Further, modifications to FMVSS 305a require manufacturers of electric-powered vehicles to submit standardized emergency response information to enable emergency responders to safely interact with these vehicles.[53]

Expenditures

As the quality of new passenger vehicles improves, average expenditures per vehicle transaction rise. We derive estimates of average expenditures attributable to equipment upgrades from the Bureau of Labor Statistics (BLS). Each year, BLS publishes the raw value of quality changes for new cars and light trucks by model year.[54] This data represents the change in average expenditures solely attributable to improvements in vehicle model quality over time, including comfort, convenience, durability, fuel economy, and safety.[55]

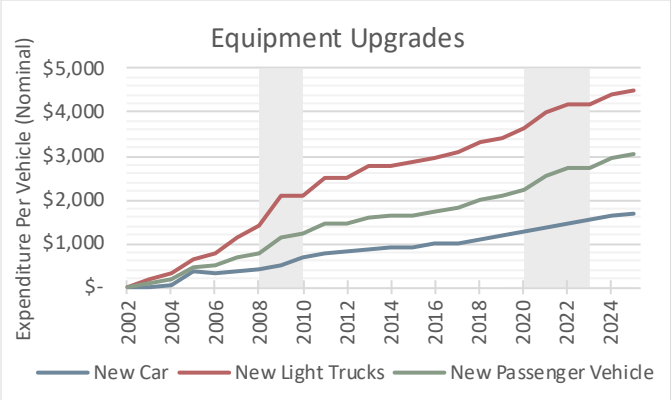

Figure 10: The National Consumers League. Expenditures are measured in nominal dollars.

Since 2002, equipment upgrades have steadily increased average expenditures per new car, light truck, and passenger vehicle (see *Figure 10*). For new cars, equipment upgrades

[51] Partnership for Analytics Research in Traffic Safety, "PARTS: Market Penetration of Advanced Driver Assistance Systems (ADAS)," September 2024, https://www.mitre.org/sites/default/files/2024-09/PR-24-2614-PARTS-Market-Penetration-Advanced-Driver-Assistance-Systems.pdf.

[52] National Highway Traffic Safety Administration, "Federal Motor Vehicle Safety Standards; Minimum Sound Requirements for Hybrid and Electric Vehicles," 85 Fed. Reg. 54273, September 1, 2020.

[53] National Highway Traffic Safety Administration, "Federal Motor Vehicle Safety Standards; FMVSS No. 305a Electric-Powered Vehicles: Electric Powertrain Integrity Global Technical Regulation No. 20 Incorporation by Reference," 89 Fed. Reg. 104318, December 20, 2024.

[54] Bureau of Labor Statistics, "Producer Price Indexes," November 14, 2024, https://www.bls.gov/ppi/quality-adjustment/archived-ppi-reports-on-quality-changes-for-motor-vehicles.htm.

[55] Ibid; Bureau of Labor Statistics, "Quality Adjustment in the CPI: New Vehicles" April 9, 2025, https://www.bls.gov/cpi/quality-adjustment/new-vehicles.htm.

account for $1,705.12 in additional expenditures, which is 5.1 percent of total average expenditures in 2025 and 14.9 percent of the net increase in average expenditures since 2002. For new light trucks, equipment upgrades account for $4,510.48 in additional expenditures, which is approximately 8.9 percent of total average expenditures in 2025 and 18.6 percent of the net increase in average expenditures since 2002. Across all new passenger vehicles, we estimate that the change in expenditures attributable to quality improvements is $3,040.20, which is approximately 6.4 percent of total average expenditures in 2025 and 13 percent of the net increase in average expenditures since 2002.

Trimflation

Overview

Trimflation is the rise in expenditures attributable to dealers and manufacturers selling a higher share of premium trims (i.e., more luxurious, well-equipped versions of a vehicle model) than in prior years. Trimflation has increased over the last two decades, primarily fueled by dealers and automakers seeking to generate higher profits from the sale of optional features and luxury trims. According to industry experts, the sale of luxury trims is an important factor for dealer profitability.[56] In 2018, General Motors claimed that sales of high-end trims are a vital profit center for the automaker.[57] In its most recent annual report to shareholders, Ford Motor Company reveals that the "mix of trim levels and options within a vehicle line" is a key factor affecting margins.[58] Stellantis reports to shareholders that "vehicles equipped with additional options are generally more profitable than those with fewer options," and "our ability to offer attractive vehicle options and upgrades is critical to our ability to increase our profitability…"[59]

Expenditures

Trimflation accounts for a significant share of the increase in average expenditures since 2002. For new cars, trimflation is attributable to $2,025.27 in additional expenditures, which is 6.1 percent of total average expenditures in 2025 and 17.8 percent of net average expenditures since 2002. For new light trucks, trimflation accounts for $7,847.07 of additional expenditures, which is 15.6 percent of total average expenditures in 2025 and 32.3 percent of net average expenditures since 2002. Across all new passenger vehicles, trimflation is attributable to $5,863.32 in additional expenditures, which is 12.4 percent of total average expenditures in 2025 and 25.1 percent of net average expenditures since 2002. Trimflation between 2002 and 2025 is depicted in *Figure 11*.

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[56] Nadapayments, "The Profit Margin of Car Dealerships: A Comprehensive Analysis," accessed December 24, 2025, https://www.nadapayments.com/blog/the-profit-margin-of-car-dealerships-a-comprehensive-analysis.

[57] Forbes, "Why GM Is So Bullish On The Future -- And Why You Should Believe It," January 16, 2018, https://www.forbes.com/sites/joannmuller/2018/01/16/why-gm-is-so-bullish-on-the-future-and-why-you-should-believe-it/; The Detroit News, "Vehicle Add-Ons Rev Up Auto Earnings," May 1, 2017, https://www.detroitnews.com/story/business/autos/2017/05/01/auto-add-ons/101138604/.

[58] Ford Motor Company, "Annual Report Pursuant to Section 13 or 15(D) of the Securities Exchange Act of 1934 For the Fiscal Year Ended December 31, 2024," February 6, 2025, https://www.sec.gov/Archives/edgar/data/37996/000003799625000013/f-20241231.htm.

[59] Stellantis, "Annual Report for the Year Ended December 31, 2024," February 27, 2025, https://www.stellantis.com/content/dam/stellantis-corporate/investors/financial-reports/Stellantis-NV-20241231-Annual-Report.pdf.

Trimflation is a growing share of vehicle expenditures. Trimflation gradually rose from 2002 to 2007, as disposable household income increased and macroeconomic conditions were strong. During the Great Recession (i.e., the severe global economic downturn from late 2007 to mid-2009), consumer demand for comfort and convenience features weakened, resulting in lower trimflation in 2008 and 2009.[60] As the nation recovered from the economic downturn, trimflation returned to pre-recession levels, remaining fairly steady between 2010 and 2017.

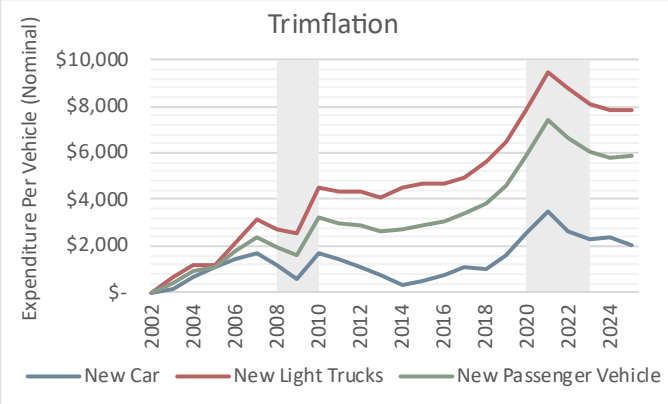

Figure 11: The National Consumers League. Expenditures are measured in nominal dollars.

To boost profits, automakers deliberately began producing more expensive trims in 2017, substantially increasing trimflation.[61] In December 2017, manufacturers produced 36 affordable trims (i.e., vehicle trims $25,000 or less), accounting for 13 percent of new vehicle sales, and 61 high-tier trims (i.e., vehicle trims $60,000 or more), constituting less than 8 percent of new vehicle sales.[62] By December 2022, automakers manufactured 10 affordable trims, amounting to less than 4 percent of sales, and 90 high-tier trims, accounting for 25 percent of new vehicle sales.[63]

The steady reduction of entry-level trims has effectively increased the price of admission into the new passenger vehicle market, squeezing household budgets and putting new vehicle ownership out of reach for many Americans. Between 2017 and 2019, new car trimflation increased $514.11, a 47.7 percent rise. New light truck trimflation increased $1,537.24, a 30.9 percent rise. New passenger vehicle trimflation increased $1,199.32, a 35.1 percent rise.

In response to severe supply chain shocks during the COVID-19 pandemic, automakers dedicated scarce parts to more profitable, expensive trims, exacerbating trimflation.[64] Parts shortages during the COVID-19 pandemic limited the number of vehicles manufacturers could produce.[65] To boost profits, automakers reserved their limited parts for high-end trims while

[60] ABC News, "In Past Recessions, Sales of Luxury Cars Held On," January 13, 2009, https://abcnews.go.com/Business/story?id=6641810&page=1; NBC News, "Luxury Car Market May Never Look the Same," 28 Sep. 2009, https://www.nbcnews.com/id/wbna32860931.

[61] Kelley Blue Book, "Return of the Base Trim: Automakers Look to Lower Prices," February 3, 2025, https://www.kbb.com/car-news/return-of-the-base-trim-automakers-look-to-lower-prices/.

[62] Cox Automotive, "Seismic Shift: The U.S. New-Vehicle Market is Becoming a Luxury Market," February 23, 2023, https://www.coxautoinc.com/insights-hub/seismic-shift-the-u-s-new-vehicle-market-is-becoming-a-luxury-market/.

[63] Ibid.

[64] Isabella M. Weber, and Evan Wasner, "Sellers' Inflation, Profits, and Conflict: Why Can Large Firms Hike Prices in an Emergency," *Review of Keynesian Economics*, Vol. 11 No. 2, Summer 2023, pp. 183–213.

[65] Ibid.

curbing the production of affordable entry-level trims, which generate lower margins.[66] For example, between 2019 and 2022, annual sales of Chevy Silverado pickups decreased 9.5 percent, yet the number of entry-level Silverado 1500 Work Trucks (WTs) available for sale plummeted 78 percent.[67] Between 2019 and 2020, annual sales of Ford's F-Series pickup trucks decreased 12 percent, yet entry-level F-150 XL listings dropped 43 percent.[68] Between 2019 and 2022, annual sales of Ram pickup trucks decreased 27 percent, yet entry-level Ram 1500 Classic listings plunged 85 percent.[69] For model year 2023, Honda eliminated entry-level CR-V trims, increasing the price of the most affordable CR-V $1,800.[70]

As a result of these practices, trimflation peaked during the COVID-19 pandemic. Between 2020 and 2021, new car trimflation rose $1,937.55, a 121.7 percent increase. New light truck trimflation increased $2,944.53, a 45.2 percent rise. New passenger vehicle trimflation increased $2,797.47, a 60.6 percent rise.

Trimflation modestly decreased as interest rates spiked and supply chain shocks eased. Interest rates dramatically increased in late 2021 and remain above historical levels, making financing vehicles less affordable than in prior years.[71] Such high interest rates have exacerbated affordability concerns, dampening demand for high-tier vehicles.[72] Further, by the end of 2021 and throughout 2022, parts inventories steadily grew and assembly lines returned to full production capacity.[73] To capture larger market share, automakers gradually began reintroducing more affordable trims, which has eased trimflation.[74]

Since 2021, new car trimflation decreased $1,504.32, a 42.6 percent decline. New light truck trimflation decreased $1,608.70, a 17 percent decline. New passenger vehicle trimflation decreased $1,551.10, a 20.9 percent decline.

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[66] Ibid.

[67] The Autopian, "Trimflation: Explaining Why Automakers Raised Prices So Much In The Pandemic," August 9, 2023, https://www.theautopian.com/trimflation-explaining-why-automakers-raised-prices-so-much-in-the-pandemic/.

[68] Ibid.

[69] Ibid.

[70] The Autopian, "The Honda CR-V Gets A Lot More Expensive For 2023," September 14, 2022, https://www.theautopian.com/the-ever-popular-honda-cr-v-gets-a-lot-more-expensive-for-2023/.

[71] Cox Automotive, "Auto Loan Rates Trend Higher as Federal Reserve Cuts Rate Policy," September 17, 2025, https://www.coxautoinc.com/insights-hub/auto-loan-rates-trend-higher-as-federal-reserve-cuts-rate-policy/; Board of Governors of the Federal Reserve System. "Federal Funds Effective Rate [FEDFUNDS]," *FRED, Federal Reserve Bank of St. Louis,* January 4, 2026, https://fred.stlouisfed.org/series/FEDFUNDS.

[72] Transport Topics, "Carmakers End 2023 With High Rates, Prices Affecting Sales," January 3, 2024, https://www.ttnews.com/articles/car-sales-slow-year-end-2023.

[73] Cox Automotive, "New-Vehicle Supply Finally Recovers," June 7, 2023, https://www.coxautoinc.com/insights-hub/2022-new-vehicle-inventory.

[74] Kelley Blue Book, "Return of the Base Trim: Automakers Look to Lower Prices," February 3, 2025, https://www.kbb.com/car-news/return-of-the-base-trim-automakers-look-to-lower-prices/.

Automaker Margins and Production Costs

Overview

Automaker margins and production costs are the general change in vehicle expenditures attributable to changing automaker profits and manufacturing expenses.[75] Factors contributing to automaker margins and production costs include input costs (e.g., materials, parts, labor, and manufacturing processes), supply-side macroeconomic factors (e.g., exchange rates, tariffs, and capital), demand (e.g., financial incentives, government stimulus, and wage growth), and competition.[76]

Changes in the cost of raw materials, parts, labor, and manufacturing processes can affect automakers' margins and production costs. A typical passenger motor vehicle is made from approximately 30,000 parts, spanning engine fasteners, semiconductors, polyester seat coverings, and tire valve caps.[77] Each individual component is produced from raw materials, including steel, aluminum, plastics, and rubber.[78] Automakers and their suppliers transform these raw materials into individual parts, transport parts to various plants, and assemble final vehicles.[79] The manufacturing process is intricate and complex, involving as many as 18,000 suppliers from across the globe.[80] Workers are the backbone of this manufacturing process. In the United States, approximately 294,000 workers are employed in motor vehicle manufacturing, and 531,000 in motor vehicle parts manufacturing.[81]

Supply-side macroeconomic factors can significantly affect automaker margins and production costs. Passenger vehicle manufacturing is highly globalized. In 2007, 73 percent of the content in Ford, General Motors, and Stellantis vehicles was sourced from the United States and Canada.[82] In recent years, those automakers source just 40 percent of their vehicles' content

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[75] Brookings, "How does the government measure inflation?," June 28, 2021, https://www.brookings.edu/articles/how-does-the-government-measure-inflation/.

[76] Congressional Research Service, "Inflation in the U.S. Economy: Causes and Policy Options," October 6, 2022, https://www.congress.gov/crs-product/R47273.

[77] Boise State University, "The U.S. Automotive Industry Supply Chain: Challenges and Transformations," College of Business and Economics, February 24, 2025, https://www.boisestate.edu/cobe/blog/2025/02/the-u-s-automotive-industry-supply-chain-challenges-and-transformations/; Wilson-Garner, "Engine Fasteners: Types & Applications," November 10, 2022, https://wilsongarner.com/engine-fasteners-types-applications/; Tirerack.com, "What Are the Tire Valve Stem Types, Components, & Uses?," accessed December 27, 2025, https://www.tirerack.com/upgrade-garage/what-are-the-tire-valve-stem-types-components-uses?srsltid=AfmBOoprjWYFCOMLMgxfykYw6LWhTSt2zmLGb4phTgwLV8j-CrXYU9T9; Alliance for Automotive Innovation, "The Automotive Semiconductor Supply Chain is (Still) Vulnerable," August 19, 2025, https://www.autosinnovate.org/posts/blog/auto-semiconductor-supply-chain-still-vulnerable.

[78] Boise State University, "The U.S. Automotive Industry Supply Chain: Challenges and Transformations," College of Business and Economics, February 24, 2025, https://www.boisestate.edu/cobe/blog/2025/02/the-u-s-automotive-industry-supply-chain-challenges-and-transformations/.

[79] Ibid.

[80] Ibid; McKinsey & Company, "Reimagining Industrial Supply Chains," August 11, 2020, https://www.mckinsey.com/industries/industrials/our-insights/reimagining-industrial-supply-chains.

[81] Bureau of Labor Statistics, "Automotive Industry: Employment, Earnings, and Hours," December 19, 2025, https://www.bls.gov/iag/tgs/iagauto.htm.

[82] allamerican.org, "State of American Auto Manufacturing Report," April 18, 2024, https://allamerican.org/research/auto-manufacturing-report/.

from the United States and Canada.[83] As supply chains have globalized, changes in exchange rates and tariffs have a dramatic effect on production costs. Exchange rates are the price of one nation's currency in relation to another country's currency.[84] As the value of the United States Dollar increases, imports are cheaper and exports more expensive.[85] As the value of the United States Dollar decreases, imports become more expensive and exports are cheaper.[86] Further, a tariff is a tax levied on foreign-made goods and paid by the importer.[87] Higher tariffs increase production costs and squeeze margins.

The health of the financial market and ease of access to capital affect automaker margins and production costs. Automobile manufacturing is a capital-intensive venture that requires substantial investment in research and development, facilities, equipment, and land.[88] In 2022, automakers invested over $32.8 billion in research and development in the United States, the fourth-highest among manufacturing industries.[89] Ford, General Motors, and Stellantis are among the top investors in research and development, spending more than Facebook, HP, DOW, or ExxonMobil.[90] In 2023, automakers and suppliers announced over $84 billion in investments in facilities and equipment.[91]

Demand for motor vehicles plays a significant role in dealer margins. NHTSA and the Environmental Protection Agency (EPA) estimate that the price elasticity of demand for passenger vehicles is −0.4, meaning that a 10 percent increase in passenger vehicle prices results in a 4 percent decrease in passenger vehicle demand.[92] Financial inducements, such as tax credits and government stimulus programs, can significantly affect sales and, therefore, automaker margins. Studies suggest that the price elasticity of demand for new passenger vehicles is −0.84 for lower-income consumers and −0.2 for higher-income consumers, indicating that lower-

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[83] Ibid.

[84] OECD, "Exchange Rates," accessed December 27, 2025, https://www.oecd.org/en/data/indicators/exchange-rates.html.

[85] Ibid.

[86] GTreasury, "Strong Dollar vs. Weak Dollar: What Treasurers Need to Know," accessed December 12, 2025, https://www.gtreasury.com/posts/strong-dollar-vs-weak-dollar-what-treasurers-need-to-know.

[87] Council on Foreign Relations, "What Are Tariffs," April 1, 2025, https://www.cfr.org/backgrounder/what-are-tariffs.

[88] American Automakers, "Investing for the Future," March 2022, https://www.americanautomakers.org/sites/default/files/2021%20AAPC%20Scoreboard%20on%20Auto%20CapEx%20and%20R%26D.pdf.

[89] Alliance for Automotive Innovation, "Alliance for Automotive Innovation Releases New Economic Data," January 29, 2025, https://www.autosinnovate.org/posts/press-release/auto-innovators-data-driven-report-release.

[90] American Automakers, "Investing for the Future," March 2022, https://www.americanautomakers.org/sites/default/files/2021%20AAPC%20Scoreboard%20on%20Auto%20CapEx%20and%20R%26D.pdf.

[91] Center for Automotive Research, "Economic Contribution of the U.S. Automotive Industry," July 2024, https://www.cargroup.org/wp-content/uploads/2024/08/CAR-LV-Mfg-Econ-Contribution-Analysis-MBS-2024.pdf.

[92] National Highway Traffic Safety Administration, "Corporate Average Fuel Economy Standards for Passenger Cars and Light Trucks for Model Years 2027 and Beyond and Fuel Efficiency Standards for Heavy-Duty Pickup Trucks and Vans for Model Years 2030 and Beyond," Department of Transportation, 89 Fed. Reg. 52540. 24 June 2024; Environmental Protection Agency, "Multi-Pollutant Emissions Standards for Model Years 2027 and Later Light-Duty and Medium-Duty Vehicles," 89 Fed. Reg. 27842, April 18, 2024.

income consumers are more price-sensitive.[93] Further, as incomes increase, demand for new passenger vehicles rises. Economists estimate the income elasticity of demand for new passenger vehicles to be 1.7, meaning that for every 10 percent increase in income, demand increases 17 percent.[94]

The competitiveness of the motor vehicle manufacturing sector also influences automaker margins. Greater competition puts downward pressure on profits, as automakers are incentivized to reduce margins to avoid being undercut by competitors and losing market share.[95] Conversely, less competition allows higher profits, as automakers are better positioned to increase margins while maintaining market share. As competitive forces wax and wane, automakers' pricing power changes, affecting automaker margins.

Expenditures

Automaker margins and production costs are the most significant factors driving up per vehicle expenditures since 2002. For new cars, automaker margins and production costs account for $6,168.39 in additional expenditures, which is 18.5 percent of total average expenditures in 2025 and 54.1 percent of the net change in average expenditures since 2002. For new light trucks, automaker margins and production costs account for $8,822.20 in additional expenditures, which is 17.5 percent of total average expenditures in 2025 and 36.3 percent of the net change in average expenditures since 2002. For new passenger vehicles, automaker margins and production costs account for $8,008.03 in additional expenditures, which is 16.9 percent of total average expenditures in 2025 and 34.3 percent of the net change in average expenditures since 2002. *Figure 12* depicts the change in automaker margins and production costs since 2002.

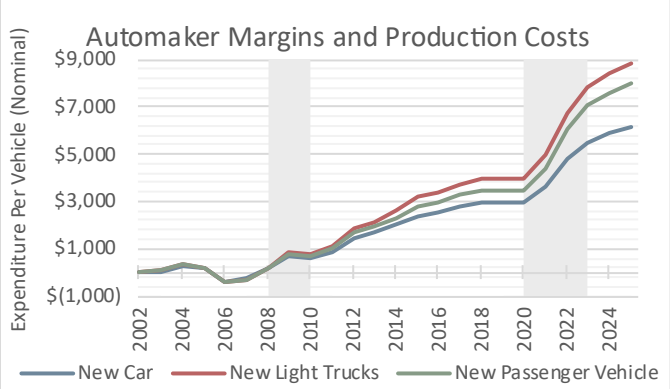

Figure 12: The National Consumers League. Average expenditures are measured in nominal dollars.

Between 2002 and 2006, changes in automaker margins and production costs were relatively modest due to shifting consumer demand, fierce competition, and improved manufacturing efficiency. During this period, a dramatic increase in gasoline prices discouraged consumers from buying more profitable light trucks, squeezing automakers' profits.[96] Further,

[93] Resources for the Future, "New Passenger Vehicle Demand Elasticities: Estimates and Policy Implications," August 2023, https://media.rff.org/documents/WP_23-33.pdf.
[94] The MIT Press, "Market Price and Income Elasticities of New Vehicle Demands," August 1996, https://lindseyresearch.com/wp-content/uploads/2021/12/NHTSA-2021-0053-1575-Exhibit-41-McCarthy-1996.pdf.
[95] Council of Economic Advisors, "Benefits of Competition and Indicators of Market Power," May 2016.
[96] National Bureau of Economic Research, "A Decade of Change for the U.S. Auto Industry: The Internet, Promotions, and Rising Gasoline Prices," September 2010, https://www.nber.org/reporter/2010number3/decade-change-us-auto-industry-internet-promotions-and-rising-gasoline-prices?page=1&perPage=50.

faced with increased competition and cost concerns, automakers produced more passenger vehicles than market conditions warranted, resulting in an overcapacity of vehicles that cut into profits.[97] In addition, manufacturing practices became more efficient, resulting in a steady reduction in the hours worked by all plant personnel per vehicle.[98]

During the Great Recession, skyrocketing production costs per vehicle eclipsed collapsing automaker margins, resulting in slight increases in automaker margins and production costs. Between 2007 and 2009, sales of new motor vehicles plummeted, reaching the lowest volume in three decades as the economic downturn chilled demand for new passenger vehicles.[99] Given the high fixed costs associated with manufacturing passenger vehicles, production costs per new vehicle sold rose as sales dropped.[100] Such a sharp decline in demand, coupled with exorbitant legacy costs, significantly reduced automaker margins. General Motors incurred nearly $40 billion in losses in 2007 and another $31 billion in 2008.[101] Ford Motor Company lost $3 billion in 2007 and $15 billion in 2008.[102]

Between 2010 and 2019, automaker margins and production costs gradually increased as efficiency improved and overcapacity eased. During the Great Recession, the automobile industry was substantially restructured, curbing costs and optimizing production levels.[103] To eliminate overcapacity, automakers cut production, allowing expenditures and profitability per passenger vehicle to rise.[104] Total vehicle sales remained low for years, only returning to pre-recession levels in 2015.[105] In addition, manufacturers charged dealers higher invoices, increasing automakers' margins at the expense of dealer markups and margins.[106]

Automaker margins and production costs rose sharply during the COVID-19 pandemic due to supply chain disruptions and higher demand. In the early stages of the public health crisis, over 90 percent of domestic automotive production was briefly shut down to prevent the spread of the disease.[107] In March 2020, passenger vehicle production in the United States decreased

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[97] Center for Automotive Research, "The Major Determinants of U.S. Automotive Demand: Factors Driving the U.S. Automotive Market and Their Implications for Specialty Equipment and Performance Aftermarket Suppliers," August 2009.

[98] Harbour Consulting, "The Harbour Report," 2007, s3-prod.autonews.com/s3fs-public/CA2018861.PDF.

[99] Congressional Research Service, "The Role of TARP Assistance in the Restructuring of General Motors," March 18, 2014, https://www.congress.gov/crs-product/R41978.

[100] Ibid.

[101] National Bureau of Economic Research, "A Retrospective Look at Rescuing and Restructuring General Motors and Chrysler," March 2015, https://www.nber.org/system/files/working_papers/w21000/w21000.pdf.

[102] Ibid.

[103] Thomas Klier and James M. Rubenstein, "Restructuring of the U.S. Auto Industry in the 2008-2009 Recession," March 18, 2013, https://doi.org/10.1177/0891242413481243.

[104] Center for Automotive Research, "Repurposing Former Auto Manufacturing Sites," November 2011, https://www.cargroup.org/publication/repurposing-former-auto-manufacturing-sites/.

[105] U.S. Bureau of Economic Analysis, Total Vehicle Sales [TOTALSA], *FRED, Federal Reserve Bank of St. Louis*, December 30, 2025, https://fred.stlouisfed.org/series/TOTALSA.

[106] Bureau of Labor Statistics, "Automotive Dealerships 2019–22: Dealer Markup Increases Drive New-Vehicle Consumer Inflation," April 2023, https://www.bls.gov/opub/mlr/2023/article/automotive-dealerships-markups.htm.

[107] International Trade Commission, "The Roadblocks of the COVID-19 Pandemic in the U.S. Automotive Industry," Office of Industries, May 2022,

nearly 31 percent compared to the year prior.[108] By April, virtually no passenger vehicles were being produced in the United States. In late April, manufacturing plants gradually resumed operations, and normal production volumes were reached by July 2020.[109]

As demand for personal protective equipment (PPE) and ventilators surged, automakers repurposed factories to produce vital medical and public health equipment.[110] Ford, in partnership with General Electric, manufactured 50,000 critical care ventilators by July 2020.[111] General Motors and Ventec produced 30,000 ventilators by August 2020.[112] General Motors produced 13 million face masks by October 2020.[113] Stellantis manufactured 10 million face masks and 55,000 face shields by December 2020.[114] Ford donated over 160 million face masks, 20 million face shields, and 1.5 million washable hospital gowns.[115]

Supply chain disruptions hampered production, keeping passenger vehicle volumes low.[116] Parts shortages became a persistent challenge as automakers' vast, globalized networks of suppliers adopted different COVID-19 mitigation policies.[117] Global shipping challenges and periodic port shutdowns exacerbated the issue.[118]

Semiconductor shortages significantly constrained passenger vehicle production during the COVID-19 pandemic. Semiconductors are small chips that enable machines to harness electricity for processing power. They are essential components for a wide range of electronic devices, from PlayStations to Tomahawk missiles.[119] As passenger vehicles have become more sophisticated in recent decades, automakers have grown increasingly reliant on semiconductors. A typical passenger vehicle now has 1,400 to 1,500 semiconductors, though some modern vehicles may have as many as 3,500 chips.[120]

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https://www.usitc.gov/publications/332/working_papers/final_the_roadblocks_of_the_covid-19_pandemic_in_the_automotive_industry.pdf.

[108] Ibid.
[109] Ibid.
[110] Ibid.
[111] Ibid.
[112] Ibid.
[113] Ibid.
[114] Ibid.
[115] Ibid.
[116] Ibid.
[117] Ibid.
[118] Ibid.
[119] McKinsey & Company, "What is a semiconductor?" April 14, 2025, https://www.mckinsey.com/featured-insights/mckinsey-explainers/what-is-a-semiconductor; The White House, "Building Resilient Supply Chains, Revitalizing American Manufacturing, and Fostering Broad-Based Growth," June 2021, https://bidenwhitehouse.archives.gov/wp-content/uploads/2021/06/100-day-supply-chain-review-report.pdf?utm_source=sfmc%E2%80%8B&utm_medium=email%E2%80%8B&utm_campaign=20210610_Global_Manufacturing_Economic_Update_June_Members.
[120] Micron, "Automotive Semiconductors," accessed December 30, 2025, https://www.micron.com/about/micron-glossary/automotive-semiconductors?srsltid=AfmBOopvchyMatTDiG2sYXn1AJeN7Bql0YP083xtk9EFrK26bevl0WJf.

During the pandemic, globalized chip shortages and shifts in semiconductor production created severe semiconductor shortages for automakers.[121] In the early days of the public health crisis, automakers slashed semiconductor orders and kept chip inventories low, expecting demand for passenger vehicles to plummet.[122] Cancelled orders enabled the semiconductor industry to shift production, fabricating chips to meet surging demand for consumer electronics and telecommunications equipment.[123] Once it became evident that demand for passenger vehicles remained strong, semiconductor producers no longer had the capacity to fulfill automakers' orders.[124]

These supply chain challenges led to lower passenger vehicle production. In 2020, vehicle production in the United States totaled 8.8 million units, down more than 2 million from 2019.[125] In 2021, vehicle production neared 9.2 million units, 1.7 million less than in 2019.[126]

Despite initial expectations, demand for new passenger vehicles remained strong during the COVID-19 pandemic. Stay-at-home precautions and social distancing led to a sharp contraction in spending on services.[127] Yet disposable income increased significantly, primarily driven by federal stimulus programs.[128] Both factors contributed to a substantial increase in spending on durable goods, such as furniture, appliances, recreational goods, and passenger vehicles, during the pandemic.[129] One study estimates that the Economic Impact Payments and the Paycheck Protection Program were attributable to 1.75 million new passenger vehicle sales in 2020, which is 12 percent of all sales that year.[130]

High demand yet low volumes of passenger vehicles gave automakers substantial pricing power, resulting in increased margins during the pandemic. Automakers' annual margins were 6 percent in 2018 and 4.9 percent in 2019.[131] After dropping to 3 percent in 2020, margins quickly rose, reaching 8.2 percent and 8.5 percent over the next three years.[132]

The rate of growth in automaker margins and production costs was highest during the COVID-19 pandemic. Between 2020 and 2023, automaker margins and production costs rose 89 percent for new cars, an increase of $2,598.93. For new light trucks, automaker margins and

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[121] International Trade Commission, "The Roadblocks of the COVID-19 Pandemic in the U.S. Automotive Industry," Office of Industries, May 2022, https://www.usitc.gov/publications/332/working_papers/final_the_roadblocks_of_the_covid-19_pandemic_in_the_automotive_industry.pdf.

[122] Ibid.

[123] Ibid.

[124] Ibid.

[125] Ibid.

[126] Ibid.

[127] Kristen Tauber, and Willem Van Zandweghe, "Why Has Durable Goods Spending Been So Strong during the COVID-19 Pandemic?" Economic Commentary, July 7, 2021.

[128] Ibid.

[129] Ibid.

[130] Jack Dunbar, Christopher Kurz, Geng Li, and Maria D. Tito, "In the Driver's Seat: Pandemic Fiscal Stimulus and Light Vehicles," Finance and Economics Discussion Series 2024-013, 2024, https://www.federalreserve.gov/econres/feds/files/2024013pap.pdf.

[131] Bain & Company, "Automotive Profitability: How OEM and Supplier Margins Are Faring," November 20, 2025, https://www.bain.com/insights/automotive-profitability-how-oem-and-supplier-margins-are-faring-interactive/.

[132] Ibid.

production costs rose 98.5 percent, a $3,892.85 increase. For new passenger vehicles, automaker margins and production costs rose 103.9 percent, a $3,613.84 increase.

Automaker margins and production costs continued to rise in 2024 and 2025 due to persistent inflation and macroeconomic instability. While down significantly from pandemic levels, inflation remained higher than optimal, averaging 2.9 percent in 2024 and 2.7 percent in 2025.[133] Further, the Trump administration has imposed aggressive tariffs on raw materials, parts, and passenger vehicles, elevating production costs.[134]

Dealer Markups and Margins

Overview

Dealers are independent businesses that typically enter contracts with automakers to sell and service the manufacturer's vehicles.[135] Dealers perform several key functions, including inventorying and showcasing vehicles; offering loans, leases, and insurance products; performing maintenance and repair; and marketing.[136] There are approximately 18,000 new passenger vehicle dealerships across the country.[137]

Dealers generate revenue from passenger vehicle sales by selling the vehicles for more than the invoice price. The invoice price is the amount of money a dealer pays an automaker to acquire a passenger vehicle.[138] Automakers provide a manufacturer's suggested retail price (MSRP) for each vehicle, which includes dealer margins.[139] Dealers are not obligated to sell passenger vehicles at the MSRP.[140] Instead, dealers may impose markups or offer discounts.[141]

Dealers also generate substantial revenue from ancillary charges and fees. There are several ancillary charges and fees that can be assessed during the transaction process, including extended warranties, service and maintenance plans, guaranteed automobile or asset protection agreements, emergency road service, vehicle identification number etching and other theft

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[133] Bureau of Labor Statistics, "Consumer Price Index for All Urban Consumers: All Items in U.S. City Average [CPIAUCSL], *FRED, Federal Reserve Bank of St. Louis*, https://fred.stlouisfed.org/series/CPIAUCSL, accessed January 30, 2026.

[134] Congressional Research Service, "Presidential 2025 Tariff Actions: Timeline and Status," September 16, 2025, https://www.congress.gov/crs-product/R48549.

[135] Congressional Research Service, "U.S. Motor Vehicle Industry Restructuring and Dealership Terminations," January 8, 2010, https://www.everycrsreport.com/files/20100108_R40712_461532aa2624faaa80c6e8f950d6b0ad0719195e.pdf.

[136] Ibid.

[137] Cox Automotive, "The Auto Industry: The Vital Importance of Used Cars," accessed December 30, 2025, https://www.coxautoinc.com/wp-content/uploads/2018/02/VitalImportanceofUsedCars_InfographicUpdated021218.pdf.

[138] J.D. Power, "How Much Does a New Car Dealer Make on a Deal?," July 27, 2023, https://www.jdpower.com/cars/shopping-guides/how-much-does-a-new-car-dealer-make-on-a-deal.

[139] Ibid; Remitly, "What Is MSRP? Why It Matters When You're Buying Something," September 25, 2025, https://www.remitly.com/blog/finance/what-is-msrp/.

[140] J.D. Power, "How Much Does a New Car Dealer Make on a Deal?," July 27, 2023, https://www.jdpower.com/cars/shopping-guides/how-much-does-a-new-car-dealer-make-on-a-deal.

[141] Ibid.

protection devices, and undercoating.[142] Such ancillary charges and fees can cost thousands of dollars per transaction and became significantly more expensive during the COVID-19 pandemic, even though these products and services were not subject to supply chain shocks.[143] Some of these add-ons do not provide any appreciable benefit to the consumer, including warranty programs that duplicate the automaker's warranty, service contracts for oil changes on an electric vehicle, and software or audio subscription services that cannot be supported by the vehicle.[144]

Many consumers may not want or be aware of dealer add-ons. The Federal Trade Commission (FTC) found that some unscrupulous dealers misrepresent or bury add-ons in lengthy paperwork, potentially leading unsuspecting consumers to purchase add-ons they do not want.[145] In December 2023, the FTC finalized a rule requiring dealers to make fair representations about price and costs, disclose the offering price of each vehicle, notify consumers that optional add-ons are not mandatory, and receive a consumer's express consent before assessing an ancillary charge or fee.[146] The rule also banned dealers from offering any add-ons that do not benefit the consumer.[147] The rule was projected to save consumers $3.4 billion per year.[148] In January 2025, the U.S. Court of Appeals for the Fifth Circuit vacated the rule on procedural grounds.[149]

Expenditures

Dealer markups and margins are the difference between the invoice price at which a manufacturer sells a passenger vehicle to a dealer and the final price a dealer charges a consumer for that vehicle.[150] Such markups and margins include profits generated by dealers, transaction costs borne by dealers (e.g., transportation and vehicle holding costs), and government taxes and fees.[151]

Dealer markups and margins have increased average expenditures per new passenger vehicle in recent years, as low inventories and strong demand gave dealers the market power to increase prices. Since 2002, changes in dealer markups and margins are attributable to $836.94 in average expenditures per new car, which is 2.5 percent of total average expenditures in 2025 and 7.3 percent of net average expenditures since 2002. For new light trucks, dealer markups and

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[142] Federal Trade Commission, "Combating Auto Retail Scams Trade Regulation Rule," 89 Fed. Reg. 13267, February 22, 2024.
[143] Ibid.
[144] Ibid.
[145] Ibid.
[146] Ibid.
[147] Ibid.
[148] Ibid.
[149] Holland & Knight, "Fifth Circuit Strikes Down FTC's Auto Retail Scam Rule: Key Implications for Dealers," February 4, 2025, https://www.hklaw.com/en/insights/publications/2025/02/fifth-circuit-strikes-down-ftcs-auto-retail-scam-rule.
[150] J.D. Power, "How Much Does a New Car Dealer Make on a Deal?," July 27, 2023, https://www.jdpower.com/cars/shopping-guides/how-much-does-a-new-car-dealer-make-on-a-deal; Remitly, "What Is MSRP? Why It Matters When You're Buying Something," September 25, 2025, https://www.remitly.com/blog/finance/what-is-msrp/.
[151] Ibid.

margins are attributable to $2,520.55 in average expenditures, which is 5.0 percent of total average expenditures in 2025 and 10.4 percent of net average expenditures since 2002. For new passenger vehicles, dealer markups and margins are attributable to $1,810.78 in average expenditures, which is 3.8 percent of total average expenditures in 2025 and 7.8 percent of net average expenditures since 2002. *Figure 13* depicts the change in dealer markups and margins since 2002.

Between 2002 and 2019, dealer markups and margins decreased due to the Great Recession and automakers' aggressive pricing practices. During the 2008 financial crisis, new vehicle inventories were high while demand collapsed, significantly eroding dealers' pricing power. Dealers' margins suffered, as many were forced to offer deep discounts and attractive incentives to clear inventory.[152]

As manufacturers lowered production and demand rebounded, dealer markups and margins gradually recovered but never reached pre-recession levels. Between 2007 and 2019, automakers deployed more aggressive pricing practices, resulting in invoices rising faster than MSRPs, harming dealer profits.[153] By 2019, dealer markups and margins had decreased $1,899.06, $1,745.77, and $1,970.07, respectively, per new car, light truck, and passenger vehicle since 2002.

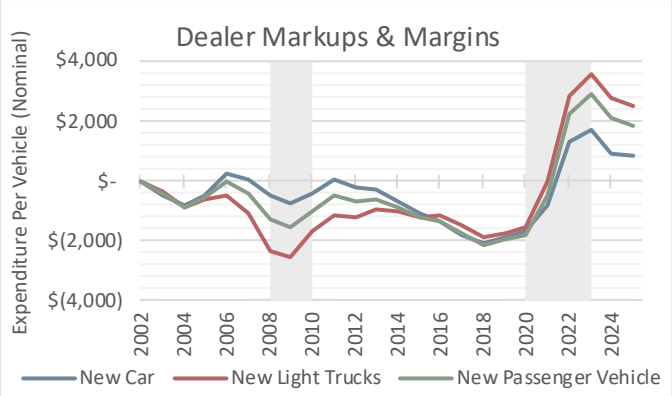

Figure 13: The National Consumers League. Average expenditures are measured in nominal dollars.

Dealer markups and margins soared during the COVID-19 pandemic as lower inventories and strong demand allowed dealers to increase prices per passenger vehicle.[154] Between 2020 and 2023, dealer markups and margins per new car increased 190 percent, amounting to $3,607.56 in additional expenditures. For new light trucks, dealer markups and margins increased 305.5 percent, amounting to $5,334.14 in additional expenditures. For new passenger vehicles, dealer markups and margins increased 246.7 percent, amounting to $4,860.29 in additional expenditures.

Since 2023, dealer markups and margins have gradually decreased due to stabilizing inventories and cooling demand. As the supply chain crisis subsided, production of passenger

[152] Congressional Research Service, "The Role of TARP Assistance in the Restructuring of General Motors," March 18, 2014, https://www.congress.gov/crs-product/R41978; New York Times. "Automakers Offer Big Incentives to Spur Sales," November 14, 2008, https://www.nytimes.com/2008/11/15/business/15auto.html.

[153] Bureau of Labor Statistics, "Automotive Dealerships 2019–22: Dealer Markup Increases Drive New-Vehicle Consumer Inflation," April 2023, https://www.bls.gov/opub/mlr/2023/article/automotive-dealerships-markups.htm.

[154] Ibid.

vehicles returned to pre-pandemic levels, increasing dealer inventories.[155] Further, high interest rates and persistent inflation have weakened demand.[156]

Affordability

By evaluating sticker price alone, the cost of new and used vehicles has seemingly skyrocketed over the past 25 years, straining household budgets and exacerbating the affordability crisis plaguing the nation. However, merely comparing prices between two points in time is misleading without accounting for inflation, purchasing power, and budgetary effects.

Inflation is the general increase in prices of goods and services over time, irrespective of changes in the quality of those goods and services.[157] When evaluating price trends, controlling for inflation reveals changes in the real price of a product or service compared to the general change in prices across all goods and services. By identifying whether vehicle prices have grown faster or slower than prices for typical household goods and services, we gain insights into the extent to which changes in vehicle prices are putting pressure on household budgets.

Purchasing power is a measure of consumers' ability to afford a good or service, taking into account changes in consumers' income and prices. Even during periods of rising prices, purchasing power may increase if income rises faster than prices.

Budgetary effects capture the extent to which changes in essential categories of household expenditures affect consumers' ability to afford basic goods and services. Each year, households spend nearly the entirety of their annual budgets on housing, transportation, food, personal insurance and pensions, healthcare, entertainment, apparel, and education.[158] As costs of basic goods and services rise or fall, the amount of household disposable income available for other expenditures changes, affecting household budgets.

In this section, we calculate and evaluate real average expenditures, household purchasing power, and household budgetary impact of used passenger vehicles and new cars, light trucks, and passenger vehicles.

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[155] International Trade Commission, "The Roadblocks of the COVID-19 Pandemic in the U.S. Automotive Industry," Office of Industries, May 2022, https://www.usitc.gov/publications/332/working_papers/final_the_roadblocks_of_the_covid-19_pandemic_in_the_automotive_industry.pdf.

[156] Bureau of Labor Statistics, "Consumer Price Index for All Urban Consumers: All Items in U.S. City Average [CPIAUCSL], *FRED, Federal Reserve Bank of St. Louis*, https://fred.stlouisfed.org/series/CPIAUCSL, accessed January 30, 2026.; CNBC, "Auto Incentives are Back — But High Interest Rates Weaken Deals for Buyers," May 16, 2024, https://www.cnbc.com/2024/05/16/despite-auto-incentives-high-interest-rates-weaken-deals-for-buyers.html.

[157] The Federal Reserve, "What is Inflation, and How Does the Federal Reserve Evaluate Changes in the Rate of Inflation?," August 22, 2025, https://www.federalreserve.gov/faqs/economy_14419.htm.

[158] Bureau of Labor Statistics, "Consumer Expenditure Surveys," December 19, 2025, https://www.bls.gov/cex/tables/calendar-year/mean-item-share-average-standard-error.htm#cu-income.

Real Passenger Vehicle Expenditures

The real average expenditures (i.e., expenditures adjusted for inflation) on new vehicles have remained relatively steady between 2002 and 2025, with real average expenditures per new car falling and real average expenditures per new light truck rising. Since 2002, real average expenditures per new car have fallen $5,772.60, a 14.7 percent decrease. Over the same period, real average expenditures per new light truck have risen $3,867.81, an 8.2 percent increase. Real average expenditures per new passenger vehicle have risen $4,501.53, a 10.4 percent increase. *Figure 14* depicts the change in real average expenditures and the percent change in real average expenditures since 2002.

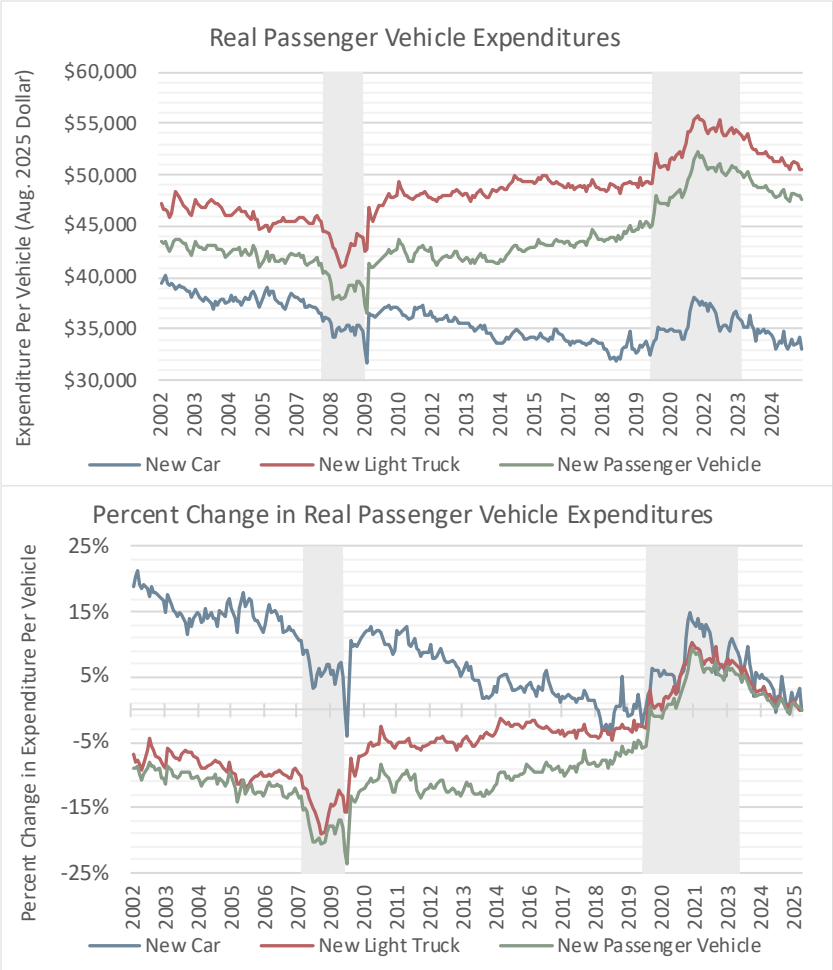

Figure 14: The National Consumers League. The base month is August 2025. For percent changes, positive values denote months in which the average expenditure of a new car or light truck is higher than the average expenditure in August 2025, while negative values denote months in which the average expenditure is lower than the average expenditure in August 2025.

Real Used Vehicle Expenditures

To estimate the change in the real price of used vehicles, we derive a relative price index, which adjusts changes in used vehicle prices for inflation. The sales price of used vehicles is sourced from the Manheim Used Vehicle Value Index, a measure of used vehicle prices derived from statistical analysis of more than 5 million transactions each year.[159] *Figure 15* depicts the percent change in the real price of used vehicles.

[159] Manheim by Cox Automotive, "Used Vehicle Value Index," accessed December 26, 2025, https://site.manheim.com/en/services/consulting/used-vehicle-value-index.html.

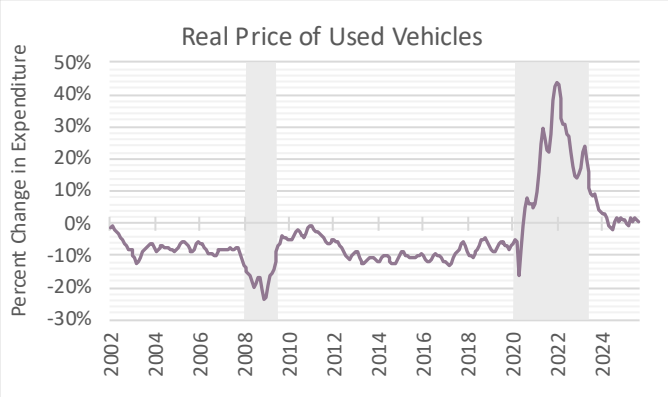

Figure 15: The National Consumers League. Negative percentages indicate that used vehicle prices in a given year were lower than in August 2025. Positive percentages indicate that used vehicle prices in a given year were higher than in August 2025.

After nearly two decades of relatively steady price levels, real used vehicle prices dramatically spiked during the COVID-19 pandemic but have nearly returned to early 2000s levels. Between 2002 and 2007, real used vehicle prices gradually dropped, becoming approximately 9 percent less than 2025 levels. During the Great Recession, real used vehicle prices plummeted, becoming nearly 24 percent less expensive than 2025 used vehicles, before quickly rebounding to pre-recession levels. Between 2012 and 2020, real used vehicle prices stabilized, hovering around 9 percent below 2025 levels until the COVID-19 pandemic. Between February 2020 and December 2021, real used vehicle prices climbed from approximately 5 percent below 2025 levels to nearly 44 percent above 2025 levels, a nearly 50 percent increase in price. Since 2021, real used-vehicle prices have fallen dramatically, becoming 5.8 percent higher than in 2002.

New and Used Passenger Vehicle Purchasing Power

Purchasing power measures whether average household disposable income rises faster or slower than average passenger vehicle expenditures. If average household disposable income rises faster than average passenger vehicle expenditures, purchasing power is strengthened, leaving households with more disposable income for other goods and services. If average household disposable income rises more slowly than average passenger vehicle expenditures, purchasing power is weakened, leaving households with less disposable income for other goods and services.

To evaluate the purchasing power of new passenger vehicles over time, we derive purchasing power indices by comparing changes in average new car, light truck, passenger vehicle, and used passenger vehicle expenditures with changes in household disposable income. Disposable income is the income remaining after taxes, a practical measure of households' financial ability to purchase goods or services.[160] Households are an ideal unit of comparison when evaluating Americans' ability to purchase vehicles, as such financial decisions are typically made at the household level, where income and expenditures are shared.[161] Estimates of household disposable income are derived from the BEA.[162]

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[160] Bureau of Economic Analysis, "Income & Saving," Department of Commerce, February 7, 2024, https://www.bea.gov/resources/learning-center/what-to-know-income-saving.

[161] Bureau of Economic Analysis, "Technical Document: The Methodology for Distributing Personal Saving via a Joint Distribution of Disposable Personal Income and Personal Consumption Expenditures," Department of Commerce, accessed December 26, 2025, https://www.bea.gov/sites/default/files/2024-07/technical_document_personal_saving.pdf.

[162] Ibid.

Passenger Vehicle Purchasing Power

Purchasing power for new passenger vehicles has risen over time, as increases in household disposable income have outpaced average expenditures for new passenger cars. *Figure 16* depicts the purchasing power for new passenger vehicles for the median household. Since 2002, purchasing power for new cars has increased 34.9 percent for the median household. Over the same period, purchasing power for new trucks rose 17.4 percent for the median household. Purchasing power for new passenger vehicles increased 15.7 percent for the median household since 2002.

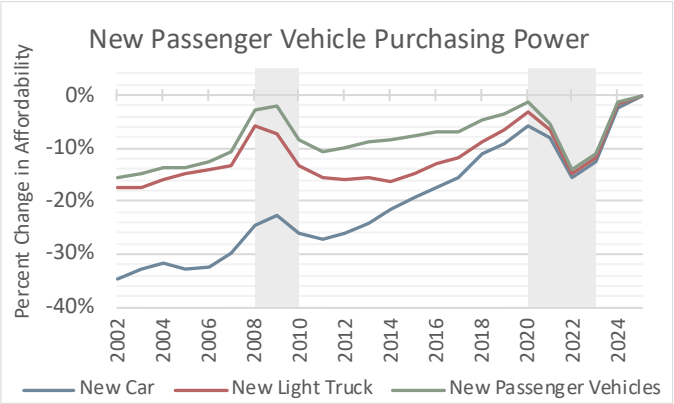


Figure 16: The National Consumers League. Negative percentages indicate that purchasing power was weaker in a given year than in 2025. Positive percentages signify that purchasing power was stronger in a given year than in 2025.

Purchasing power for new passenger vehicles has improved for all household income brackets since 2002. *Figure 17* depicts purchasing power for new passenger vehicles by quintile (i.e., five equally sized groups of households spanning the lowest to the highest disposable incomes). Each quintile generally follows the same trend. Notably, purchasing power improved most for the lowest two and the highest quintiles, which experienced greater percentage increases in disposable income than the other quintiles over the last two decades.

New Passenger Vehicle Purchasing Power: Change by Quintile																							
New Car																							
Quintile	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
0-20%	-40%	-38%	-36%	-39%	-33%	-32%	-28%	-26%	-29%	-30%	-29%	-28%	-26%	-22%	-20%	-18%	-14%	-12%	-5%	-7%	-19%	-11%	-3%	0%
20-40%	-38%	-36%	-34%	-35%	-33%	-32%	-28%	-26%	-27%	-29%	-28%	-27%	-23%	-21%	-18%	-17%	-13%	-12%	-6%	-7%	-17%	-13%	-2%	0%
40-60%	-34%	-33%	-31%	-33%	-32%	-30%	-25%	-24%	-26%	-28%	-27%	-25%	-21%	-20%	-18%	-15%	-11%	-10%	-5%	-7%	-15%	-13%	-2%	0%
60-80%	-33%	-30%	-29%	-30%	-30%	-28%	-23%	-21%	-25%	-25%	-24%	-24%	-19%	-18%	-16%	-14%	-10%	-9%	-5%	-9%	-16%	-14%	-2%	0%
80-100%	-38%	-35%	-32%	-32%	-30%	-28%	-25%	-26%	-28%	-27%	-23%	-25%	-20%	-19%	-18%	-14%	-10%	-10%	-10%	-12%	-18%	-12%	-2%	0%
Median	-35%	-33%	-32%	-33%	-32%	-30%	-25%	-23%	-26%	-27%	-26%	-24%	-21%	-19%	-18%	-16%	-11%	-9%	-6%	-8%	-15%	-13%	-2%	0%
New Light Truck																								
0-20%	-23%	-24%	-22%	-22%	-15%	-15%	-10%	-11%	-17%	-18%	-19%	-20%	-21%	-18%	-15%	-14%	-12%	-10%	-2%	-6%	-18%	-10%	-2%	0%
20-40%	-21%	-22%	-19%	-18%	-15%	-16%	-10%	-11%	-14%	-18%	-18%	-18%	-18%	-16%	-14%	-13%	-10%	-10%	-4%	-6%	-16%	-13%	-2%	0%
40-60%	-16%	-17%	-16%	-15%	-14%	-14%	-6%	-9%	-14%	-16%	-17%	-17%	-16%	-15%	-14%	-12%	-9%	-7%	-3%	-6%	-15%	-12%	-2%	0%
60-80%	-15%	-14%	-12%	-12%	-11%	-11%	-4%	-5%	-13%	-13%	-14%	-15%	-14%	-13%	-12%	-10%	-8%	-6%	-3%	-8%	-16%	-13%	-1%	0%
80-100%	-21%	-20%	-16%	-14%	-11%	-11%	-6%	-11%	-16%	-15%	-12%	-17%	-14%	-14%	-14%	-10%	-8%	-8%	-7%	-10%	-18%	-11%	-2%	0%
Median	-17%	-17%	-16%	-15%	-14%	-13%	-6%	-7%	-13%	-16%	-16%	-16%	-16%	-15%	-13%	-12%	-9%	-7%	-3%	-7%	-15%	-12%	-2%	0%
New Passenger Vehicle																								
0-20%	-22%	-22%	-20%	-21%	-14%	-13%	-7%	-6%	-12%	-14%	-13%	-13%	-14%	-11%	-9%	-9%	-8%	-7%	0%	-4%	-17%	-10%	-1%	0%
20-40%	-19%	-20%	-17%	-17%	-13%	-13%	-7%	-6%	-9%	-13%	-11%	-12%	-10%	-9%	-8%	-8%	-6%	-7%	-2%	-5%	-15%	-12%	-1%	0%
40-60%	-15%	-15%	-13%	-13%	-12%	-11%	-3%	-4%	-9%	-11%	-10%	-10%	-8%	-8%	-8%	-7%	-5%	-4%	-1%	-5%	-14%	-12%	-1%	0%
60-80%	-13%	-11%	-10%	-10%	-10%	-8%	-1%	0%	-8%	-8%	-7%	-8%	-6%	-6%	-6%	-5%	-3%	-3%	-1%	-6%	-15%	-12%	-1%	0%
80-100%	-19%	-17%	-14%	-13%	-9%	-8%	-3%	-6%	-11%	-10%	-6%	-10%	-6%	-7%	-8%	-5%	-4%	-5%	-6%	-9%	-17%	-10%	-1%	0%
Median	-16%	-15%	-14%	-13%	-13%	-11%	-3%	-2%	-8%	-11%	-10%	-9%	-9%	-8%	-7%	-7%	-5%	-4%	-1%	-5%	-14%	-11%	-1%	0%

Figure 17: The National Consumers League. Negative percentages indicate that purchasing power was weaker in a given year than in 2025. Positive percentages signify that purchasing power was stronger in a given year than in 2025.

Used Vehicle Purchasing Power

Purchasing power for used vehicles has improved over time, as increases in average expenditures per used vehicle have been eclipsed by rising household income. *Figure 18* depicts the purchasing power for used vehicles for the median household between 2002 and 2025. Since 2002, purchasing power for used vehicles increased 19.2 percent for the median household.

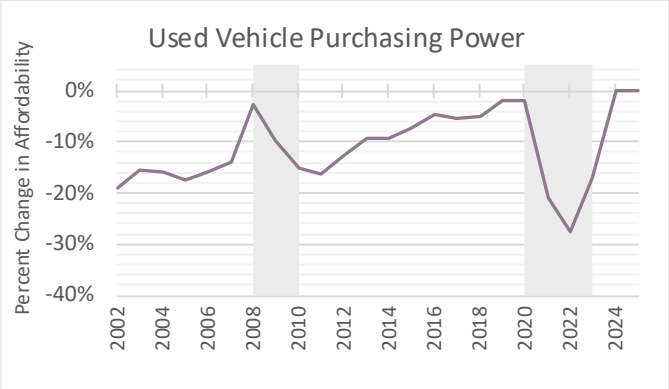


Figure 18: The National Consumers League. Negative percentages indicate that purchasing power was weaker in a given year than in 2025. Positive percentages signify that purchasing power was stronger in a given year than in 2025.

Purchasing power for used vehicles has improved for all household income brackets. *Figure 19* depicts purchasing power for used vehicles by quintile. Each quintile generally follows the same trend. Notably, purchasing power has improved the most for the lowest two and the highest quintiles, which have experienced greater percentage increases in disposable income than the other quintiles over the last two decades.

Used Passenger Vehicle Purchasing Power: Change by Quintile																								
Quintile	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
0-20%	-25%	-23%	-22%	-24%	-17%	-16%	-6%	-14%	-18%	-19%	-16%	-14%	-15%	-10%	-7%	-8%	-8%	-5%	-1%	-20%	-30%	-15%	0%	0%
20-40%	-23%	-20%	-19%	-20%	-16%	-17%	-7%	-13%	-16%	-19%	-15%	-12%	-11%	-9%	-6%	-7%	-7%	-5%	-2%	-20%	-29%	-18%	0%	0%
40-60%	-18%	-15%	-16%	-17%	-16%	-14%	-2%	-12%	-16%	-17%	-14%	-11%	-9%	-8%	-6%	-5%	-5%	-3%	-1%	-20%	-27%	-17%	0%	0%
60-80%	-17%	-12%	-12%	-14%	-13%	-12%	-1%	-8%	-15%	-14%	-10%	-9%	-7%	-5%	-4%	-4%	-4%	-2%	-2%	-22%	-28%	-18%	0%	0%
80-100%	-23%	-18%	-16%	-17%	-13%	-12%	-3%	-14%	-18%	-16%	-9%	-11%	-7%	-7%	-6%	-4%	-4%	-3%	-6%	-24%	-30%	-16%	0%	0%
Median	-19%	-16%	-16%	-17%	-16%	-14%	-3%	-10%	-15%	-16%	-13%	-9%	-9%	-7%	-5%	-6%	-5%	-2%	-2%	-21%	-27%	-17%	0%	0%

Figure 19: The National Consumers League. Negative percentages indicate that purchasing power was weaker in a given year than in 2025. Positive percentages signify that purchasing power was stronger in a given year than in 2025.

Budgetary Analysis

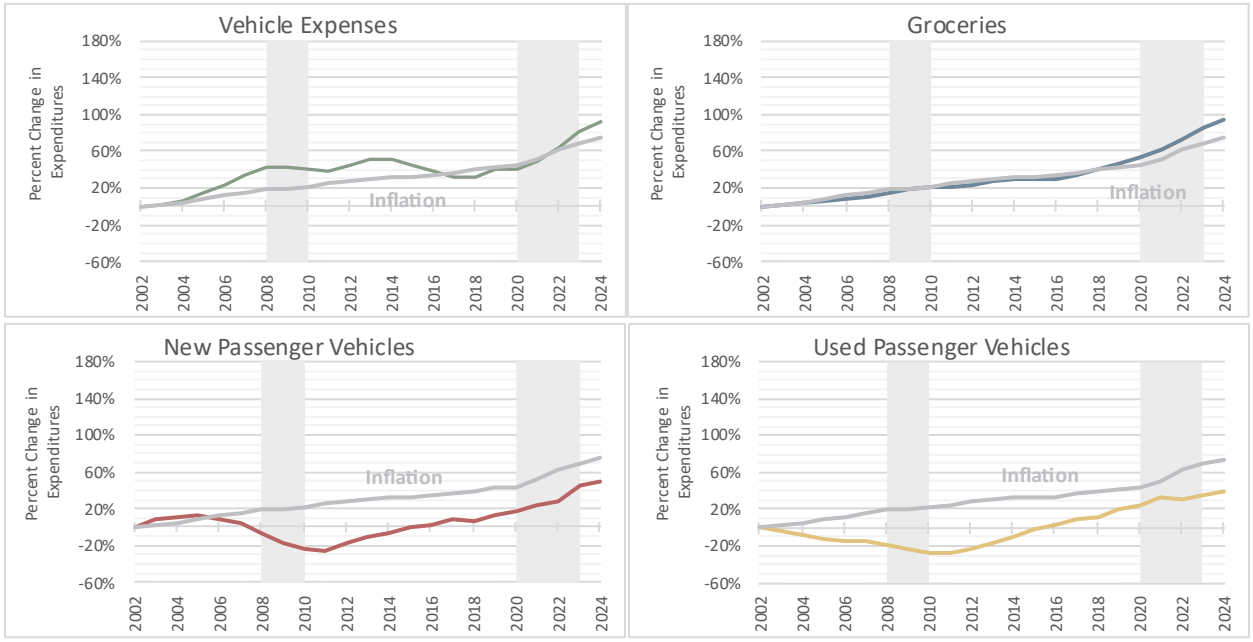
To evaluate the budgetary effect of passenger vehicles and other vehicle expenses over time, we analyze changes in essential categories of household expenditures since 2002. We derive our data from the Consumer Expenditure Surveys, a nationally representative survey administered by BLS and the U.S. Census Bureau that captures information on consumer expenditures, income, and demographics.[163] Our expenditure categories are housing (i.e., rent, mortgage interest and charges, property taxes, maintenance, and insurance), healthcare (i.e., health insurance, medical services, medications, and medical supplies), groceries, education (i.e., preschool, childcare, college tuition, and private schooling), utilities (i.e., electricity, natural gas, telephones service, and water service), vehicle expenses (i.e., gasoline, automobile insurance, financing, and maintenance and repair), new passenger vehicles, and used passenger vehicles, as

[163] The Bureau of Labor Statistics, "Consumer Expenditure Surveys," accessed December 30, 2025, https://www.bls.gov/cex/.

these categories are essential for a good quality of life and constitute a large portion of annual household expenditures.[164]

New and Used Passenger Vehicles

Since 2002, average household expenditures on new and used passenger vehicles have grown more slowly than inflation and the other expenditure categories, indicating that the passenger vehicle market is easing household budgetary pressures. *Figure 20* depicts the percent change in average nominal household expenditures (i.e., expenditures not adjusted for inflation). Average household expenditures for new and used passenger vehicles have increased 49.9 percent and 40 percent, respectively, since 2002. Over the same period, inflation rose 74.4 percent, meaning average passenger vehicle expenditures per household rose more slowly than all goods and services combined. Due to a relatively modest rise in average passenger-vehicle expenditures per household since 2002, households have more disposable income left over to spend on other essential goods and services. By contrast, average household expenditures on vehicle expenses increased 92.4 percent, outpacing inflation by 18 percent. Further, average household expenditures on groceries rose 95.3 percent, housing increased 105.5 percent, education climbed 124.4 percent, healthcare skyrocketed 175.9 percent, and utilities increased 75.2 percent.



[164] Bureau of Labor Statistics, "Consumer Expenditure Surveys," December 19, 2025, https://www.bls.gov/cex/tables/calendar-year/mean-item-share-average-standard-error.htm#cu-income; Bureau of Labor Statistics, "Section 16 – Educational Expenses," September 11, 2013, https://www.bls.gov/cex/csxsection16.htm#EDUDESC.

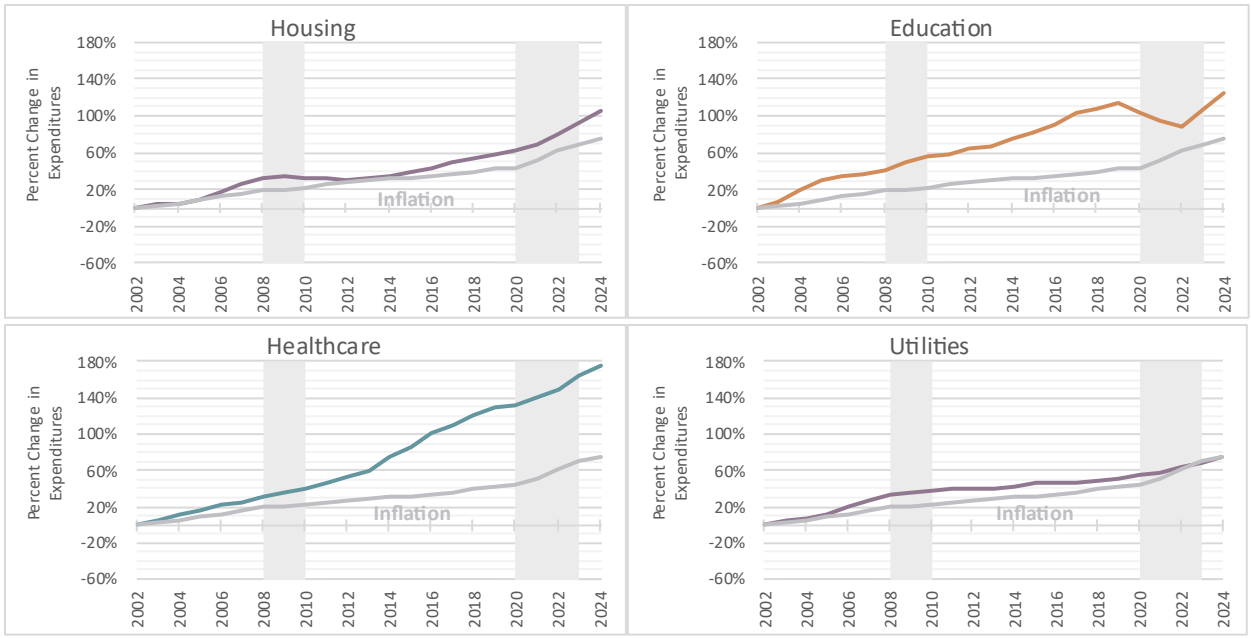


Figure 20: The National Consumers League.

Since 2002, average passenger vehicle expenditures have constituted a smaller share of all household spending, further indicating that the change in average household expenditures on new and used passenger vehicles is alleviating budgetary pressures. The share of all household spending is the percentage of all household expenditures allocated to individual expenditure categories.[165] In 2002, average household expenditures on new and used passenger vehicles constituted 4.3 percent and 4.6 percent of all household spending, respectively. By 2024, average household expenditures on new and used passenger vehicles had fallen to 3.3 percent each.

The share of all household spending on new and used vehicles has decreased since 2002, while several other categories evaluated increased. *Figure 21* depicts the percentage change in the share of expenditures attributable to each category since 2002. Over this period, the share of household expenditures devoted to new and used vehicles fell 23.4 percent and 28.1 percent, respectively. By contrast, the share of expenditures attributable to vehicle expenses rose 0.4 percent, groceries increased 0.9 percent, housing climbed 6.5 percent, education grew 15.7 percent, and healthcare spiked 43.1 percent, while utilities decreased 9.5 percent.

[165] Bureau of Labor Statistics, "Consumer Expenditure Surveys Tables: Getting Started Guide," December 19, 2025, https://www.bls.gov/cex/tables-getting-started-guide.htm.

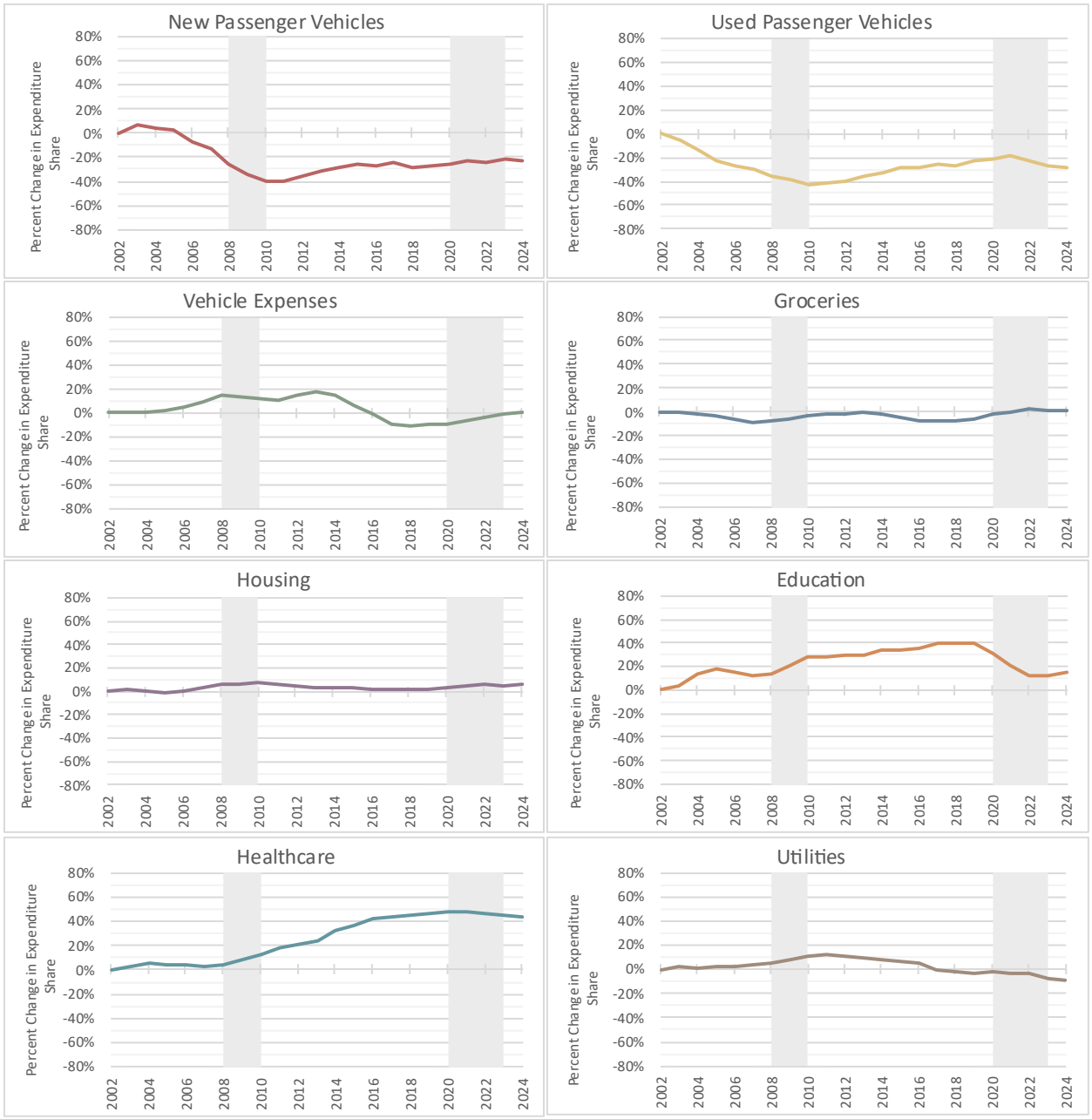


Figure 21: The National Consumers League.

Average household expenditures on new and used passenger vehicles rose more slowly than those for other essential expenditure categories because of longer vehicle lifespans and the discretionary nature of vehicle purchases. As vehicles become less reliable and more expensive to repair with age, consumers are more likely to consider purchasing another vehicle.[166] According to one survey, 65 percent of Americans report that the primary motivation for purchasing a new vehicle is the condition of a household's current vehicle.[167] Further, the purchase of a new or used vehicle is more deferrable compared to other essential goods and services, as households can opt to repair and retain vehicles longer than previously desirable if prices and vehicle availability warrant. A study found that 69 percent of Americans delay buying new passenger vehicles because of market conditions or personal financial concerns.[168] Because the durability and lifespans of passenger vehicles have dramatically increased in recent decades, households are purchasing fewer vehicles (see *Figure 22*). Between 2002 and 2024, the ratio of new passenger vehicles sold per household decreased 22 percent, with more substantial decreases during poor economic conditions.[169]

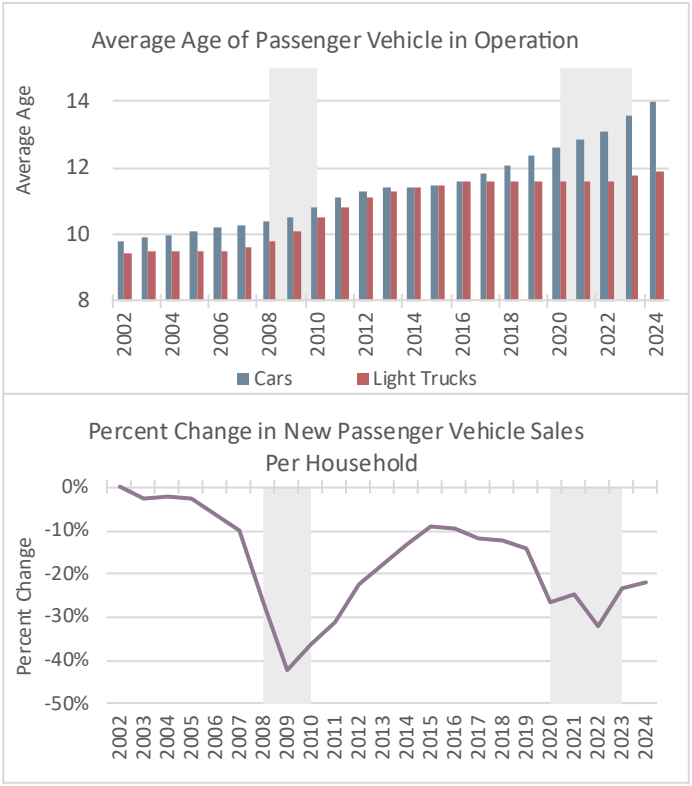


Figure 22: The National Consumers League.

Expenditures on new passenger vehicles have become a larger portion of household budgets since the beginning of the COVID-19 pandemic compared to other essential expenditure categories. *Figure 23* depicts the percent change in average nominal household expenditures since 2019. Average household expenditures for new and used passenger vehicles increased 33 percent and 16.5 percent, respectively, since 2019. Over that same period, inflation rose 22.7 percent, indicating new passenger vehicle expenditures per household rose faster than all goods and services combined. Average household expenditures on vehicle expenses grew 37.7 percent, groceries rose 33.5 percent, housing increased 29.3 percent, education climbed 5 percent, healthcare rose 20.7 percent, and utilities rose 16.5 percent.

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[166] Ibid.

[167] The Zebra, "Survey: Average length of car ownership in America," November 26, 2025, https://www.thezebra.com/resources/driving/average-length-of-car-ownership/.

[168] Ibid.

[169] Census Bureau, "Total Households [TTLHH]," *FRED, Federal Reserve Bank of St. Louis*, January 4, 2026, https://fred.stlouisfed.org/series/TTLHH; Bureau of Economic Analysis, "Table 7.2.5S. Auto and Truck Unit Sales, Production, Inventories, Expenditures, and Price," Department of Commerce, December 23, 2025, https://apps.bea.gov/iTable/?categories=underlying&isuri=1&nipa_table_list=2055&reqid=19&step=3.

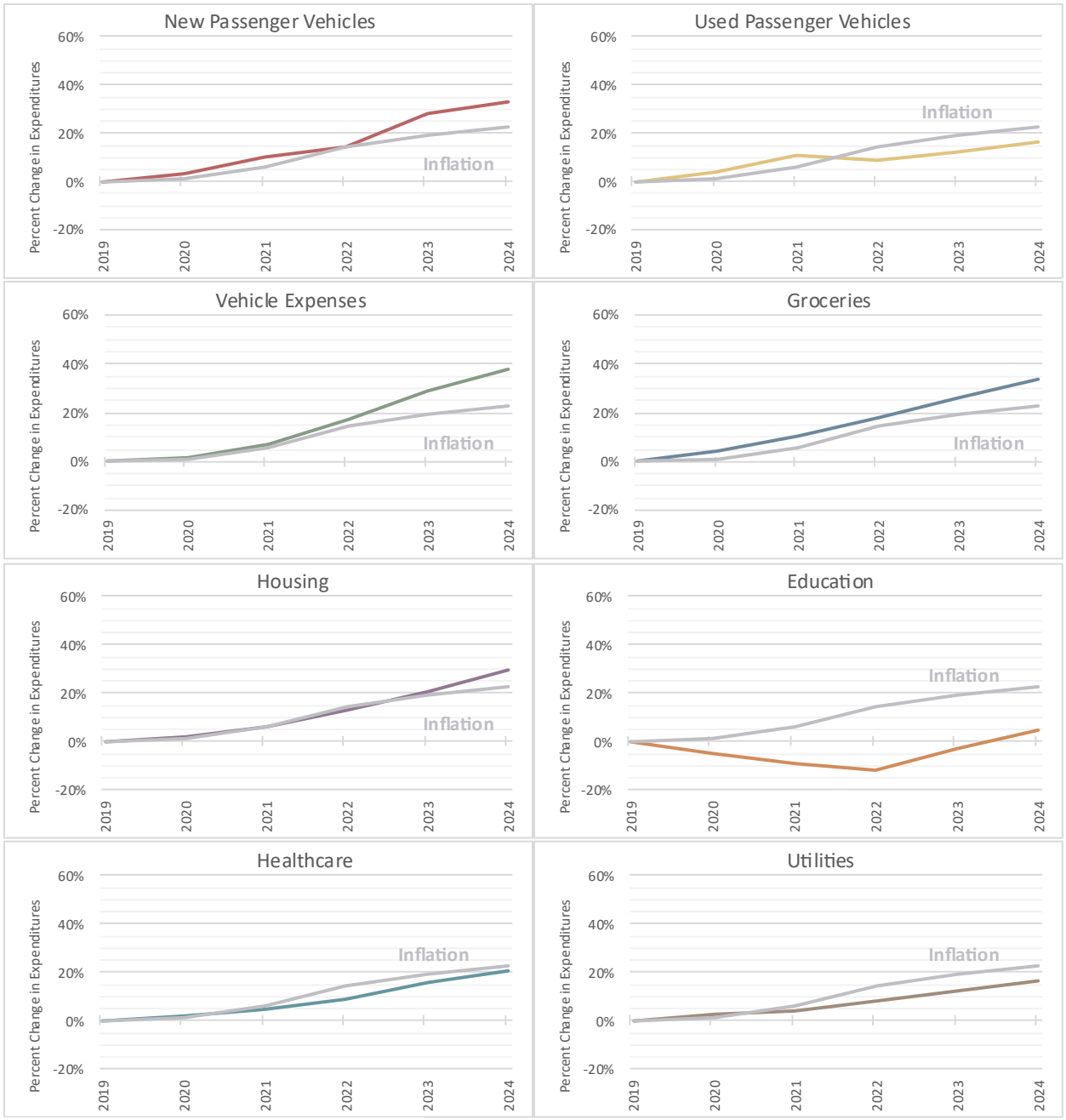

Figure 23: The National Consumers League.

The share of household spending on new vehicles has increased in recent years. *Figure 24* depicts the percent change in the share of average expenditures dedicated to each category since 2019. The share of average household expenditures devoted to new passenger vehicles increased 5.4 percent, while the share of average household expenditures for used passenger vehicles decreased 6.5 percent. Over the same period, the share of average household expenditures devoted to vehicle expenses rose 11.2 percent, groceries increased 6.8 percent, and housing grew 4.3 percent, while education dropped 16.9 percent, healthcare decreased 2.5 percent, and utilities decreased 6.2 percent.

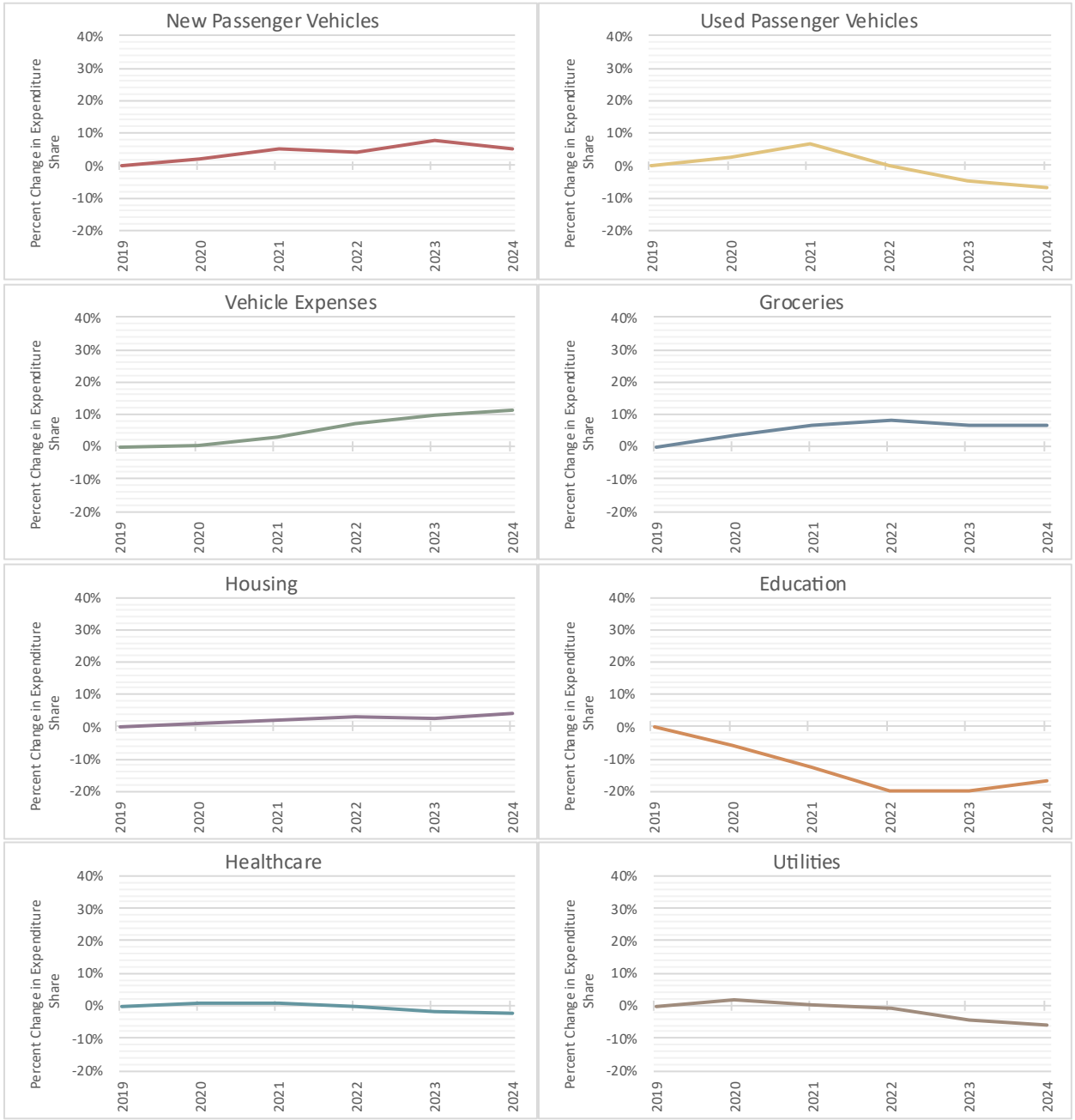

Figure 24: The National Consumers League.

Between 2019 and 2024, average household expenditures on new passenger vehicles rose faster than inflation because declining sales did not fully offset higher expenditures per vehicle. As spending shifted from services to durable goods during the COVID-19 pandemic, households were more willing to tolerate higher expenditures per vehicle than in prior periods of economic disruption.[170] As higher vehicle prices persist, households that deferred new vehicle purchases

[170] Kristen Tauber, and Willem Van Zandweghe, "Why Has Durable Goods Spending Been

eventually reached the end of their vehicles' service lives, compelling some households to enter the passenger vehicle market.[171]

Despite historic increases in expenditures per used vehicle, used vehicles constituted a shrinking share of all household expenditures between 2019 and 2024 because low inventories resulted in fewer transactions. During the COVID-19 pandemic, used vehicle inventories hit historic lows, hovering approximately 30 percent below 2019 levels.[172] This sharp decline in inventory was attributable to the collapse of trade-ins, decreased fleet remarketing, and more lease buyouts.[173] As passenger vehicle production plummeted, fewer used vehicles were traded in due to significant decreases in new passenger vehicle sales.[174] In addition, after liquidating many vehicles in the early phases of the pandemic, rental car companies retained their existing stock for longer periods as they struggled to replenish inventories.[175] As new and used vehicle prices spiked, lessees were more likely to buy out than return vehicles, as cars and light trucks had built up significant equity.[176] Furthermore, high interest rates discouraged households from entering new lease agreements.[177] As a result, annual lease returns fell from approximately 5 million units in 2022 to an estimated 2 million units in 2025, further constraining used vehicle inventory.[178]

Vehicle Expenses

The transaction price is merely one of the many expenses households incur to own, operate, and maintain a passenger vehicle. All passenger vehicles operate on an external fuel source, with nearly 98 percent of the U.S. fleet operating on gasoline.[179] Further, every state

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So Strong during the COVID-19 Pandemic?," Economic Commentary, July 7, 2021; Jack Dunbar, Christopher Kurz, Geng Li, and Maria D. Tito, "In the Driver's Seat: Pandemic Fiscal Stimulus and Light Vehicles," Finance and Economics Discussion Series 2024-013, 2024, https://www.federalreserve.gov/econres/feds/files/2024013pap.pdf.

[171] CCC Intelligent Solutions Inc, "The Forces Shaping the U.S. Car Parc in 2025 and Beyond," accessed January 5, 2026, https://www.cccis.com/reports/crash-course-2025/q1.

[172] Cox Automotive, "Used-Vehicle Inventory Closes Out Year at Highest Level in Five Years," March 20, 2024, https://www.coxautoinc.com/insights-hub/used-vehicle-inventory-closes-out-year-at-highest-level-in-five-years/.

[173] Mercer Capital, "Key Takeaways for Auto Dealers from the 2023 AICPA Dealership Conference," November 22, 2023, https://mercercapital.com/key-takeaways-for-auto-dealers-from-the-2023-aicpa-dealership-conference/; Car Edge, "The Used Car Shortage Is Worse Than We Thought," May 23, 2023, https://caredge.com/guides/used-car-shortage-affordability-crisis.

[174] Ibid.

[175] Zia Consulting, "How the car rental industry emerged from the pandemic and what comes next?," July 14, 2022, https://www.ziaconsulting.com/digital-transformation/car-rental-industry-after-pandemic/; Auto Rental News, "Hot Takes: A Deep Dive Into the State of Car Rental," January 2, 2023, https://www.autorentalnews.com/10189174/hot-takes-a-deep-dive-into-the-state-of-car-rental.

[176] Cox Automotive, "Leasing Decline Has Short-Term and Long-Term Implications," October 28, 2022, https://www.coxautoinc.com/insights-hub/leasing-decline-has-short-term-and-long-term-implications/.

[177] Ibid.

[178] The Presidio Group, "Dealerships Navigating an Undersupplied Used-Vehicle Market Through 2027," accessed January 4, 2026, https://thepresidiogroup.com/dealerships-navigating-an-undersupplied-used-vehicle-market-through-2027.

[179] Alliance for Automotive Innovation, "Alliance for Automotive Innovation Reports New U.S. Electric Vehicle Data," October 1, 2025, https://www.autosinnovate.org/posts/press-release/2025-q2-get-connected-press-release.

except New Hampshire requires vehicle owners to possess auto insurance, which typically includes minimum liability coverage for property damage and bodily injury.[180] Passenger vehicles also require periodic repair and maintenance to remain in good working order.[181] In addition, some households take out auto loans to purchase passenger vehicles, resulting in interest payments and fees.[182]

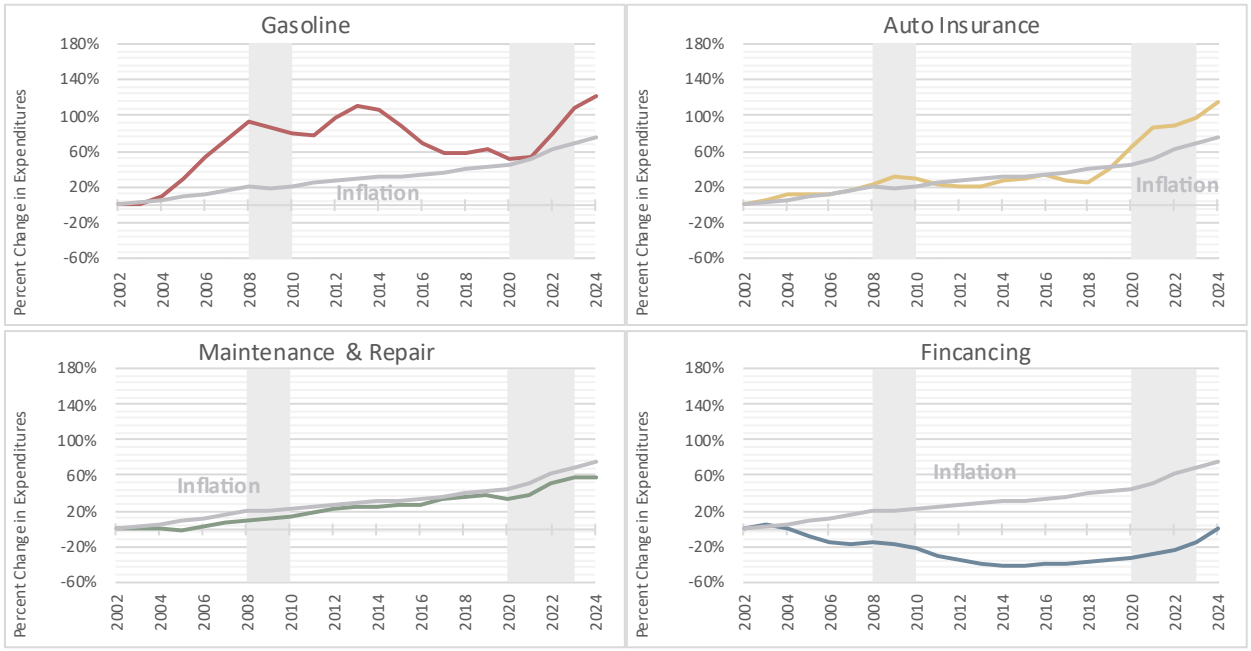

Figure 25: The National Consumers League.

Between 2002 and 2024, vehicle expenses rose slightly more than inflation, primarily due to increases in gasoline prices and auto insurance costs. *Figure 25* depicts the percentage change in average nominal vehicle expenses per household since 2002. Average household expenditures on gasoline rose 122.3 percent, auto insurance increased 115.2 percent, and maintenance and repairs grew 57.3 percent, while vehicle financing decreased 0.9 percent.

[180] Nerdwallet, "State Minimum Car Insurance Requirements in 2025," July 20, 2025, https://www.nerdwallet.com/insurance/auto/learn/minimum-car-insurance-requirements.

[181] AAA, "Time-Stamped Car Maintenance Checklist," accessed January 23, 2026, https://www.aaa.com/autorepair/articles/time-stamped-car-maintenance-checklist.

[182] Bureau of Labor Statistics, "Consumer Expenditure Surveys," December 12, 2025, https://www.bls.gov/cex/csxgloss.htm.

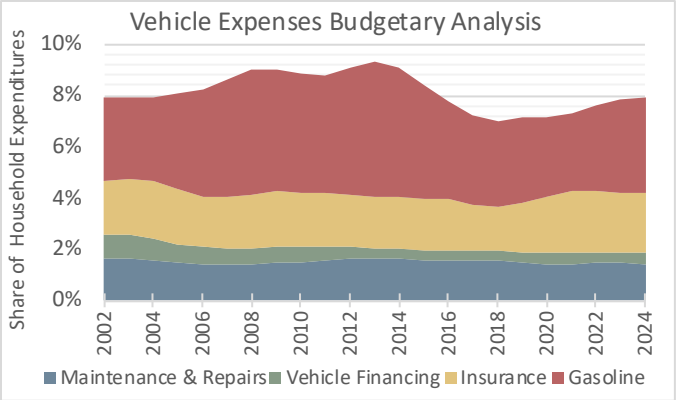

Figure 26: The National Consumers League.

After peaking in 2013, the share of average household expenditures attributable to vehicle expenses has dipped below 2002 levels. In 2002, vehicle expenses constituted 7.9 percent of all household expenditures. By 2024, the share of average household expenditures attributable to vehicle expenses had returned to 7.9 percent. *Figure 26* depicts the share of average household expenditures attributable to vehicle expenses since 2002. The share of gasoline and insurance expenditures rose 16.7 percent and 11.1 percent, respectively, while the share of vehicle financing expenditures and maintenance and repair expenditures decreased 50 percent and 16 percent, respectively.

Average gasoline expenditures have fluctuated dramatically since 2002, primarily due to plateauing vehicle miles traveled, increasing fleet-wide fuel economy, assortative matching, and greater energy production. Between 2002 and 2024, vehicle miles traveled per household decreased 4.7 percent, largely driven by increased urbanization and remote work.[183] Over the same period, fleet-wide fuel economy improved dramatically.[184] Further, research suggests households that drove the most were more likely to purchase more fuel-efficient vehicles, compounding the benefits of fleet-wide fuel-economy improvements.[185] As a result, gasoline consumption per household is falling. Between 2002 and 2021, gasoline sales decreased by over 3 million gallons per day, a 0.8 percent reduction, while the total number of households increased

[183] Federal Highway Administration, "Moving 12-Month Total Vehicle Miles Traveled [M12MTVUSM227NFWA]," *FRED, Federal Reserve Bank of St. Louis*, accessed January 4, 2026, https://fred.stlouisfed.org/series/M12MTVUSM227NFWA; Bureau of Labor Statistics, "American Time Use Survey—2024 Results," June 26, 2025, https://www.bls.gov/news.release/pdf/atus.pdf; Bureau of Labor Statistics, "American Time Use Survey—2012 Results," June 20, 2013, https://www.bls.gov/news.release/archives/atus_06202013.pdf; Transportation Research Board, "Driving and the Built Environment: The Effects of Compact Development on Motorized Travel, Energy Use, and CO_2 Emissions," National Research Council of the National Academies, 2009, https://www.nationalacademies.org/read/12747/chapter/5#89; Census Bureau, "Nation's Urban and Rural Populations Shift Following 2020 Census," December 29, 2022, https://www.census.gov/newsroom/press-releases/2022/urban-rural-populations.html.

[184] Environmental Protection Agency, "Explore the Automotive Trends Data," March 27, 2025, https://www.epa.gov/automotive-trends/explore-automotive-trends-data.

[185] David L. Greene and J. Mark Welch, "The Impact of Increased Fuel Economy for Light-Duty Vehicles on the Distribution of Income in the United States," University of Tennessee, 2017, https://baker.utk.edu/wp-content/uploads/2022/07/The-Impact-of-Increased-Fuel-Economy-for-Light-Duty-Vehicles-on-the-Distribution-of-Income-in-the-U.S.-A-Retrospective-and-Prospective-Analysis.White_.Paper_.pdf.

18.2 percent, or by 19,927,000 new households.[186] Further increased domestic and international oil production in the mid-2010s generally helped keep gasoline prices close to 2002 levels.[187]

Average household expenditures on maintenance and repair have decreased since 2002 due to improved roadway safety, increasing durability, and deferred maintenance. The price of maintenance and repair has significantly increased, making our findings appear paradoxical. Between 2002 and 2024, the price of maintenance and repair rose 114.1 percent, 39.7 percent more than inflation.[188] The primary factor attributable to this substantial rise is the increasing complexity of performing maintenance and repair. More sophisticated, technologically integrated vehicles require more advanced and specialized services to properly perform diagnostics, calibration, and repairs.[189] Further, the increasing penetration of ADAS has also increased repair costs. While ADAS can help prevent and mitigate collisions, repair costs on ADAS-equipped vehicles are 15 to 19 percent more expensive on average.[190]

Average maintenance and repair expenditures have fallen because consumers are utilizing these services less frequently. Between 2002 and 2023, police-reported crashes per household decreased 19.2 percent, while crashes involving injury and death decreased 30.9 percent and 20.9 percent, respectively, per household.[191] Fewer crashes per household result in fewer repairs per household. In addition, maintenance service intervals have increased. Traditionally, owners were encouraged to change their vehicle's oil every 3,000 miles.[192] Today, automakers typically recommend oil changes every 5,000 to 7,500 miles.[193] Further, many consumers defer maintenance, dampening the effect of increasing maintenance costs on average household expenditure. CARFAX estimates that approximately 20 percent of vehicles are behind on oil

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[186] Energy Information Agency, "U.S. Total Gasoline All Sales/Deliveries by Prime Supplier," June 1, 2022, https://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=PET&s=C100000001&f=A; Census Bureau, "Total Households [TTLHH]," *FRED, Federal Reserve Bank of St. Louis*, accessed January 4, 2026, https://fred.stlouisfed.org/series/TTLHH.

[187] World Bank Blogs, "What Triggered the Oil Price Plunge of 2014-2016 and Why it Failed to Deliver an Economic Impetus in Eight Charts," January 18, 2018, https://blogs.worldbank.org/en/developmenttalk/what-triggered-oil-price-plunge-2014-2016-and-why-it-failed-deliver-economic-impetus-eight-charts; Bureau of Labor Statistics, "Average Price: Gasoline, Unleaded Premium (Cost per Gallon/3.785 Liters) in U.S. City Average [APU000074716]," *FRED, Federal Reserve Bank of St. Louis*, accessed January 4, 2026, https://fred.stlouisfed.org/series/APU000074716.

[188] Bureau of Labor Statistics, "Consumer Price Index for All Urban Consumers: Motor Vehicle Maintenance and Repair in U.S. City Average [CUSR0000SETD]," *FRED, Federal Reserve Bank of St. Louis*, accessed January 4, 2026, https://fred.stlouisfed.org/series/CUSR0000SETD.

[189] CCC Intelligent Solutions, "What is Vehicle Complexity Really Costing Us?," September 5, 2023, https://www.cccis.com/news-and-insights/posts/what-is-vehicle-complexity-really-costing-us.

[190] Ibid.

[191] Bureau of Transportation Statistics, "Motor Vehicle Safety Data," *Department of Transportation*, accessed January 4, 2026, https://www.bts.gov/content/motor-vehicle-safety-data; Census Bureau, "Total Households [TTLHH]," *FRED, Federal Reserve Bank of St. Louis*, accessed January 4, 2026, https://fred.stlouisfed.org/series/TTLHH.

[192] AAA, "How Often Should You Change Your Oil?," accessed January 4, 2026, https://www.aaa.com/autorepair/articles/how-often-should-you-change-your-oil.

[193] Ibid.

changes, 30 percent are behind on tire rotations, and more than 30 million vehicles are behind on both services.[194]

Average auto insurance expenditures per household have risen since 2002 due to higher repair costs, rising healthcare costs, and more frequent extreme weather events. Rising vehicle repair expenses and medical bills are passed along to insurers, putting upward pressure on the cost of auto insurance policies.[195] In addition, as extreme weather events have become more frequent and severe, comprehensive paid claims associated with weather events have increased, further raising insurance costs.[196]

The decrease in average household expenditures on vehicle financing between 2002 and 2024 is largely attributable to fewer transactions per household, low interest rates, and longer maturity periods. Given improvements in vehicle longevity and the subsequent decrease in transactions per household, the rate of auto loans per household has decreased since the mid-2000s. Between 2006 and 2024, the number of auto loans originated decreased 15.1 percent, while the total number of households increased 18.2 percent.[197] Interest rates on auto loans also substantially decreased between 2002 and 2021.[198] Meanwhile, the typical maturity period on auto loans has increased. The 48-month auto loan has been supplanted by 60-month and 72-month loans, resulting in an average maturity period of approximately 70 months.[199] As the maturity period on auto loans increases, loan payments are relatively lower but spread over a longer period.[200]

Since the beginning of the COVID-19 pandemic, vehicle expenses per household have increased faster than inflation, increasing budgetary pressures. *Figure 27* depicts the percent change in nominal vehicle expenses per household since 2019. Between 2019 and 2024, average

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[194] PR Newswire, "CARFAX: Millions of Cars Are Alarmingly Behind on Maintenance," November 25, 2024, https://www.prnewswire.com/news-releases/carfax-millions-of-cars-are-alarmingly-behind-on-maintenance-302314731.html.

[195] CCC Intelligent Solutions Inc., "A Year of Shifting Gears: How the Auto Claims and Repair Industry Adapted to Economic Strain and Evolving Technology in 2024," accessed January 4, 2026, https://www.cccis.com/reports/crash-course-2024/q4.

[196] Ibid.

[197] Census Bureau, "Total Households [TTLHH]," *FRED, Federal Reserve Bank of St. Louis*, accessed January 4, 2026, https://fred.stlouisfed.org/series/TTLHH; Consumer Financial Protection Agency, "Auto Loans: Origination Activity," November 17, 2025, https://www.consumerfinance.gov/data-research/consumer-credit-trends/auto-loans/origination-activity/.

[198] Board of Governors of the Federal Reserve System, "Finance Rate on Consumer Installment Loans at Commercial Banks, New Autos 48 Month Loan [TERMCBAUTO48NS]," *FRED, Federal Reserve Bank of St. Louis*, accessed January 4, 2026, https://fred.stlouisfed.org/series/TERMCBAUTO48NS; Board of Governors of the Federal Reserve System, "Finance Rate on Consumer Installment Loans at Commercial Banks, New Autos 60 Month Loan [RIFLPBCIANM60NM]," *FRED, Federal Reserve Bank of St. Louis*, accessed January 4, 2026, https://fred.stlouisfed.org/series/RIFLPBCIANM60NM.

[199] Bradley Katcher, Geng Li, Alvaro Mezza, and Steve Ramos, "One Month Longer, One Month Later? Prepayments in the Auto Loan Market," *Board of Governors of the Federal Reserve System*, 2024, https://doi.org/10.17016/FEDS.2024.056.

[200] Board of Governors of the Federal Reserve System, "Average Maturity of New Car Loans at Finance Companies, Amount of Finance Weighted [DTCTLVENMNM]," *FRED, Federal Reserve Bank of St. Louis*, accessed January 4, 2026, https://fred.stlouisfed.org/series/DTCTLVENMNM.

expenditures per household on gasoline rose 37.1 percent, auto insurance increased 53.7 percent, maintenance and repairs climbed 14.2 percent, and vehicle financing rose 54.8 percent.

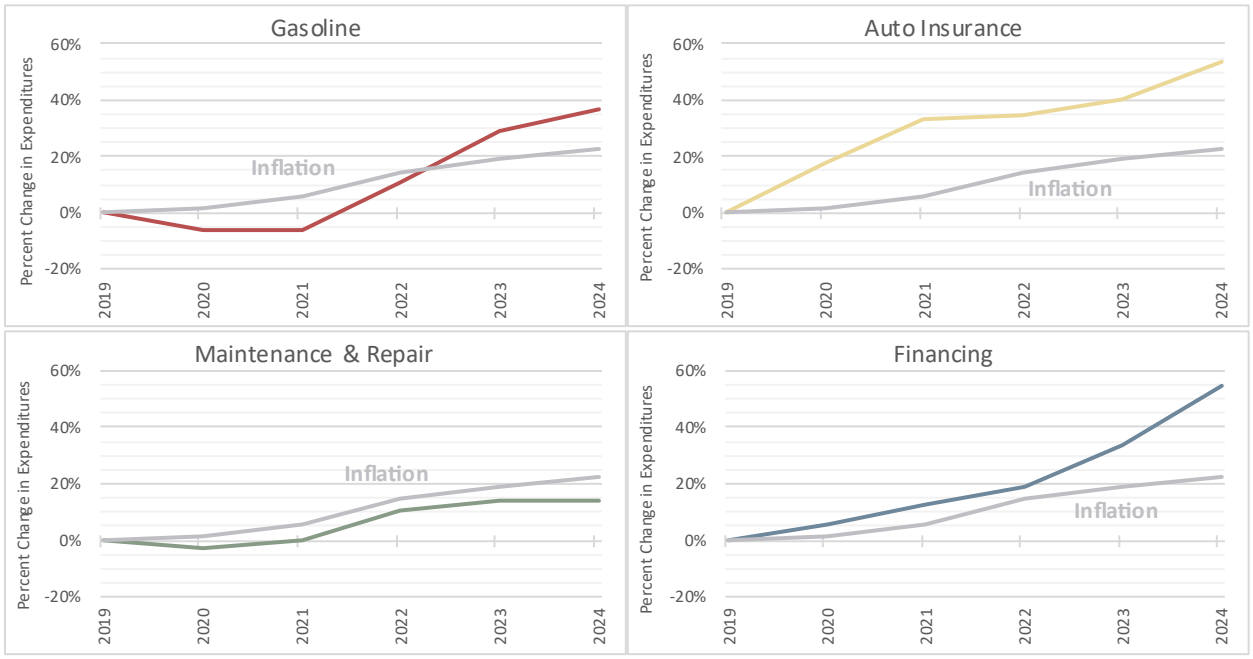
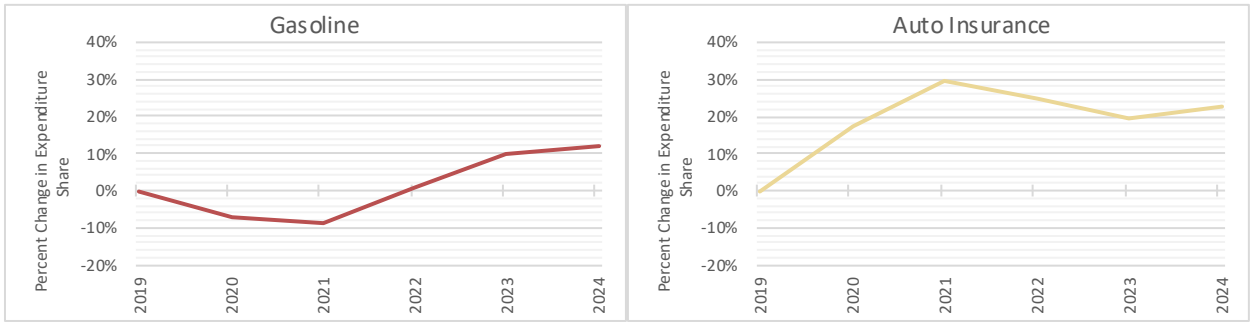


Figure 27: The National Consumers League.

Between 2019 and 2024, vehicle expenses have accounted for an increasing share of total household expenditures. Over the same period, the share of average household expenditures for gasoline increased 12 percent, auto insurance grew 22.8 percent, and vehicle financing increased 16.7 percent, while maintenance and repair decreased 6.7 percent. *Figure 28* depicts the share of average household expenditures attributable to vehicle expenses since 2019.



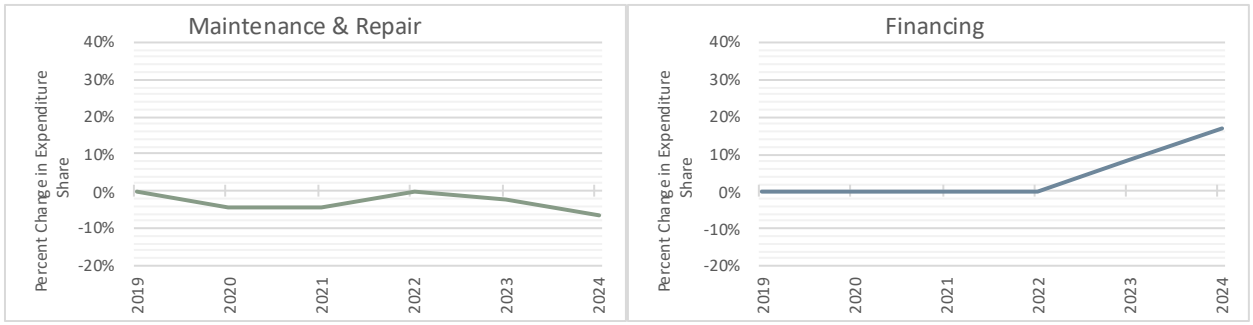


Figure 28: The National Consumers League.

Since 2019, average household gasoline expenditures have increased due to rising gasoline prices. Between 2019 and 2021, average gasoline expenditures decreased as gasoline prices fell amid a global economic slowdown, widespread remote work, and social distancing.[201] From 2022 and 2024, average gasoline expenditures rapidly increased as mobility rebounded and Russia's invasion of Ukraine disrupted global energy markets.[202]

Since 2019, average household expenditures on maintenance and repair have risen less than inflation because of an increase in deferred maintenance and repair. Between 2019 and 2024, the price of maintenance and repair rose 37.6 percent, 14.9 percent more than inflation.[203] Yet, increased remote work and social distancing during the COVID-19 pandemic reduced vehicle use, thereby decreasing demand for maintenance and repair services. As mobility returned to pre-pandemic levels and broader affordability concerns grew, demand for maintenance and repair has not fully rebounded.[204] As such, households have increasingly deferred maintenance and repair to alleviate budgetary pressures.[205]

Between 2019 and 2024, average household expenditures on auto insurance increased because of rising repair costs, rapidly rising medical costs, and more extreme weather events.[206] Rising repair costs put upward pressure on auto insurance premiums.[207] Additionally, first- and third-party medical billing for auto casualty claims is outpacing the general rise in healthcare

[201] Bureau of Labor Statistics, "From the Barrel to the Pump: The Impact of the COVID-19 Pandemic on Prices for Petroleum Products," October 2020, https://www.bls.gov/opub/mlr/2020/article/from-the-barrel-to-the-pump.htm.

[202] Bureau of Labor Statistics, "Consumer Expenditures in 2021," January 2023, https://www.bls.gov/opub/reports/consumer-expenditures/2021; Energy Information Administration, "Crude Oil Prices Rise Above $100 Per Barrel After Russia's Further Invasion into Ukraine," December 19, 2022, https://www.eia.gov/todayinenergy/detail.php?id=55020.

[203] Bureau of Labor Statistics, "Consumer Price Index for All Urban Consumers: Motor Vehicle Maintenance and Repair in U.S. City Average [CUSR0000SETD]," *FRED, Federal Reserve Bank of St. Louis*, accessed January 4, 2026, https://fred.stlouisfed.org/series/CUSR0000SETD.

[204] Auto Body News, "CARFAX: 41% of Vehicles Overdue for Major Service, Creating Risks and Opportunities for Shops," November 24, 2025, https://www.autobodynews.com/news/carfax-41-of-vehicles-overdue-for-major-service-creating-risks-and-opportunities-for-shops.

[205] Ibid.

[206] CCC Intelligent Solutions Inc., "A Year of Shifting Gears: How the Auto Claims and Repair Industry Adapted to Economic Strain and Evolving Technology in 2024," accessed January 4, 2026, https://www.cccis.com/reports/crash-course-2024/q4.

[207] Ibid.

costs.[208] In 2024, payouts for third-party bodily injuries rose to $27,373 per claim, an 8 percent increase over the prior year.[209] Coupled with higher claim frequencies for uninsured and underinsured motorists, insurers are pressured to raise prices.[210] In addition, comprehensive paid claim frequency is at historic levels, primarily due to extreme weather events.[211]

Since 2019, average household expenditures on vehicle financing increased due to rising interest rates. Between 2019 and 2021, average vehicle financing expenditures remained fairly stable, as the Federal Reserve kept interest rates low to boost economic activity during the height of the COVID-19 pandemic.[212] As the federal funds rate rose to combat rising inflation, interest rates for auto loans dramatically increased.[213] Between 2019 and 2024, interest rates on 48-month auto loans rose from 5.39 percent to 8.49 percent, a 57.5 percent increase.[214] Interest rates on 60-month loans rose from 5.31 percent to 8.16 percent, a 53.7 percent increase.[215] Interest rates on 72-month loans rose from 5.36 percent to 8.29 percent, a 54.7 percent increase.[216]

Federal Standards

Federal fuel economy and safety standards have alleviated budgetary pressures by reducing household expenditures on healthcare and vehicle expenses and by preventing job-losing injuries and illnesses. All quality changes—including changes in comfort, convenience, durability, fuel economy, and safety—account for only $3,669.17, or 15.7 percent, of the increase in average expenditures per new passenger vehicle since 2002. Yet, federal fuel economy improvements since 2002 save, on average, owners of model year 2024 cars $9,099.75 in avoided gasoline expenditures and owners of model year 2024 light trucks $9,920.23 in avoided gasoline expenditures. In addition, federal safety standards established between 1968 and 2019 have generated an estimated $12.8 trillion in net societal benefits. In 2025 alone, FMVSS that came into effect between 1968 and 2019 generated $5,164.51 in net societal benefits per household.

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[208] Ibid.
[209] Ibid.
[210] Ibid.
[211] Ibid.
[212] Board of Governors of the Federal Reserve System, "Federal Funds Effective Rate [FEDFUNDS]," *FRED, Federal Reserve Bank of St. Louis,* accessed January 4, 2026, https://fred.stlouisfed.org/series/FEDFUNDS; Board of Governors of the Federal Reserve System, "Finance Rate on Consumer Installment Loans at Commercial Banks, New Autos 48 Month Loan [TERMCBAUTO48NS]," *FRED, Federal Reserve Bank of St. Louis*, accessed January 4, 2026, https://fred.stlouisfed.org/series/TERMCBAUTO48NS; Board of Governors of the Federal Reserve System, "Finance Rate on Consumer Installment Loans at Commercial Banks, New Autos 60 Month Loan [RIFLPBCIANM60NM]," *FRED, Federal Reserve Bank of St. Louis*, accessed January 4, 2026, https://fred.stlouisfed.org/series/RIFLPBCIANM60NM.
[213] Ibid.
[214] Board of Governors of the Federal Reserve System, "Finance Rate on Consumer Installment Loans at Commercial Banks, New Autos 48 Month Loan [TERMCBAUTO48NS]," *FRED, Federal Reserve Bank of St. Louis*, accessed January 4, 2026, https://fred.stlouisfed.org/series/TERMCBAUTO48NS.
[215] Board of Governors of the Federal Reserve System, "Finance Rate on Consumer Installment Loans at Commercial Banks, New Autos 60 Month Loan [RIFLPBCIANM60NM]," *FRED, Federal Reserve Bank of St. Louis*, accessed January 4, 2026, https://fred.stlouisfed.org/series/RIFLPBCIANM60NM.
[216] Board of Governors of the Federal Reserve System, "Finance Rate on Consumer Installment Loans at Commercial Banks, New Autos 72 Month Loan [RIFLPBCIANM72NM]," *FRED, Federal Reserve Bank of St. Louis*, accessed January 4, 2026, https://fred.stlouisfed.org/series/RIFLPBCIANM72NM.

Fuel Economy Standards

Since 2002, increasingly stringent fuel economy standards have been the primary driver of improvements in fleet-wide fuel economy (see *Figure 29*). The Energy Policy and Conservation Act of 1975 established Corporate Average Fuel Economy (CAFE) requirements for cars and light trucks. Upon enactment of the law, minimum fuel economy standards gradually increased from model years 1978 to 1985.[217] Between model years 1985 and 2010, fuel economy standards for cars were unchanged.[218] Fuel economy standards for light trucks were modestly increased in 1996 and strengthened twice in the mid-2000s.[219]

In the midst of the energy crisis of the 2000s, Congress enacted the Energy Independence and Security Act of 2007, mandating more stringent fuel economy standards.[220] The Obama administration exceeded statutorily required levels, establishing robust CAFE standards for model years 2012 to 2016 and more stringent standards for model years 2017 to 2025.[221]

Following the Obama administration, changes in political leadership have led to dramatic swings in fuel economy requirements. The Trump administration established more modest improvements in CAFE for model years 2021 to 2026, requiring a 1.5 percent increase in fuel economy, rather than the 5 percent improvements required under the Obama-era standards.[222]

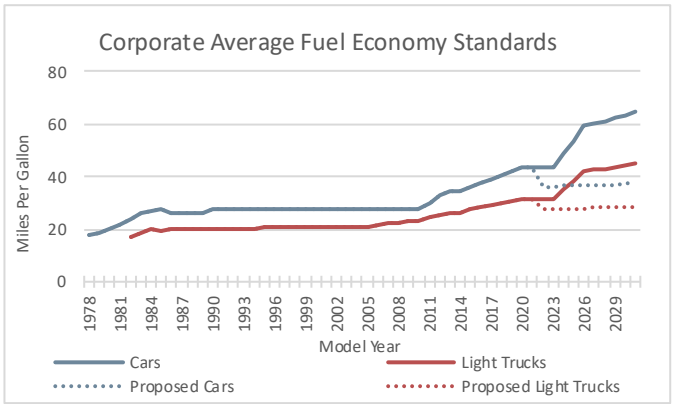

Figure 29: The National Consumers League.

The Biden administration established more ambitious fuel economy standards for model years 2024 to 2026, mandating an 8 percent improvement per year for model years 2024 and 2025 and a 10 percent improvement for model year 2026.[223] The Biden administration also required CAFE improvements of 2 percent per year for model years 2027 to 2031 for cars and 2 percent per year for model years 2029 through 2031 for light trucks.[224]

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[217] Congressional Research Service, "Vehicle Fuel Economy and Greenhouse Gas Standards," May 9, 2022.
[218] Ibid.
[219] Ibid.
[220] Ibid.
[221] Ibid.
[222] Ibid.
[223] Ibid.
[224] National Highway Traffic Safety Administration, "Corporate Average Fuel Economy Standards for Passenger Cars and Light Trucks for Model Years 2027 and Beyond and Fuel Efficiency Standards for Heavy-Duty Pickup Trucks and Vans for Model Years 2030 and Beyond," *Department of Transportation*, 89 Fed. Reg. 52540, June 24, 2024.

In December, the Trump administration released a proposed rule to weaken CAFE standards, lowering model year 2022 requirements and mandating more modest improvements through model year 2031.[225] NHTSA estimates that the proposed standards would achieve a fleet-average fuel economy of 34.5 mpg by model year 2031, a dramatic decrease from the 50.4 mpg that the Biden-era standards were projected to achieve.[226]

Improved fuel economy standards reduce average household healthcare expenditures. Vehicles that consume more gasoline generally emit more harmful pollutants, including carbon dioxide, carbon monoxide, nitrogen oxides, particulate matter, and volatile organic compounds.[227] Many of these compounds can be harmful to human health, increasing the risk of heart disease, respiratory diseases (e.g., asthma), cancer, neurological damage, and immune system issues.[228] Improving fuel economy standards reduces these harmful pollutants, lowering healthcare costs. The EPA estimates that model year 2027 to 2032 standards will save $13 billion in annual public health expenditures due to improved air quality.[229]

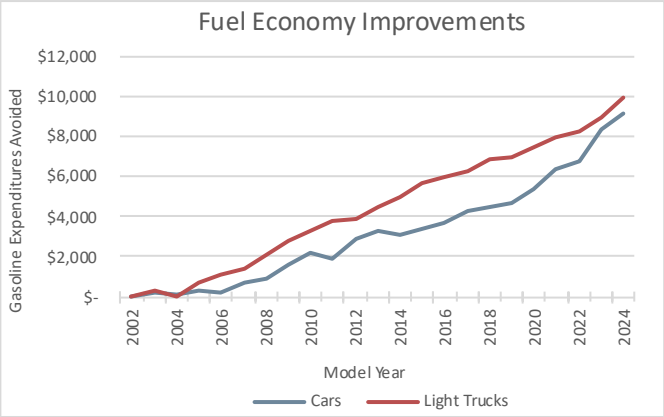

Figure 30: The National Consumers League.

Fleet-wide fuel economy improvements have saved consumers thousands of dollars at the pump since 2002. To evaluate the effect of improved fuel economy, we estimate the change in average gasoline expenditures per car and light truck if fleet-wide fuel economy remained constant since 2002. Because of fuel economy improvements, we estimate that owners of model year 2024 cars save, on average, $9,099.75 in gasoline expenditures avoided over the life of that vehicle. Owners of model year 2024 light trucks save, on average,

[225] National Highway Traffic Safety Administration, "The Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule III for Model Years 2022 to 2031 Passenger Cars and Light Trucks," *Department of Transportation*, 90 Fed. Reg. 56438, December 5, 2025.

[226] Ibid; National Highway Traffic Safety Administration, "Corporate Average Fuel Economy Standards for Passenger Cars and Light Trucks for Model Years 2027 and Beyond and Fuel Efficiency Standards for Heavy-Duty Pickup Trucks and Vans for Model Years 2030 and Beyond," *Department of Transportation*, 89 Fed. Reg. 52540, June 24, 2024.

[227] Environmental Protection Agency, "Greenhouse Gas Emissions from a Typical Passenger Vehicle," June 12, 2025, https://www.epa.gov/greenvehicles/greenhouse-gas-emissions-typical-passenger-vehicle#burning; American Lung Association, "Transportation," October 26, 2023, https://www.greenvehicleguide.gov.au/pages/UnderstandingEmissions/VehicleEmissions.

[228] Environmental Protection Agency, "Research on Health Effects, Exposure, & Risk from Mobile Source Pollution," October 6, 2025, https://www.epa.gov/mobile-source-pollution/research-health-effects-exposure-risk-mobile-source-pollution.

[229] Environmental Protection Agency, "Biden-Harris Administration finalizes strongest-ever pollution standards for cars that position U.S. companies and workers to lead the clean vehicle future, protect public health, address the climate crisis, save drivers money," March 20, 2024, accessed March 10, 2025, www.epa.gov/newsreleases/biden-harris-administration-finalizes-strongest-ever-pollution-standards-cars-position.

$9,920.23 in gasoline expenditures avoided over the life of that vehicle. *Figure 30* depicts the estimated average gasoline expenditures avoided per model year.

Safety Standards

Through establishing safety standards, NHTSA has ensured vehicles are equipped with lifesaving safety features, including seatbelts, airbags, and crumple zones. These standards save lives, prevent and mitigate injuries, and generate trillions of dollars in societal benefits. *Figure 31* depicts the estimated number of crashes avoided involving fatalities, injuries, and property damage each year due to FMVSS-mandated safety technologies. As safety standards have improved, more crashes have been mitigated and prevented.

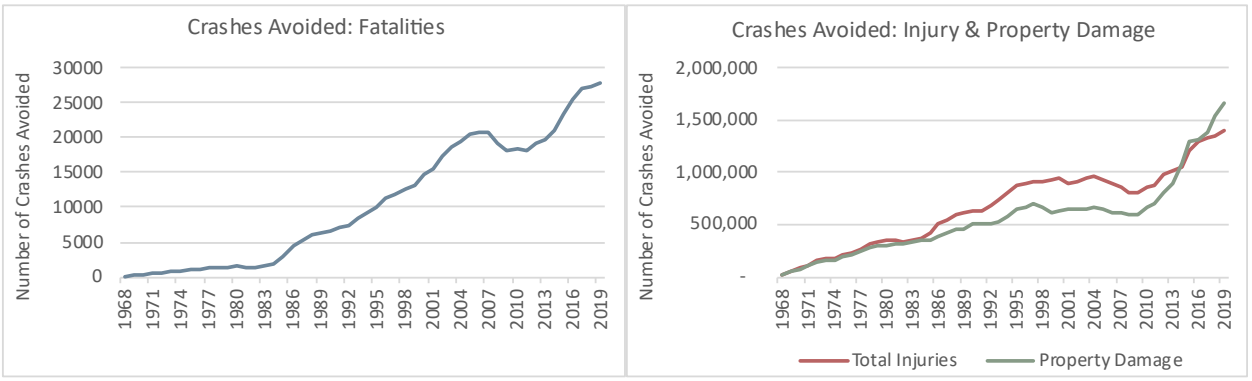

Figure 31: The National Consumers League.

From 1968 through 2019, NHTSA's safety standards prevented over 552,000 deaths, nearly 35 million injuries, and damage to 29 million vehicles, generating over $13.5 trillion in societal benefits, measured in 2025 dollars.[230] In 2019 alone, standards prevented over 27,700 deaths, nearly 1.4 million injuries, and damage to approximately 1.7 million vehicles, generating over $724.7 billion in societal benefits, measured in 2025 dollars.[231]

The benefits of FMVSS far outweigh the costs. *Figure 32* depicts the societal benefits, societal costs, benefit-cost ratio, and net benefit per household attributable to FMVSS that came into effect between 1968 and 2019. Societal benefits include prevention of lost wages, decreased household productivity, loss of quality of life, property damage, insurance administration, congestion, medical costs, emergency services costs, legal costs, and workplace costs.[232] Societal costs include the cost of safety technology and additional gasoline expenses resulting from any change in vehicle weight.[233]

The net benefits to society attributable to FMVSS that came into effect between 1968 and 2019 are $12.8 trillion, measured in 2025 dollars. In 2025 alone, FMVSS that came into effect

[230] J. F. Simons, L. J. Blincoe, and C. J. Kahane, "Historical Analysis of Costs and Benefits of FMVSS for Passenger Cars and LTVs on a Calendar-Year Basis," *National Highway Traffic Safety Administration*, Report No. DOT HS 813 647, December 2024.
[231] Ibid.
[232] Ibid.
[233] Ibid.

between 1968 and 2019 generated $5,164.51 in net societal benefits per household. The benefit-cost ratio of such FMVSS exceeded $24.00 in 2019, revealing that for every $1.00 spent on FMVSS-mandated safety technology and associated weight increases, more than $24.00 in societal benefits are generated.

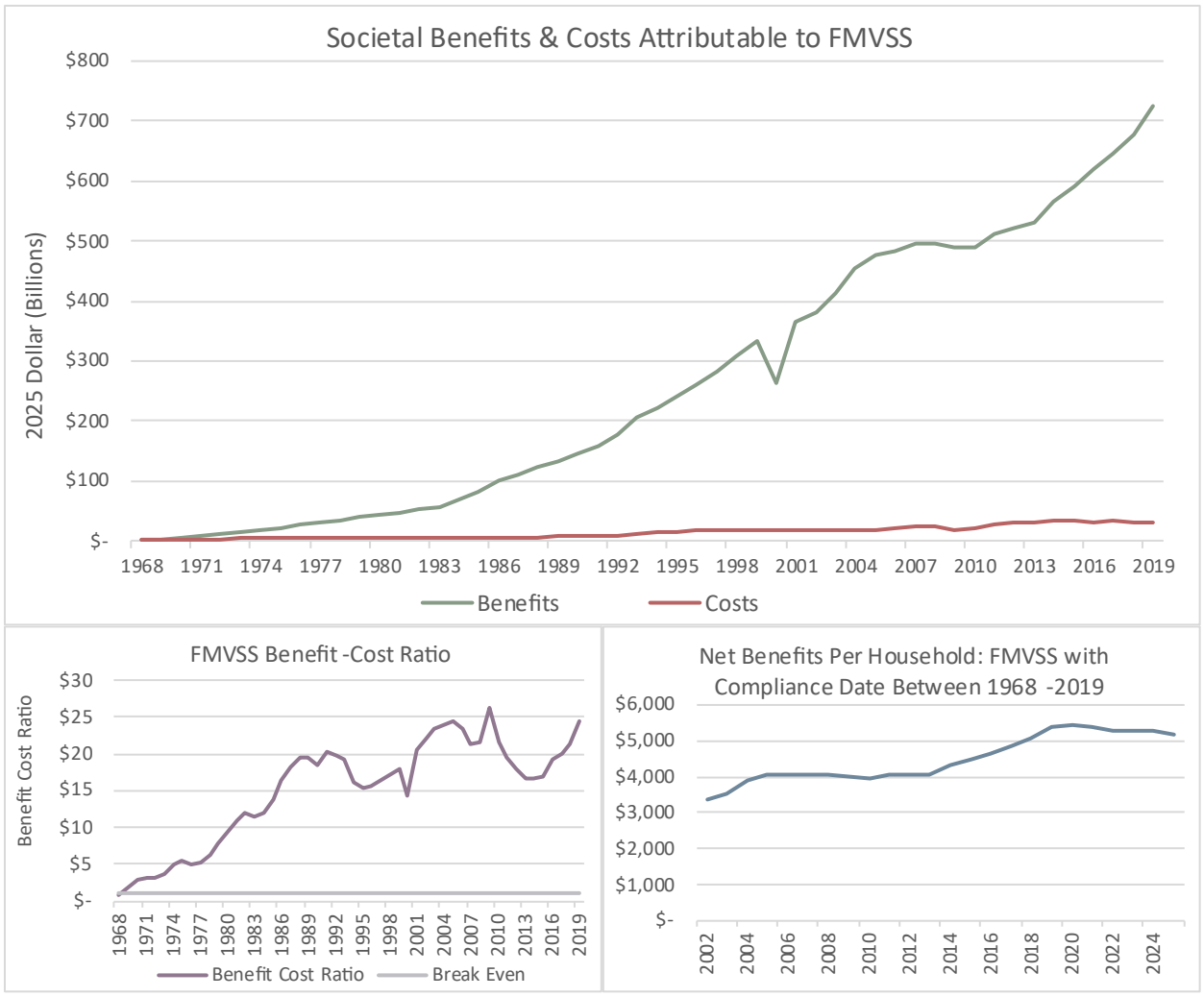

Figure 32: The National Consumers League.

Conclusion

Despite rising sticker prices, federal safety and fuel economy standards account for only a small fraction of the increase in new passenger vehicle expenditures since 2002, while automaker margins and production costs, trimflation, changing vehicle mix, and dealer markups and margins account for the overwhelming majority of the increase in average expenditures. Further, after accounting for inflation and household income growth, vehicle affordability remains strong, as purchasing power has improved and the real average expenditure per passenger vehicle has risen only modestly. All the while, average household expenditures on new and used vehicles have increased far less than inflation and other essential household goods and services, including housing, healthcare, groceries, and education, revealing that the passenger vehicle market is

easing household budgetary pressures. Most importantly, federal safety and fuel economy standards deliver overwhelming benefits, demonstrating that the American people do not have to choose between affordability and safety, energy independence, public health, and environmental stewardship.

Appendix: Methodology

Passenger Vehicle Expenditures

We derive annual average expenditures per new car and light truck transaction from the Bureau of Economic Analysis (BEA), which produces the National Income and Product Accounts (NIPA).[234] NIPA captures the output of the economy, sources and uses of national income, and sources of saving, including quarterly estimates of the nation's gross domestic product (GDP).[235]

NIPA Table 7.2.5S provides estimates of new car and light truck unit sales, production, inventory levels, and average monthly expenditures in the United States. The BEA derives the average expenditure per new car and light truck transaction from monthly retail transaction prices reported by J.D. Power and Associates.[236] Expenditures are the value of goods or services purchased by consumers, a good proxy for total price.[237] Light trucks are pickup trucks, minivans, and SUVs with a gross vehicle weight of less than 14,001 pounds.[238]

The BEA does not provide estimates of the average expenditure per new passenger vehicle (i.e., cars and light trucks combined). The average expenditure per new passenger vehicle is extrapolated using expenditure data and transaction volumes from NIPA Table 7.2.5S. NIPA Table 7.2.5S contains estimates of the number of cars and light trucks sold each month, sourced from Wards Intelligence.[239] Using this data and the average expenditure for car and light truck transactions, we estimate the average expenditure for new passenger vehicle transactions using a weighted average formula:

$$\mathrm{PVE_Y} = \mathrm{CE_Y} \times \left(\frac{\mathrm{CS_Y}}{\mathrm{CS_Y} + \mathrm{TS_Y}}\right) + \mathrm{TE_Y} \times \left(\frac{\mathrm{TS_Y}}{\mathrm{CS_Y} + \mathrm{TS_Y}}\right) \quad (1)$$

where $\mathrm{PVE_Y}$ is the average expenditure per new passenger vehicle in a given year; $\mathrm{CE_Y}$ is the average expenditure per new car in that same year; $\mathrm{TE_Y}$ is the average expenditure per new light truck in that same year; $\mathrm{CS_Y}$ is the total number of new cars sold in that same year; and $\mathrm{TS_Y}$ is the total number of new light trucks sold in that same year.

[234] Bureau of Economic Analysis, "Concepts and Methods of the U.S. National Income and Product Accounts," Department of Commerce, December 2024, https://www.bea.gov/resources/methodologies/nipa-handbook/pdf/chapters-01-04.pdf.
[235] Ibid.
[236] Ibid.
[237] Bureau of Economic Analysis, "Consumer Spending," December 23, 2025, https://www.bea.gov/data/consumer-spending/main.
[238] Bureau of Economic Analysis, "Concepts and Methods of the U.S. National Income and Product Accounts," Department of Commerce, December 2024, https://www.bea.gov/resources/methodologies/nipa-handbook/pdf/chapters-01-04.pdf.
[239] Ibid.

Factors Affecting Vehicle Prices

We estimate average expenditures attributable to safety standards, equipment upgrades, vehicle mix, trimflation, dealer markups and margins, and automaker margins and production costs using natural logarithm functions. Natural logarithms measure continuous growth rates, which are ideal for evaluating compounding changes over time.[240] Factors affecting vehicle prices have a compounding effect, as the growth of one factor builds upon prior growth. For example, expenditures attributable to automaker margins and production costs in one year are in addition to those in the prior year. If automaker margins and production costs rise 10 percent in two subsequent years, the cumulative increase over the two-year period is 21 percent, as the 10 percent rise in automaker margins and production costs compounds upon the 10 percent increase in the prior year.

The natural logarithm function also preserves proportionality and improves comparability of growth rates. Factors affecting vehicle prices act as multipliers on average expenditures.

$$E_Y = E_{Y-1} \times (1 + AMPC_{GR}) \times (1 + DMM_{GR}) \times (1 + T_{GR}) \times (1 + EU_{GR}) \times (1 + SS_{GR}) \quad (2)$$

where E_Y is the average expenditures in a given year; E_{Y-1} is the average expenditures in the prior year; $AMPC_{GR}$ is the growth rate in average expenditures attributable to automaker margins and production costs in the given year; DMM_{GR} is the growth rate in average expenditures attributable to dealer markups and margins in the given year; T_{GR} is the growth rate in average expenditures attributable to trimflation in the given year; EU_{GR} is the growth rate in average expenditures attributable to equipment upgrades in the given year; and SS_{GR} is the growth rate in average expenditures attributable to safety standards in a given year.

With multiple factors simultaneously affecting expenditures, simple algebraic approaches, such as deriving percent changes, can misattribute expenditures due to path dependence. With compounding effects, algebraically derived results can change depending on the order in which the factors are derived. For example, suppose average expenditures in the prior year were $40,000, and both trimflation and equipment upgrades rose 10 percent, resulting in average expenditures increasing to $48,400. If trimflation is derived first, 10 percent of $40,000 is $4,000. Equipment upgrades would amount to $4,400, which is 10 percent of $44,000. If equipment upgrades are derived first, 10 percent of $40,000 is $4,000. Trimflation would amount to $4,400, which is 10 percent of $44,000.

The mathematical properties of natural logarithms transform multiplicative growth into additive form, so that compounding changes can be expressed as sums of growth rates. Such conversion eliminates distortions and retains the proportionality of growth rates.

$$\ln\left(\frac{E_Y}{E_{Y-1}}\right) = \ln(1 + AMPC_{GR}) + \ln(1 + DMM_{GR}) + \ln(1 + T_{GR}) + \ln(1 + EU_{GR}) + \ln(1 + SS_{GR}) \quad (3)$$

[240] Mary O'Mahony, "Growth Rates and the Exponential and Logarithm Functions," accessed January 22, 2026, https://www.measuringtheeconomy.uk/book/text/50-02-appendix-02-b.html.

where E_Y is the average expenditures in a given year; E_{Y-1} is the average expenditures in the prior year; $AMPC_{GR}$ is the growth rate in average expenditures attributable to automaker margins and production costs in the given year; DMM_{GR} is the growth rate in average expenditures attributable to dealer markups and margins in the given year; T_{GR} is the growth rate in average expenditures attributable to trimflation in the given year; EU_{GR} is the growth rate in average expenditures attributable to equipment upgrades in the given year; SS_{GR} is the growth rate in average expenditures attributable to safety standards in a given year; and ln is the natural logarithm function.

To convert the growth rates of the factors affecting vehicle prices into expenditures, we use a log-mean multiplier. The log-mean multiplier scales the logarithmic results into the average expenditures per new car, light truck, and passenger vehicle attributable to each factor. The log-mean multipliers are derived from the following equation:

$$LMM_{XY} = \frac{E_{XY} - E_{XY-1}}{\ln\left(\frac{E_{XY}}{E_{XY-1}}\right)} \tag{4}$$

where LMM_{XY} is the log-mean multiplier for new cars, light trucks, or passenger vehicles in a given year; E_{XY} is the average expenditures per new car, light truck, or passenger vehicle in that same year; E_{XY-1} is the average expenditures per new car, light truck, or passenger vehicle in the prior year; and ln is the natural logarithm function.

Vehicle Mix

Vehicle mix is the net expenditures per new passenger vehicle attributable to changes in the ratio of new car and new light truck sales. To evaluate the effect of shifting vehicle mix on average expenditures per year, we estimate the change in average expenditures per new passenger vehicle had the ratio of new car to new light truck transactions remained constant.

First, we derive chained vehicle mixes for each year using a weighted-average formula. Chained vehicle mixes are the average expenditure per new passenger vehicle had the vehicle mix remained unchanged from the prior year.

$$CVM_Y = \left(CE_Y \times \frac{CS_{Y-1}}{CS_{Y-1} + TS_{Y-1}}\right) + \left(TE_Y \times \frac{TS_{Y-1}}{CS_{Y-1} + TS_{Y-1}}\right) \tag{5}$$

where CVM_Y is the average expenditure per passenger vehicle if the vehicle mix remained unchanged from the prior year; CE_Y is the average expenditure per new car in that same year; TE_Y is the average expenditure per new light truck in that same year; CS_{Y-1} is the total number of new cars sold in the prior year; and TS_{Y-1} is the total number of new light trucks sold in the prior year.

We use the following formula to calculate the average annual expenditure per passenger vehicle attributable to vehicle mix:

$$VM_Y = LMM_Y \times \ln\left(\frac{PVE_Y}{CVM_Y}\right) \quad (6)$$

where VM_Y is the average expenditures per passenger vehicle attributable to vehicle mix in a given year; LMM_Y is the log-mean multiplier for that same year; PVE_Y is the average expenditure per new passenger vehicle in a given year; CVM_Y is the average expenditure per passenger vehicle if the vehicle mix remained unchanged from the prior year; and ln is the natural logarithm function.

Equipment Upgrades

Equipment upgrades are the expenditures attributable to improvements in comfort, convenience, durability, fuel economy, nonmandatory safety features, and safety technologies mandated by FMVSS that became effective between 2020 and 2025. We derive our estimates of average expenditures attributable to equipment upgrades by first identifying the raw value of equipment upgrades.

Each year, BLS publishes the raw value of quality changes for new cars and light trucks by model year.[241] This data represents the change in average expenditures solely attributable to changes in the quality of a vehicle model, including comfort, convenience, durability, fuel economy, and safety improvements (i.e., all federally mandated safety standards and voluntary safety improvements).[242]

Table 2: BLS Value of Quality Changes

Year	New Cars	New Light Trucks	New Passenger Vehicles
2002	$ 62.87	$ 16.02	$ 38.43
2003	$ 23.07	$ 207.16	$ 123.57
2004	$ 75.86	$ 131.26	$ 106.68
2005	$ 283.12	$ 306.26	$ 295.80
2006	$ 26.73	$ 148.15	$ 91.05
2007	$ 139.96	$ 361.76	$ 257.51
2008	$ 158.04	$ 256.06	$ 205.77
2009	$ 170.08	$ 675.41	$ 413.02
2010	$ 249.69	$ (5.02)	$ 119.21
2011	$ 100.80	$ 391.85	$ 252.68
2012	$ 69.36	$ 18.94	$ 44.25
2013	$ 89.58	$ 251.25	$ 172.27
2014	$ 85.65	$ 22.69	$ 52.19
2015	$ 45.78	$ 66.10	$ 57.31
2016	$ 90.35	$ 128.57	$ 113.52
2017	$ 7.97	$ 110.59	$ 74.15
2018	$ 134.87	$ 239.96	$ 207.56
2019	$ 94.11	$ 102.48	$ 100.15
2020	$ 73.39	$ 197.74	$ 168.51
2021	$ 86.97	$ 335.64	$ 279.90
2022	$ 86.84	$ 186.22	$ 165.56
2023	$ 110.35	$ 5.54	$ 26.61
2024	$ 76.07	$ 230.98	$ 201.83
2025	$ 76.36	$ 96.79	$ 93.22

The BLS discloses both the invoice price and the estimated retail price of the raw value of quality changes. The invoice price represents automaker margins and production costs attributable to changes in the vehicle model's quality. The estimated retail price of quality changes is the projected increase in the vehicle's MSRP attributable to quality changes. The delta between MSRP and the invoice price is dealer margins.

As equipment upgrades capture only expenditures attributable to changes in equipment quality, not dealer margins, the invoice value of quality changes is our estimate of the raw value

[241] Bureau of Labor Statistics, "Archived PPI Quality Adjustment Releases for Motor Vehicles," November 14, 2024, https://www.bls.gov/ppi/quality-adjustment/archived-ppi-reports-on-quality-changes-for-motor-vehicles.htm.

[242] Bureau of Labor Statistics, "Quality Adjustment in the CPI: New, Used, and Leased Motor Vehicles," May 12, 2025, https://www.bls.gov/cpi/quality-adjustment/vehicles.htm.

of quality changes per model year. BLS's raw value of quality changes for new cars and new light trucks is included in *Table 2*.

BLS does not provide the invoice value of quality changes for all passenger vehicles. We estimate the invoice value of quality changes for all passenger vehicles by using a weighted-average formula:

$$\mathrm{IQC_{PVY}} = \mathrm{IQC_{CY}} \times \left(\frac{\mathrm{CS_Y}}{\mathrm{CS_Y} + \mathrm{TS_Y}}\right) + \mathrm{IQC_{TY}} \times \left(\frac{\mathrm{TS_Y}}{\mathrm{CS_Y} + \mathrm{TS_Y}}\right) \quad (7)$$

where $\mathrm{IQC_{PVY}}$ is the invoice value of quality changes per new passenger vehicle for a given model year; $\mathrm{IQC_{CY}}$ is the invoice value of quality changes per new car for that same model year; $\mathrm{IQC_{TY}}$ is the invoice value of quality changes per new light truck for that same model year; $\mathrm{CS_Y}$ is the total number of new cars sold that year; and $\mathrm{TS_Y}$ is the total number of new light trucks sold that year. The estimated raw value of quality changes for all passenger vehicles is included in *Table 2*.

To isolate the raw value of equipment upgrades, we subtract the raw value of safety standards from the BLS data on the invoice value of quality changes per model year:

$$\mathrm{REU_{XY}} = \mathrm{IQC_{XY}} - \mathrm{RFMVSS_{XY}} \quad (8)$$

where $\mathrm{REU_{XY}}$ is the raw value of expenditures attributable to equipment upgrades per new car, light truck, or passenger vehicle in a given year; $\mathrm{IQC_{XY}}$ is the invoice value of quality changes per new car, light truck, or passenger vehicle in that same year; and $\mathrm{RFMVSS_{XY}}$ is the raw expenditures attributable to FMVSS that came into effect between 2002 and 2019 per new car, light truck, or passenger vehicle in a given year.

To ensure the compounding nature of the various factors affecting vehicle prices does not distort our estimates of equipment upgrades, we multiply the continuously compounding growth rate of equipment upgrades by the log-mean multiplier:

$$\mathrm{EU_{XY}} = \mathrm{LMM_{XY}} \times \ln\left(\frac{\mathrm{REU_{XY}} + \mathrm{E_{XY-1}}}{\mathrm{E_{XY-1}}}\right) \quad (9)$$

where $\mathrm{EU_{XY}}$ is the average expenditures attributable to equipment upgrades per new car, light truck, or passenger vehicle in a given year; $\mathrm{LMM_{XY}}$ is the log-mean multiplier per new car, light truck, or passenger vehicle in that same year; $\mathrm{REU_{XY}}$ is the raw value of expenditures attributable to equipment upgrades per new car, light truck, or passenger vehicle in that same year; $\mathrm{E_{XY-1}}$ is the average expenditures per new car, light truck, or passenger vehicle in the prior year; and ln is the natural logarithm function.

Safety Standards

Safety standards are the average expenditures per new car, light truck, or passenger vehicle attributable to FMVSS that came into effect between 2002 and 2019. We source our data from NHTSA. Research published by NHTSA estimates the retail price of safety technologies attributable to FMVSS that came into effect between 1968 and 2019.[243] These retail prices are derived from tear-down studies of countermeasures and Final Regulatory Impact Analyses.[244] Safety technologies attributable to FMVSS are those that were added or modified primarily to comply with federal safety standards.

Retail prices include research, development, production, and manufacturing costs attributable to compliance with FMVSS, as well as the additional margins dealers can derive from selling safer passenger vehicles. As our safety standard estimate solely captures the expenditures attributable to safety technologies mandated by FMVSS between 2002 and 2019, not dealer margins, we strip dealer margins from the retail price of FMVSS-mandated safety technologies.

We estimate dealer margins for FMVSS-mandated safety technologies by calculating dealer margin ratios for all quality improvements per model year, using BLS data on the raw value of quality changes per model year.[245] Dealer margin ratios are derived by using the following formula:

$$\mathrm{DM\%_{XY}} = \frac{\mathrm{MQC_{XY}} - \mathrm{IQC_{XY}}}{\mathrm{MQC_{XY}}} \tag{10}$$

where $\mathrm{DM\%_{XY}}$ is the dealer margin ratio per new car, light truck, or passenger vehicle in a given model year; $\mathrm{MQC_{XY}}$ is the MSRP of quality changes per new car, light truck, or passenger vehicle in the same model year; and $\mathrm{IQC_{XY}}$ is the invoice price of quality changes per new car, light truck, or passenger vehicle in the same model year.

We use dealer margin ratios to derive the raw average expenditures attributable to safety standards using the following formula:

$$\mathrm{RFMVSS_{XY}} = \mathrm{RPST_{XY}} \times (1 - \mathrm{DM\%_{XY}}) \tag{11}$$

where $\mathrm{RFMVSS_{XY}}$ is the raw expenditures attributable to FMVSS that came into effect between 2002 and 2019 per new car, light truck, or passenger vehicle in a given year; $\mathrm{RPST_{XY}}$ is the retail price of safety technologies per new car, light truck, or passenger vehicle in the same model

[243] J. F. Simons, L. J. Blincoe, and C. J. Kahane, "Historical Analysis of Costs and Benefits of FMVSS for Passenger Cars and LTVs on a Calendar-Year Basis," *National Highway Traffic Safety Administration*, Report No. DOT HS 813 647, December 2024.

[244] Ibid.

[245] Bureau of Labor Statistics, "Archived PPI Quality Adjustment Releases for Motor Vehicles," November 14, 2024, https://www.bls.gov/ppi/quality-adjustment/archived-ppi-reports-on-quality-changes-for-motor-vehicles.htm.

year; and $DM\%_{XY}$ is the dealer margin ratio per new car, light truck, or passenger vehicle in the same model year.

To ensure the compounding nature of the various factors affecting vehicle prices does not distort our estimates of safety standards, we multiply the continuously compounding growth rate of safety standards by the log-mean multiplier.

$$SS_{XY} = LMM_{XY} \times \ln\left(\frac{RFMVSS_{XY} + E_{XY-1}}{E_{XY-1}}\right) \quad (12)$$

where SS_{XY} is the average expenditures attributable to safety standards per new car, light truck, or passenger vehicle in a given year; LMM_{XY} is the log-mean multiplier per new car, light truck, or passenger vehicle in that same year; $RFMVSS_{XY}$ is the raw expenditures attributable to FMVSS that came into effect between 2002 and 2019 per new car, light truck, or passenger vehicle in that same year; E_{XY-1} is the average expenditures per new car, light truck, or passenger vehicle in the prior year; and ln is the natural logarithm function.

Trimflation

Trimflation reflects the change in average expenditures attributable to the sale of more expensive vehicles than in prior years. To estimate trimflation, we must first isolate the change in average expenditures attributable to changes in vehicle quality. We do so by calculating quality differentials, which are the percent change in average expenditures in a given year attributable to changes in quality, including safety standards, equipment upgrades, vehicle mix, and trimflation.

Quality differentials can be derived by removing pure inflation from the change in average expenditures. Pure inflation is the change in the price of a vehicle attributable to dealer markups and margins and automaker margins and production costs.[246] We use the Consumer Price Index (CPI): New Vehicles index, CPI: New Cars index, and the CPI: New Trucks index as our measures of pure inflation.[247] The BLS produces these indices by comparing and aggregating changes in transaction prices of vehicle models from one model year to the next.[248]

The CPI indices do not capture price changes attributable to equipment upgrades or safety equipment attributable to FMVSS. When comparing prices across model years, the BLS calculates and excludes changes in vehicle quality, which includes comfort, convenience,

[246] Congressional Research Service, "Inflation in the U.S. Economy: Causes and Policy Options," October 6, 2022, https://www.congress.gov/crs-product/R47273.

[247] Bureau of Labor Statistics, "Consumer Price Index for All Urban Consumers: New Vehicles in U.S. City Average [CUSR0000SETA01]," *FRED*, *Federal Reserve Bank of St. Louis*, accessed January 16, 2026, https://fred.stlouisfed.org/series/CUSR0000SETA01; Bureau of Labor Statistics, "Consumer Price Index for All Urban Consumers: New Vehicles in U.S. City Average [CUSR0000SETA01]," *FRED, Federal Reserve Bank of St. Louis*, accessed January 16, 2026, https://fred.stlouisfed.org/series/CUSR0000SETA01; Bureau of Labor Statistics, "Consumer Price Index for All Urban Consumers (CPI-U), CUUR0000SS45021, New trucks in U.S. city average, all urban consumers, not seasonally adjusted," accessed January 16, 2026.

[248] Bureau of Labor Statistics, "Measuring Price Change in the CPI: New Vehicles," 14 May 2025, https://www.bls.gov/cpi/factsheets/new-vehicles.htm.

durability, fuel economy, and safety improvements.[249] BLS estimates the value of quality changes by comparing data supplied by domestic manufacturers for similarly equipped vehicles of different model years.[250]

The CPI indices also do not capture changes in expenditures attributable to vehicle mix or trimflation. The indices measure changes in the prices of vehicle models from one model year to another, rather than changes in average transaction prices.[251] As such, rising shares of light truck transactions or sales of more expensive vehicle trims do not affect CPI. For example, if the quality-adjusted price of a light-duty truck model rises from $50,000 to $52,000 over the course of the year, the annual amount of pure inflation is $2,000, which is captured in the CPI indices. If a consumer chooses to purchase the $52,000 light truck because a $25,000 car model has been discontinued, average expenditure per transaction increases $27,000. Yet, pure inflation is still $2,000.

We use the following formula to estimate quality differentials:

$$\mathrm{QD_{XY}} = \frac{1 + \frac{\mathrm{E_{XY}} - \mathrm{E_{XY-1}}}{\mathrm{E_{XY-1}}}}{1 + \frac{\mathrm{CPI_{XY}} - \mathrm{CPI_{XY-1}}}{\mathrm{CPI_{XY-1}}}} - 1 \qquad (13)$$

where $\mathrm{QD_{XY}}$ is the quality differential for new cars, light trucks, or passenger vehicles in a given year; $\mathrm{E_{XY}}$ is the average expenditures per new car, light truck, or passenger vehicle for that same year; $\mathrm{E_{XY-1}}$ is the average expenditures per new car, light truck, or passenger vehicle for the prior year; $\mathrm{CPI_{XY}}$ is the CPI of new passenger vehicles, new cars, or new light trucks for that same year; and $\mathrm{CPI_{XY-1}}$ is the CPI of new cars, light trucks, or passenger vehicles for the prior year.

Upon deriving quality differentials, we create chained quality differential indices for new passenger vehicles, cars, and light trucks. Quality improvements compound over the years, meaning their value persists beyond the initial year in which a quality change was made. For example, backup cameras became standard in all vehicles in 2018.[252] The value of this quality change persists beyond that year. To account for the compounding nature of quality changes, we use the following formula to create a chained quality differential index:[253]

$$\mathrm{QDI_{XY}} = (1 + \mathrm{QD_{XY}}) \times (1 + \mathrm{QD_{XY-1}}) \times (1 + \mathrm{QD_{XY-2}}) \ldots \times (1 + \mathrm{QD_{X2002}}) \qquad (14)$$

[249] Bureau of Labor Statistics, "Quality Adjustment in the CPI: New, Used, and Leased Motor Vehicles," May 12, 2025, https://www.bls.gov/cpi/quality-adjustment/vehicles.htm.

[250] Ibid.

[251] Bureau of Labor Statistics, "Consumer Price Index: Methodology," April 27, 2023, https://www.bls.gov/cpi/factsheets/r-cpi-u-nv.htm.

[252] National Highway Traffic Safety Administration, "NHTSA Announces Final Rule Requiring Rear Visibility Technology," Department of Transportation, March 31, 2014, https://www.transportation.gov/briefing-room/nhtsa-announces-final-rule-requiring-rear-visibility-technology#:~:text=Today's%20final%20rule%20requires%20all,reduce%20death%20and%20injury%20resulting.

[253] Eurostat, "Glossary: Chain Index," https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Glossary:Chain_index, accessed December 26, 2025.

where QDI_{XY} is the quality differential index for new cars, light trucks, or passenger vehicles in a given year; QD_{XY} is the quality differential for new cars, light trucks, or passenger vehicles in that same year; and QD_{X2002} is the quality differential for new cars, light trucks, or passenger vehicles in 2002.

To isolate average expenditures attributable to trimflation, we remove the growth rate of vehicle mix, equipment upgrades, and safety standards from the growth rate of the quality differential index:

$$T_{XY} = LMM_{XY} \times \ln\left[\frac{\frac{QDI_{XY}}{QDI_{XY-1}}}{\left(\frac{PVE_Y}{CVM_Y}\right) \times \left(\frac{REU_{XY} + E_{XY-1}}{E_{XY-1}}\right) \times \left(\frac{RFMVSS_{XY} + E_{XY-1}}{E_{XY-1}}\right)}\right] \quad (15)$$

where T_{XY} is the average expenditures attributable to trimflation per new car, light truck, or passenger vehicle in a given year; QDI_{XY} is the quality differential index per new passenger vehicle, car, or light truck for that same year; QDI_{XY-1} is the quality differential index per new passenger vehicle, car, or light truck for the prior year; PVE_Y is the average expenditure per new passenger vehicle in a given year; CVM_Y is the average expenditure per passenger vehicle if the vehicle mix remained unchanged from the prior year; REU_{XY} is the raw value of expenditures attributable to equipment upgrades per new car, light truck, or passenger vehicle in that same year; $RFMVSS_{XY}$ is the raw expenditures attributable to FMVSS that came into effect between 2002 and 2019 per new car, light truck, or passenger vehicle in that same year; E_{XY-1} is the average expenditures per new car, light truck, or passenger vehicle in the prior year; and ln is the natural logarithm function. As average expenditures attributable to vehicle mix are only calculated for new passenger vehicles, $\left(\frac{PVE_Y}{CVM_Y}\right)$ is excluded from trimflation formulas for new cars and light trucks.

Automaker Margins and Production Costs

Automaker margins and production costs are the general change in vehicle prices attributable to changing automaker profits and manufacturing expenses.[254] Automaker margins and production costs are captured by the BLS's producer price index (PPI) for automobile, light truck, and utility vehicle manufacturing and the import price index (IPI) for motor cars and other motor vehicles.[255] The PPI of automobile, light truck, and utility vehicle manufacturing represents the average change in the invoice prices domestic manufacturers charge dealers for

[254] Brookings, "How does the government measure inflation?," June 28, 2021, https://www.brookings.edu/articles/how-does-the-government-measure-inflation/.

[255] Bureau of Labor Statistics, "Producer Price Index by Industry: Automobile, Light Truck and Utility Vehicle Manufacturing [PCU336110336110]," *FRED, Federal Reserve Bank of St. Louis*, accessed January 18, 2026, https://fred.stlouisfed.org/series/PCU336110336110; Bureau of Labor Statistics, "Import Price Index (Harmonized System): Motor Cars and Other Motor Vehicles Principally Designed for the Transport of Persons, Including Station Wagons and Racing Cars [IP8703]," *FRED, Federal Reserve Bank of St. Louis*, accessed January 18, 2026, https://fred.stlouisfed.org/series/IP8703.

passenger vehicles.[256] The IPI of motor cars and other motor vehicles measures the average change in invoice prices foreign manufacturers charge dealers for imported motor vehicles.[257]

To derive the average expenditures attributable to automaker margins and production costs, we first create an acquisition index. An acquisition index combines the PPIs for automobile, light truck, and utility vehicle manufacturing, and the IPI for motor cars and other motor vehicles, using a weighted-average formula. The acquisition index is representative of the change in both domestic and foreign automakers' margins and production costs.

$$\mathrm{AI_Y} = \frac{\mathrm{PPI_Y} \times (\mathrm{CS_{DY}} + \mathrm{TS_{DY}}) + \mathrm{IPI_Y} \times (\mathrm{CS_{FY}} + \mathrm{TS_{FY}})}{\mathrm{CS_Y} + \mathrm{TS_Y}} \tag{16}$$

where $\mathrm{AI_Y}$ is the acquisition index for a given year; $\mathrm{PPI_Y}$ is the PPI for automobile, light truck, and utility vehicle manufacturing in that same year; $\mathrm{IPI_Y}$ is the IPI for motor cars and other motor vehicles in that same year; $\mathrm{CS_{DY}}$ is the number of domestic new car sales in that same year; $\mathrm{CS_{FY}}$ is the number of foreign new car sales in that same year; $\mathrm{CS_Y}$ is the total number of new car sales in that same year; $\mathrm{TS_{DY}}$ is the number of domestic new light truck sales in that same year; $\mathrm{TS_{FY}}$ is the number of foreign new light truck sales in that same year; and $\mathrm{TS_Y}$ is the total number of new light truck sales in that same year.

Upon deriving the acquisition index, we estimate average expenditures attributable to automaker margins and production costs per new car, light truck, and passenger vehicle by using the following formula:

$$\mathrm{AMPC_{XY}} = \mathrm{LMM_{XY}} \times \ln\left(\frac{\mathrm{AI_Y}}{\mathrm{AI_{Y-1}}}\right) \tag{17}$$

where $\mathrm{AMPC_{XY}}$ is average expenditures attributable to automaker margins and production costs per new car, light truck, or passenger vehicle in a given year; $\mathrm{LMM_{XY}}$ is the log-mean multiplier for new cars, light trucks, or passenger vehicles in that same year; $\mathrm{AI_Y}$ is the acquisition index in that same year; $\mathrm{AI_{Y-1}}$ is the acquisition index in the prior year; and ln is the natural logarithm function.

Dealer Markups and Margins

Dealer markups and margins are the difference between the invoice price at which a manufacturer sells a passenger vehicle to a dealer and the final price a dealer charges a consumer for that vehicle.[258] To derive dealer markups and margins, we isolate expenditures attributable to the growth in prices dealers charge consumers to purchase new passenger vehicles and the growth in prices automakers charge dealers to purchase new passenger vehicles.

[256] Bureau of Labor Statistics, "Producer Price Indexes," accessed January 18, 2026, https://www.bls.gov/ppi/.
[257] Bureau of Labor Statistics, "International Price Program: Concepts," accessed January 18, 2026, https://www.bls.gov/opub/hom/ipp/concepts.htm.
[258] J.D. Power, "How Much Does a New Car Dealer Make on a Deal?," July 27, 2023, https://www.jdpower.com/cars/shopping-guides/how-much-does-a-new-car-dealer-make-on-a-deal; Remitly, "What Is MSRP? Why It Matters When You're Buying Something," September 25, 2025, https://www.remitly.com/blog/finance/what-is-msrp/.

$$\mathrm{DMM_{XY}} = \mathrm{LMM_{XY}} \times \left[\ln\left(\frac{\mathrm{CPI_{XY}}}{\mathrm{CPI_{XY-1}}}\right) - \ln\left(\frac{\mathrm{AI_Y}}{\mathrm{AI_{Y-1}}}\right)\right] \quad (18)$$

where $\mathrm{DMM_{XY}}$ is the average expenditure attributable to dealer markups and margins per new car, light truck, or passenger vehicle in a given year; $\mathrm{LMM_{XY}}$ is the log-mean multiplier for new cars, light trucks, or passenger vehicles in that same year; $\mathrm{CPI_{XY}}$ is the CPI for new cars, light trucks, or passenger vehicles in that same year; $\mathrm{CPI_{XY-1}}$ is the CPI for new cars, light trucks, or passenger vehicles in the prior year; $\mathrm{AI_Y}$ is the acquisition index for that same year; $\mathrm{AI_{Y-1}}$ is the acquisition index for the prior year; and ln is the natural logarithm function.

New Vehicle Expenditures

To estimate the real price of new vehicles, we adjust average expenditures per new car, light truck, and passenger vehicle for inflation. The Consumer Price Index of all items in the U.S. city average (CPI-U), a widely accepted measure of inflation for the economy, is used in our analysis to adjust prices for inflation.[259] The CPI-U captures changes in the prices of approximately 80,000 price quotes of various goods and services purchased by urban households, which represent approximately 93 percent of the population.[260]

A standard inflation adjustment formula is used to derive the real average expenditure per new car, light truck, and passenger vehicle.

$$\mathrm{RE_{XY}} = \mathrm{E_{XY}} \times \frac{\mathrm{CPIU_{2025}}}{\mathrm{CPIU_Y}} \quad (19)$$

where $\mathrm{RE_{XY}}$ is the real average expenditure per new car, light truck, or passenger vehicle for a given year, measured in 2025 dollars; $\mathrm{E_{XY}}$ is the nominal average expenditure per new car, light truck, or passenger vehicle for that same year; $\mathrm{CPIU_Y}$ is the CPI-U for that same year; and $\mathrm{CPIU_{2025}}$ is the CPI-U in 2025. The product is the estimated amount of money, valued in 2025 dollars, needed to buy a new car, light truck, or passenger vehicle in a given year.

For ease of analysis, we convert the real average expenditure per new car, light truck, or passenger vehicle to the percent change in the real average expenditure per new car, light truck, or passenger vehicle compared to 2025.

$$\%\Delta \mathrm{RE_{XY}} = (\mathrm{RE_{XY}} - 1) \times 100 \quad (21)$$

where $\%\Delta \mathrm{RE_{XY}}$ is the percent change in the in the real average expenditure per new car, light truck, or passenger vehicle for a given year compared to 2025, and $\mathrm{RE_{XY}}$ is the real average expenditure per new car, light truck, or passenger vehicle for a given year, measured in 2025 dollars. Negative percentages indicate that real average expenditures in a given year were lower

[259] Bureau of Labor Statics, "Consumer Price Indexes Overview," September 9, 2024, https://www.bls.gov/cpi/overview.htm.

[260] Bureau of Labor Statistics, "Consumer Price Index: Design," January 30, 2025. https://www.bls.gov/opub/hom/cpi/design.htm.

than those in 2025. Positive percentages signify that real average expenditures in a given year were higher than those in 2025.

Real Used Vehicle Expenditures

To estimate the change in the real price of used vehicles, we derive a relative price index of used vehicles by comparing changes in nominal used vehicle prices with changes in the price of all goods (i.e., inflation). The sales price of used vehicles is sourced from the Manheim Used Vehicle Value Index, a measure of nominal used vehicle prices derived from statistical analysis of more than 5 million transactions each year.[261]

We derive the Real Used Vehicle Price Index using the following formula.

$$\mathrm{RUVPI_Y} = \frac{\mathrm{MUVVI_Y} / \mathrm{MUVVI_{2025}}}{\mathrm{CPIU_Y} / \mathrm{CPIU_{2025}}} \tag{20}$$

where $\mathrm{RUVPI_Y}$ is the Real Used Vehicle Price Index for a given year; $\mathrm{MUVVI_Y}$ is the Manheim Used Vehicle Value Index for the same year; $\mathrm{CPIU_Y}$ is the CPI-U for the same year; $\mathrm{MUVVI_{2025}}$ is the Manheim Used Vehicle Value Index for 2025; and $\mathrm{CPIU_{2025}}$ is the CPI-U for 2025.

The Real Used Vehicle Price Index captures the evolution of used vehicle sales prices, adjusting for inflation, with 2025 as the base year. Values greater than 1 indicate that used car prices exceeded inflation, revealing that real used car prices in a given month were higher than in 2025. Values below 1 indicate that used car prices did not exceed inflation, revealing that real used car prices in a given month were lower than those in 2025.

For ease of analysis, we convert the Real Used Vehicle Relative Price Index to the percent change in the Real Used Vehicle Relative Price Index compared to 2025.

$$\%\Delta\mathrm{RUVPI_Y} = (\mathrm{RUVPI_Y} - 1) \times 100 \tag{21}$$

where $\%\Delta\mathrm{RUVPI_Y}$ is the percent change in the Real Used Vehicle Relative Price Index for a given year compared to 2025, and $\mathrm{RUVPI_Y}$ is the Real Used Vehicle Relative Price Index for that same year. Negative percentages indicate that used vehicle prices in a given year were lower than those in 2025. Positive percentages signify that used vehicle prices in a given year were higher than those in 2025.

New and Used Vehicle Purchasing Power Index

To evaluate the purchasing power for passenger vehicles over time, we derive purchasing power indices by comparing changes in average used passenger vehicle and new car, light truck, and passenger vehicle expenditures to changes in household disposable income. Household

[261] Manheim by Cox Automotive, "Used Vehicle Value Index," accessed December 26, 2025, https://site.manheim.com/en/services/consulting/used-vehicle-value-index.html.

income is income, excluding realized or unrealized capital gains, received from all sources, including wages and government benefits.[262] Household disposable income is the income remaining after taxes, a practical measure of households' financial ability to purchase goods or services.[263] Households are an ideal unit of comparison when evaluating Americans' ability to purchase vehicles, as such financial decisions are typically made at the household level, where income and expenditures are shared.[264]

The BEA has produced annual estimates of the distribution of household disposable income per year. The Bureau derives these estimates by allocating income totals from NIPA Table 2.1 and external sources amongst households.[265] The distribution amongst households is based on the Annual Social and Economic Supplement of the Current Population Survey, a nationally representative annual survey of approximately 92,000 households jointly sponsored by the U.S. Census Bureau and the BLS that reveals how income is distributed throughout society.[266]

We adjust each estimate of household disposable income for inflation using a standard inflation adjustment formula:

$$\mathrm{RDI_Y} = \mathrm{DI_Y} \times \frac{\mathrm{CPIU_{2025}}}{\mathrm{CPIU_Y}} \tag{22}$$

where $\mathrm{RDI_Y}$ is the real household disposable income measured in 2025 dollars; $\mathrm{DI_Y}$ is the nominal household disposable income for that same year; $\mathrm{CPIU_Y}$ is the CPI-U for that same year; and $\mathrm{CPIU_{2025}}$ is the CPI-U for 2025.

We input estimates of the real household disposable income into the following equation to derive purchasing power indexes of new cars, light trucks, and passenger vehicles:

$$\mathrm{RPPI_{XY}} = \frac{\mathrm{RDI_Y}/\mathrm{RDI_{2025}}}{\mathrm{RE_{XY}}/\mathrm{RE_{X2025}}} \tag{23}$$

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[262] Bureau of Economic Analysis, "Technical Document: The Methodology for Distributing Personal Saving via a Joint Distribution of Disposable Personal Income and Personal Consumption Expenditures," Department of Commerce, accessed December 26, 2025, https://www.bea.gov/sites/default/files/2024-07/technical_document_personal_saving.pdf.

[263] Bureau of Economic Analysis, "Income & Saving," Department of Commerce, February 7, 2024, https://www.bea.gov/resources/learning-center/what-to-know-income-saving.

[264] Bureau of Economic Analysis, "Technical Document: The Methodology for Distributing Personal Saving via a Joint Distribution of Disposable Personal Income and Personal Consumption Expenditures," Department of Commerce, accessed December 26, 2025, https://www.bea.gov/sites/default/files/2024-07/technical_document_personal_saving.pdf.

[265] Bureau of Economic Analysis, "Distribution of Personal Income," Department of Commerce, August 21, 2025, https://www.bea.gov/data/special-topics/distribution-of-personal-income.

[266] Bureau of Economic Analysis, "Technical Document: The Methodology for Distributing Personal Saving via a Joint Distribution of Disposable Personal Income and Personal Consumption Expenditures," Department of Commerce, accessed December 26, 2025, https://www.bea.gov/sites/default/files/2024-07/technical_document_personal_saving.pdf.

where $RPPI_{XY}$ is the real purchasing power index for new cars, light trucks, and passenger vehicles in a given year, with 2025 as the base year; RDI_{Y} is the real household disposable income for that same year; RDI_{2025} is the real average household disposable income for 2025; RE_{XY} is the real average expenditures per new car, light truck, or passenger vehicle for that year; and RE_{X2025} is the real average expenditures per new car, light truck, or passenger vehicle for 2025.

We input estimates of the real household disposable income into the following equation to derive purchasing power indexes of used passenger vehicles:

$$RPPI_{UY} = \frac{RDI_{Y} / RDI_{2025}}{RUVPI_{Y} / RUVPI_{2025}} \quad (24)$$

where $RPPI_{UY}$ is the real purchasing power index for used passenger vehicles in a given year, with 2025 as the base year; RDI_{Y} is the real household disposable income for that same year; RDI_{2025} is the real average household disposable income for 2025; $RUVPI_{Y}$ is the Real Used Vehicle Relative Price Index for that same year; and $RUVPI_{2025}$ is the Real Used Vehicle Relative Price Index for 2025.

The purchasing power indices capture the evolution of the purchasing power of used passenger vehicles and new cars, light trucks, and passenger vehicles over time, with 2025 as the base year. Annual indices greater than 1 indicate that household disposable income is outpacing average expenditures per transaction, signifying households had more purchasing power that year than in 2025. Annual indices less than 1 indicate that household disposable income is not keeping up with average expenditures per transaction, signifying that households had less purchasing power that year than in 2025.

For ease of analysis, we convert the purchasing power indexes into the percent change in purchasing power compared to 2025. To derive the percent change in the purchasing power indexes of new cars, light trucks, and passenger vehicles, we use the following formula:

$$\%\Delta RPP_{XY} = (RPPI_{XY} - 1) \times 100 \quad (25)$$

where $\%\Delta RPP_{XY}$ is the percent change in purchasing power for new cars, light trucks, or passenger vehicles in a given year compared to 2025, and $RPPI_{XY}$ is the real purchasing power index for new cars, light trucks, or passenger vehicles for that same year. Negative percentages indicate that purchasing power was weaker in a given year than in 2025. Positive percentages signify that purchasing power was stronger in a given year than in 2025.

To derive the percent change in the purchasing power index for used passenger vehicles, we use the following formula:

$$\%\Delta RPP_{UY} = (RPPI_{UY} - 1) \times 100 \quad (26)$$

where $\%\Delta RPP_{UY}$ is the percent change in purchasing power for used passenger vehicles in a given year compared to 2025, and $RPPI_{UY}$ is the real purchasing power index for used passenger vehicles for that same year. Negative percentages indicate that purchasing power was weaker in a given year than in 2025. Positive percentages signify that purchasing power was stronger in a given year than in 2025.

Budgetary Analysis

To evaluate the budgetary effect of passenger vehicles and other vehicle expenses over time, we analyze shifts in categories of household spending since 2002. Data are sourced from the Consumer Expenditure Surveys, a nationally representative survey administered by the BLS and the U.S. Census Bureau that captures information on consumer expenditures, income, and demographics.[267] Our analysis focuses on two key metrics: household expenditures per expenditure category and the share of average household expenditures per expenditure category, which is the percentage of household budgets allocated to individual expenditure categories.[268]

While the Consumer Expenditure Surveys are well-designed and executed, the data have inherent validity issues due to sampling variance, measurement error, and methodological changes. Because the Consumer Expenditure Survey is not a census of all households, its representative sample may not perfectly reflect all households in the United States, introducing sampling variability.[269] Further, the survey is performed through interviews and the collection of household expenditure diaries.[270] Nonresponse and inaccurate reporting can skew survey results. Lastly, updates to the Consumer Expenditure Survey methodology and categories can affect the validity of data.[271]

To improve the validity of the Consumer Expenditure Survey data, we take three-year rolling averages of household expenditures and the share of average household expenditures. Rolling averages increase the effective sampling size and reduce statistical noise.[272]

Rolling averages of household expenditures per expenditure category are derived by using the following formula:

$$RAHE_{XY} = \frac{HE_{XY} + HE_{XY-1} + HE_{XY-2}}{3} \quad (27)$$

[267] The Bureau of Labor Statistics, accessed December 30, 2025, "Consumer Expenditure Surveys," https://www.bls.gov/cex/.
[268] Bureau of Labor Statistics, "Consumer Expenditure Surveys Tables: Getting Started Guide," December 19, 2025, https://www.bls.gov/cex/tables-getting-started-guide.htm.
[269] Ibid.
[270] Bureau of Labor Statistics, "Consumer Expenditure Surveys," accessed January 20, 2026, https://www.bls.gov/cex/.
[271] Bureau of Labor Statistics, "Consumer Expenditures 2024 News Release Rescheduled," December 2, 2025, https://www.bls.gov/cex/notices/2025/ce-2024-reschedule.htm.
[272] Bureau of Labor Statistics, "Consumer Expenditure Surveys: Tables," accessed January 5, 2026, https://www.bls.gov/cex/tables.htm.

where $\mathrm{RAHE_{XY}}$ is the three-year rolling average of household expenditures on an expenditure category in a given year; $\mathrm{HE_{XY}}$ is the household expenditures on that expenditure category for that same year; $\mathrm{HE_{XY-1}}$ is household expenditures on that expenditure category one year prior; and $\mathrm{HE_{XY-2}}$ is household expenditures on that expenditure category two years prior.

Rolling averages of the share of average household expenditures per expenditure category are derived by using the following formula:

$$\mathrm{RASHE_{XY}} = \frac{\mathrm{SHE_{XY}} + \mathrm{SHE_{XY-1}} + \mathrm{SHE_{XY-2}}}{3} \tag{28}$$

where $\mathrm{RASHE_{XY}}$ is the three-year rolling average of the share of average household expenditures per expenditure category in a given year; $\mathrm{SHE_{XY}}$ is the share of average household expenditures per expenditure category for that same year; $\mathrm{SHE_{XY-1}}$ is the share of average household expenditures per expenditure category one year prior; and $\mathrm{SHE_{XY-2}}$ is the share of average household expenditures per expenditure category two years prior.

To compare different expenditure categories, we convert the rolling averages into percent changes since 2002. To do so, we first create household expenditure indices and the share of average household expenditure indices.

We derive the household expenditure index for expenditure categories using the following formula:

$$\mathrm{HEI_{XY}} = \frac{\mathrm{RAHE_{XY}}}{\mathrm{RAHE_{X2002}}} \tag{29}$$

where $\mathrm{HEI_{XY}}$ is the household expenditure index for an expenditure category for a given year; $\mathrm{RAHE_{XY}}$ is the three-year rolling average of household expenditures on that expenditure category for the same year; and $\mathrm{RAHE_{X2002}}$ is the three-year rolling average of household expenditures on that expenditure category for 2002.

We derive the share of average household expenditures indices for expenditure categories using the following formula.

$$\mathrm{SHEI_{XY}} = \frac{\mathrm{RASHE_{XY}}}{\mathrm{RASHE_{X2002}}} \tag{30}$$

where $\mathrm{SHEI_{XY}}$ is the share of the average household expenditures index for an expenditure category for a given year; $\mathrm{RASHE_{XY}}$ is the three-year rolling average of household expenditures on that expenditure category for the same year; and $\mathrm{RASHE_{X2002}}$ is the three-year rolling average of household expenditures on that expenditure category for 2002.

We derive the percent change in household expenditures on expenditure categories using the following formula.

$$\%\Delta \mathrm{HE}_{\mathrm{XY}} = (\mathrm{HEI}_{\mathrm{XY}} - 1) \times 100 \quad (31)$$

where $\%\Delta \mathrm{HE}_{\mathrm{XY}}$ is the percent change in household expenditures for an expenditure category in a given year, and $\mathrm{HEI}_{\mathrm{XY}}$ is the household expenditure index for an expenditure category for a given year. The base year is 2002. Negative percentages indicate that household expenditures on an expenditure category are less than in 2002. Positive percentages signify that household expenditures on an expenditure category are more than in 2002.

We derive the percent change in the share of average household expenditures on expenditure categories using the following formula.

$$\%\Delta \mathrm{SHE}_{\mathrm{XY}} = (\mathrm{SHEI}_{\mathrm{XY}} - 1) \times 100 \quad (32)$$

where $\%\Delta \mathrm{SHE}_{\mathrm{XY}}$ is the percent change in the share of average household expenditures for an expenditure category in a given year, and $\mathrm{SHEI}_{\mathrm{XY}}$ is the share of the average household expenditures index for an expenditure category for a given year. The base year is 2002. Negative percentages indicate that the share of average household expenditures on an expenditure category is less than in 2002. Positive percentages signify that the share of average household expenditures on an expenditure category is more than in 2002.

Fuel Economy

To evaluate the effect of improved fuel economy, we estimate the change in average gasoline expenditures per car and light truck if fleet-wide fuel economy remained constant since 2002. First, we estimate gasoline consumption avoided due to fuel economy improvements per new car and light truck using the following formula:

$$GCA_{XMY} = \left(\frac{1}{MPG_{X2002}} - \frac{1}{MPG_{XMY}}\right) \times VMT_X \times AA_X \quad (33)$$

where GCA_{XMY} is gasoline consumption avoided per new car or light truck for a given model year; MPG_{XMY} is the real-world miles per gallon per new car or light truck for the same model year; MPG_{X2002} is the real-world miles per gallon for model year 2002 new cars or light truck; and VMT_X is the average annual vehicle miles traveled per car or light truck in a year; and AA_X is the average age of cars or light trucks per year.

We source our data from various government agencies. Estimates of real-world miles per gallon for new cars or light trucks are published by the EPA.[273] Real-world miles per gallon are derived from laboratory tests that measure the actual fuel consumption of a new passenger vehicle driven by the average driver.[274] Estimates of the average annual vehicle miles traveled

[273] Environmental Protection Agency, "Explore the Automotive Trends Data," March 27, 2025, https://www.epa.gov/automotive-trends/explore-automotive-trends-data.

[274] Environmental Protection Agency, "About the Automotive Trends Data," November 4, 2025, https://www.epa.gov/automotive-trends/introduction-automotive-trends-report.

per car or light truck in a year are sourced by the Department of Energy.[275] The average age of cars and light trucks in operation is published by the Bureau of Transportation Statistics.[276] The Bureau did not produce estimates of the average age of cars and light trucks between 2017 and 2021. We extrapolate those values using a standard linear regression.

Upon deriving gasoline consumption avoided per new car or light truck for a given model year, we estimate average gasoline expenditures avoided by using the following formula:

$$GEA_{XMY} = GCA_{XMY} \times \frac{RGP_Y + RGP_{Y-1} + RGP_{Y-2} \ldots + RGP_{Y-AA_X}}{AA_X} \quad (34)$$

where GEA_{XMY} is the average gasoline expenditures avoided per model year for new cars or light trucks; GCA_{XMY} is gasoline consumption avoided per new car or light truck for the same model year; AA_X is the average age of cars or light trucks per year; and RGP_{MY} is the real average price of regular unleaded gasoline per year.

The nominal average price of regular unleaded gasoline per year is sourced from BLS.[277] We use a standard inflation adjustment formula to derive the real average price of regular unleaded gasoline per year:

$$\mathrm{RGP_Y} = \mathrm{NGP_Y} \times \frac{\mathrm{CPIU_{2025}}}{\mathrm{CPIU_Y}} \quad (35)$$

where RGP_Y is the real average price of regular unleaded gasoline for a given year; NGP_Y is the nominal average price of regular unleaded gasoline for the same year; $\mathrm{CPIU_{XY}}$ is the CPI-U for the same year; and $\mathrm{CPIU_{2025}}$ is the CPI-U in 2025.

[275] Department of Energy, "Average Annual Vehicle Miles Traveled by Major Vehicle Category," https://afdc.energy.gov/data/10309#:~:text=Table_title:%20Average%20Annual%20Vehicle%20Miles%20Traveled%20by,Semi%2DTruck:%2062169%20%7C%20Light%20Truck/Van:%2011318%20%7C, accessed January 18, 2026.

[276] Bureau of Transportation Statistics, "Average Age of Automobiles and Trucks in Operation in the United States," https://www.bts.gov/content/average-age-automobiles-and-trucks-operation-united-states, accessed January 18, 2026.

[277] Bureau of Labor Statistics, "Average Price: Gasoline, Unleaded Regular (Cost per Gallon/3.785 Liters) in U.S. City Average [APU000074714]," *FRED, Federal Reserve Bank of St. Louis*, https://fred.stlouisfed.org/series/APU000074714, January 18, 2026.

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