

Assessment of Tax Revenue Generated by the Automotive Sector for the Year 2013



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*All statements, findings, and conclusions in this report are those of the authors
and do not necessarily reflect those of the Alliance of Automobile Manufacturers.*

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Center for Automotive Research

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Kim Hill

About CAR

The Center for Automotive Research is a non-profit organization based in Ann Arbor, Michigan. Its mission is to conduct research on significant issues related to the future direction of the global automotive industry, organize and conduct forums of value to the automotive community, and foster industry relationships.

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INTRODUCTION

For over a century, the automotive industry has been a major contributor in shaping the U.S. economy by generating millions of jobs across the country. The automotive industry is the largest manufacturing industry in the United States. Trends in the automotive sector are indicators of the state of national and regional economies, with periods of growth in automotive manufacturing followed by periods of growth in the economy as a whole. No other single industry is linked as closely to the broader U.S. manufacturing sector or generates as much direct retail business and employment as the motor vehicle industry. This study describes the financial contribution of the automotive sector to state and federal tax revenues.

In 2012 the Center for Automotive Research (CAR) published the study, “Assessment of Tax Revenue Generated by the Automotive Sector” for the Alliance of Automobile Manufacturers.¹ In this study, CAR is providing an analysis for the year 2013. The study examines multiple instruments of tax revenue generation and focuses primarily on state and federal tax revenues. Taxes are generated at various points in the automotive product lifecycle. For instance, in addition to the sales taxes generated when vehicles are purchased, government agencies collect taxes from a variety of sources—payroll taxes from employees working in the automotive sector, fuel taxes from gas stations, registration and license taxes from drivers and vehicle owners, and corporate income taxes and licensing fees from the automakers, automotive suppliers, and dealerships. As a result of the depth and breadth of the automotive sector, every state in the nation generates tax revenues related to the automotive industry.

Through this analysis, CAR researchers produced estimates² of taxes that are generated by operations related to the U.S. auto industry. In 2013, the automotive sector generated at least \$110.0 billion in state government tax revenue (This represents approximately 13 percent of state government revenues).³ Of the total estimated 2013 state tax revenues:

- \$38.9 billion will be generated from taxes on the sales and service of new and used vehicles.
- \$3.9 billion will be generated from income taxes on direct, intermediate, and spin-off employment at auto manufacturers, auto parts suppliers, and dealerships.
- \$66.0 billion will be generated from use taxes and fees including fuel taxes, registration fees, and driver licensing fees.

¹ Hill, Kim, Debbie Maranger Menk, and Joshua Cregger. (2012). “Assessment of Tax Revenue Generated by the Automotive Sector.” Center for Automotive Research. April 2012. <<http://www.cargroup.org/?module=Publications&event=View&pubID=38>>.

² All modeled numbers used in the text are rounded.

³ Total state revenues for 2013 were approximately \$846 billion. See Census. (2013). “State Government Tax Collections: 2013.” United States Census Bureau. March 2013. <http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=STC_2013_STC003&prodType=table>.

- \$1.4 billion will be generated from business taxes such as corporate income taxes and business license fees.

State government tax revenues not counted in this report such as corporate income taxes on the non-manufacturing operations of automakers and parts supply companies,⁴ personal property taxes, sales taxes on non-dealer automotive services and aftermarket parts sales, and miscellaneous business taxes account for additional revenues above those estimated and are beyond the scope of this report.

The estimates of the federal tax revenues in this study do not exhaust all of the contributions made by the automotive industry, and therefore, the estimates serve as a lower-bound estimate. In 2013, the automotive industry generated at least \$95.5 billion in federal government tax revenue (This represents approximately 3.4 percent of federal government revenues).⁵ Of the total estimated 2013 federal tax revenues:

- \$60.2 billion will be generated from income taxes on direct, intermediate, and spin-off employment at auto manufacturers, auto parts suppliers, and dealerships.
- \$35.3 billion will be generated from federal motor fuel taxes.

Federal tax revenues that are not estimated (such as corporate income taxes paid) account for additional revenues beyond those estimated in this report.

This study demonstrates that the U.S. automotive sector has a large impact throughout the nation and provides support to state and federal governments in the form of taxes and fees collected from sales, employees, drivers, and the auto companies themselves. The auto sector's contribution to taxes was analyzed using data from industry associations, government agencies, and other publicly available sources, which are listed in the References section. CAR also gathered employment information from all major automakers in the United States.

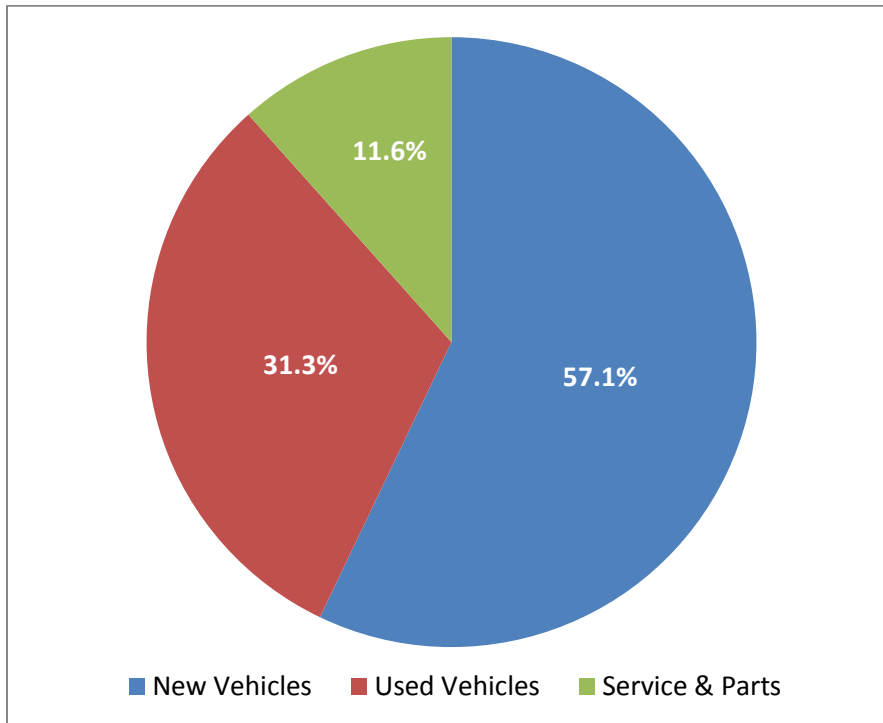
⁴ Tax revenues on non-manufacturing operations could be generated from a variety of sources, such as profits of financial arms of automotive companies, profits earned overseas, and profits earned by investments in financial securities.

⁵ Total federal revenues for 2013 were approximately \$2.8 trillion. See CBO. (2013). "Monthly Budget Review—Summary for Fiscal Year 2013." Congressional Budget Office. November 7, 2013. <<https://www.cbo.gov/publication/44716>>.

SECTION 1. SALES TAX FROM NEW MOTOR VEHICLES

Estimates of sales taxes collected from new vehicle dealers were generated using data from the National Automobile Dealers Association (NADA).⁶ State level data on sales was apportioned to the sales of new vehicles, used vehicles, and service and parts using the national average ratios provided by NADA. The percentages attributed to each category of dealer revenues can be seen in Figure 1. New vehicle purchases constitute over half of the sales dollars spent at dealerships, used vehicles constitute slightly less than a third of sales dollars, and the remaining amount is spent by consumers for service and parts.

Figure 1: Share of Total Dealership Sales Dollars, 2013



Source: National Automobile Dealers Association 2014

Once sales were apportioned by category, CAR researchers applied state vehicle sales tax rates to new and used vehicle sales and general sales tax rates to service and parts sales. These calculations resulted in sales tax estimates by category and state. The state estimates were aggregated to form national totals by category, which are displayed in Table 1 and Figure 2. Individual state level estimates can be seen in Table 2.

⁶ NADA (2014). "NADADATA 2014: Annual Financial Profile of America's Franchised New-Car Dealerships." National Automobile Dealers Association. May 28, 2014. <http://www.nada.org/NR/rdonlyres/DF6547D8-C037-4D2E-BD77-A730EBC830EB/0/NADA_Data_2014_05282014.pdf>.

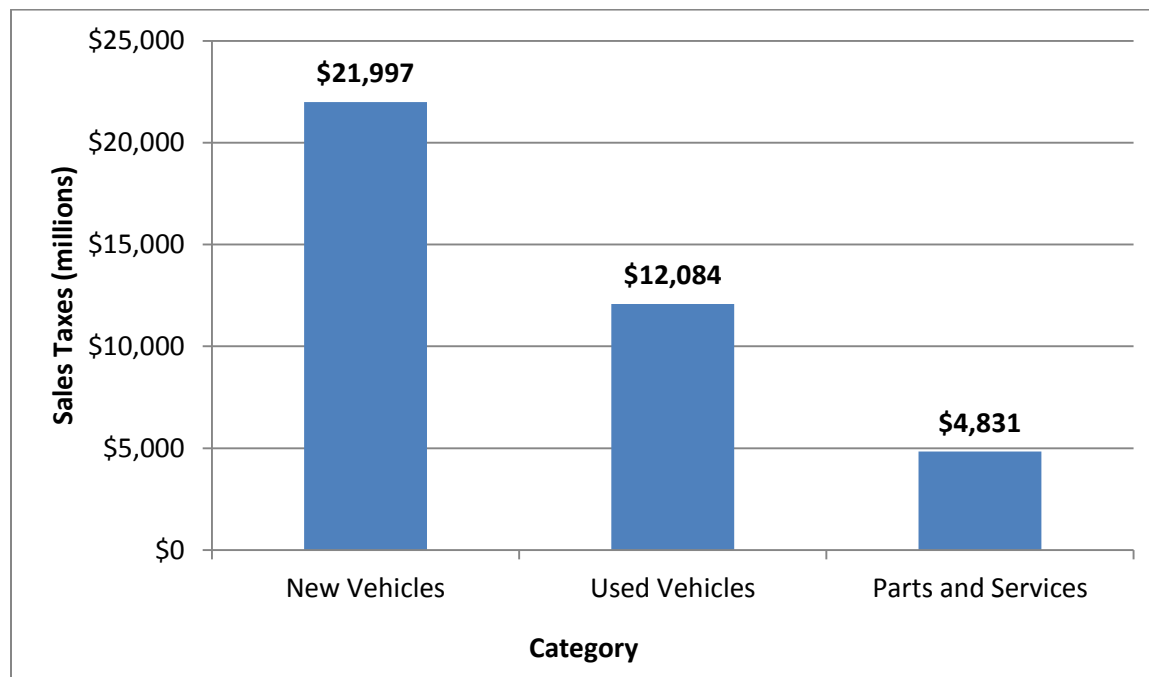
Table 1: Total Sales Taxes Collected by States on Motor Vehicles, Parts, and Service, 2013

Type of Sale	Sales Taxes Paid (millions)
New Vehicles	\$21,997
Used Vehicles	\$12,084
Parts and Services	\$4,831
Total	\$38,912

Sources: National Automobile Dealers Association 2014, Center for Automotive Research 2014

Total state sales taxes paid on vehicles, parts, and service contributed nearly \$39 billion to the revenues of states in 2013. Taxes on new vehicles totaled nearly \$22.0 billion, while used vehicles generated approximately \$12.1 billion. Taxes from parts and services were estimated at \$4.8 billion. The parts and service tax revenue estimate may be slightly overstated because some states do not tax labor. However, while not every state collects taxes on the labor portion of parts and service, nearly 60 percent of the value spent on parts and service is spent on parts.⁷ In addition, many states do collect taxes on labor, and only around six percent of the average dealership’s total revenue is associated with vehicle service labor.

Figure 2: Total Sales Taxes Collected by States on Motor Vehicles, Parts, and Service, 2013



Sources: National Automobile Dealers Association 2014, Center for Automotive Research 2014

⁷ Ibid. NADA 2014.

Table 2: State Sales Taxes Collected on Motor Vehicles, Parts, and Service, 2013

State	Sales Tax Revenues (millions)		
	New Vehicles	Used Vehicles	Parts and Services
Alabama	\$116	\$64	\$47
Alaska	\$0	\$0	\$0
Arizona	\$564	\$309	\$135
Arkansas	\$239	\$131	\$45
California	\$3,725	\$2,042	\$757
Colorado	\$225	\$123	\$46
Connecticut	\$343	\$188	\$70
Delaware	\$55	\$30	\$0
Florida	\$1,766	\$968	\$359
Georgia	\$0	\$0	\$103
Hawaii	\$46	\$25	\$9
Idaho	\$111	\$61	\$22
Illinois	\$1,012	\$555	\$206
Indiana	\$524	\$287	\$106
Iowa	\$0	\$0	\$56
Kansas	\$215	\$118	\$45
Kentucky	\$250	\$137	\$51
Louisiana	\$229	\$125	\$46
Maine	\$104	\$57	\$19
Maryland	\$479	\$263	\$97
Massachusetts	\$597	\$327	\$121
Michigan	\$517	\$284	\$105
Minnesota	\$379	\$208	\$82
Mississippi	\$155	\$85	\$44
Missouri	\$334	\$183	\$68
Montana	\$0	\$0	\$0
Nebraska	\$165	\$91	\$34
Nevada	\$205	\$113	\$42
New Hampshire	\$0	\$0	\$0
New Jersey	\$966	\$530	\$196
New Mexico	\$66	\$36	\$23
New York	\$958	\$525	\$195
North Carolina	\$368	\$202	\$118
North Dakota	\$91	\$50	\$19
Ohio	\$883	\$484	\$172
Oklahoma	\$347	\$190	\$97
Oregon	\$0	\$0	\$0
Pennsylvania	\$974	\$534	\$198
Rhode Island	\$82	\$45	\$17
South Carolina	\$59	\$59	\$65
South Dakota	\$48	\$26	\$13
Tennessee	\$567	\$311	\$115
Texas	\$2,528	\$1,386	\$514
Utah	\$174	\$95	\$45
Vermont	\$62	\$34	\$13
Virginia	\$412	\$226	\$105
Washington	\$515	\$282	\$100
West Virginia	\$112	\$61	\$27
Wisconsin	\$367	\$201	\$75
Wyoming	\$31	\$17	\$6
Total	\$21,997	\$12,084	\$4,831

Sources: National Automobile Dealers Association 2014, Center for Automotive Research 2014

Comparison of 2013 Data to 2010 Data

Estimated sales tax revenues from dealerships increased nearly 30 percent between 2010 and 2013. Approximately two thirds of that increase is attributable to the increased sales of new vehicles. Table 3 and Table 4 show how the data changed between 2010 and 2013.

Table 3: Estimated State Sales Taxes Collected at Dealerships, 2010 and 2013

Year	Sales Taxes (nominal millions)			Total
	New Vehicles	Used Vehicles	Parts and Services	
2010	\$15,778	\$9,891	\$4,352	\$30,021
2013	\$21,997	\$12,084	\$4,831	\$38,912
Percent Change	39.4%	22.2%	11.0%	29.6%

Sources: National Automobile Dealers Association 2011-2014, Hill et al. 2012, Center for Automotive Research 2014

Table 4: Total Sales and Taxes Collected, 2010 and 2013

	Sales and Taxes (nominal millions)	
	2010 Data	2013 Data
Total Sales (nominal millions)	\$552,888	\$730,082
Taxes Paid (nominal millions)	\$30,021	\$38,912
Taxes as a Percentage of Sales	5.4%	5.3%

Sources: National Automobile Dealers Association 2011-2014, Hill et al. 2012, Center for Automotive Research 2014

New vehicle sales increased by 34.5 percent, from 11.6 million in 2010 to 15.6 million units in 2013. During that period, tax revenues from new vehicles increased by 39.4 percent. Some of this change is a reflection of the increasing average transaction price for new vehicles, which rose from \$29,793 in 2010 to \$31,762 in 2013.⁸ Taxes as a percentage of sales changed slightly, from 5.4 percent to 5.3 percent. Some change in taxes as a percent of sales was expected, given that state tax rates have been updated, the apportionment of sales dollars (new vehicles, used vehicles, and parts & service) changes annually, and the distribution of sales dollars across states changes annually.

⁸ Ibid. NADA 2014.

SECTION 2: PERSONAL INCOME TAX OF AUTOMOTIVE EMPLOYEES

To calculate an estimate for personal income taxes paid by employees of automaker manufacturing facilities, parts supplier manufacturing facilities, and new vehicle dealerships, CAR researchers relied on an economic input-output model to update estimates from a previous CAR report.⁹ The analysis used a dynamic, inter-industry model developed by Regional Economic Models, Inc. (REMI) for industry- and region-specific impact analysis.

In both the earlier study and the updated model, CAR estimated the total employment and compensation provided by the automotive industry across the United States. The research team at CAR used a 51-region, 169-industry sector model developed by REMI to capture effects in all 50 state economies and the national economy.

Using the calculations of income and tax revenues generated for the earlier study, CAR researchers were able to apportion the tax revenues by the jurisdiction collecting them, as well as by the industry sector responsible for generating the tax revenue. Table 5 and Figure 3 below display the amount of income taxes generated as a result of direct, intermediate, and spin-off employment in the automotive industry.

Table 5: Estimated Income Taxes Paid in the United States, 2013

Industry Sector	Collecting Jurisdiction	Tax Revenue (millions)
Automaker	Federal	\$21,539
	State and Local	\$1,367
Parts Supplier	Federal	\$20,347
	State and Local	\$1,331
Dealer	Federal	\$18,266
	State and Local	\$1,174
Total	Federal	\$60,151
	State and Local	\$3,872
	Total	\$64,023

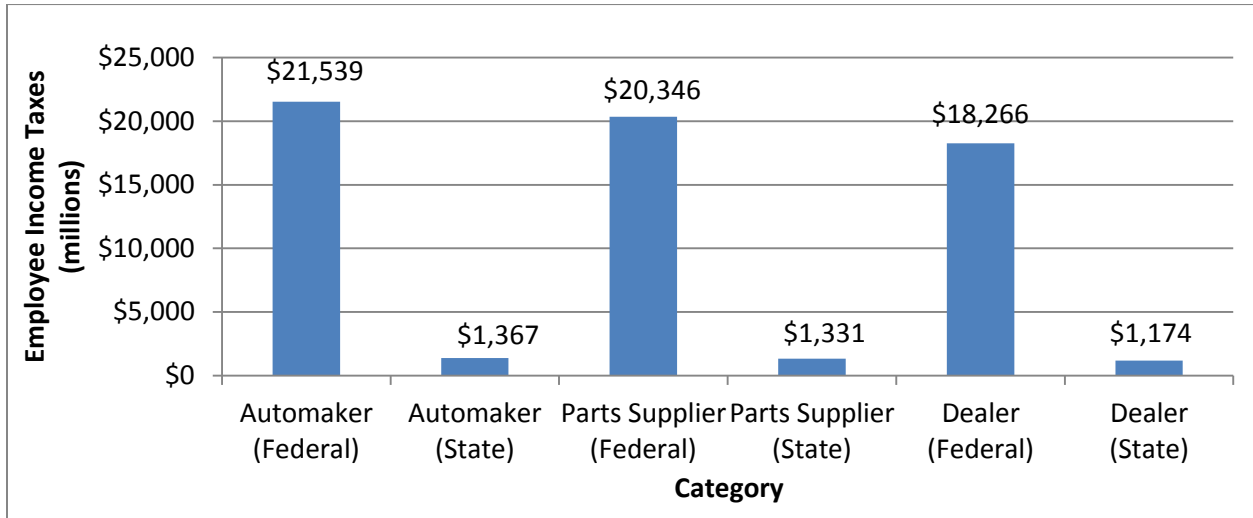
*Note: Income tax estimates include taxes on direct, intermediate, and spin-off workers.
Source: Center for Automotive Research 2014*

For this analysis, great consideration was paid to the potential of double-counting between automakers, suppliers, and dealerships. By avoiding double counting between segments of the industry (automaker, parts supply, and dealerships), the results for each of these segments can be added together to arrive at the total economic contribution of the industry. These results

⁹ Ibid. Hill et al. 2010.

fairly represent the size of the industry and its impact on the U.S. and individual state economies.¹⁰

Figure 3: Estimated Income Taxes Paid in the United States, 2013



Note: Income tax estimates include taxes on direct, intermediate, and spin-off workers.

Source: Center for Automotive Research 2014

Income taxes paid as a result of direct, intermediate, and spin-off employment in the manufacturing and sales of automobiles total \$64.0 billion, with 94 percent of the tax dollars going to the federal government. Even so, nearly \$3.9 billion in income taxes went to state and local governments (see Table 5 and Figure 3). For a breakdown of these income tax revenues by state, see Table 6.

¹⁰ For further information regarding the methodology used by CAR, read “Contribution of the Automotive Industry to the Economies of All Fifty States and the United States.” The full citation for the paper can be found in the References section of this paper.

Table 6: Estimated Direct, Intermediate, and Spin-off Worker Income Taxes by State, 2013

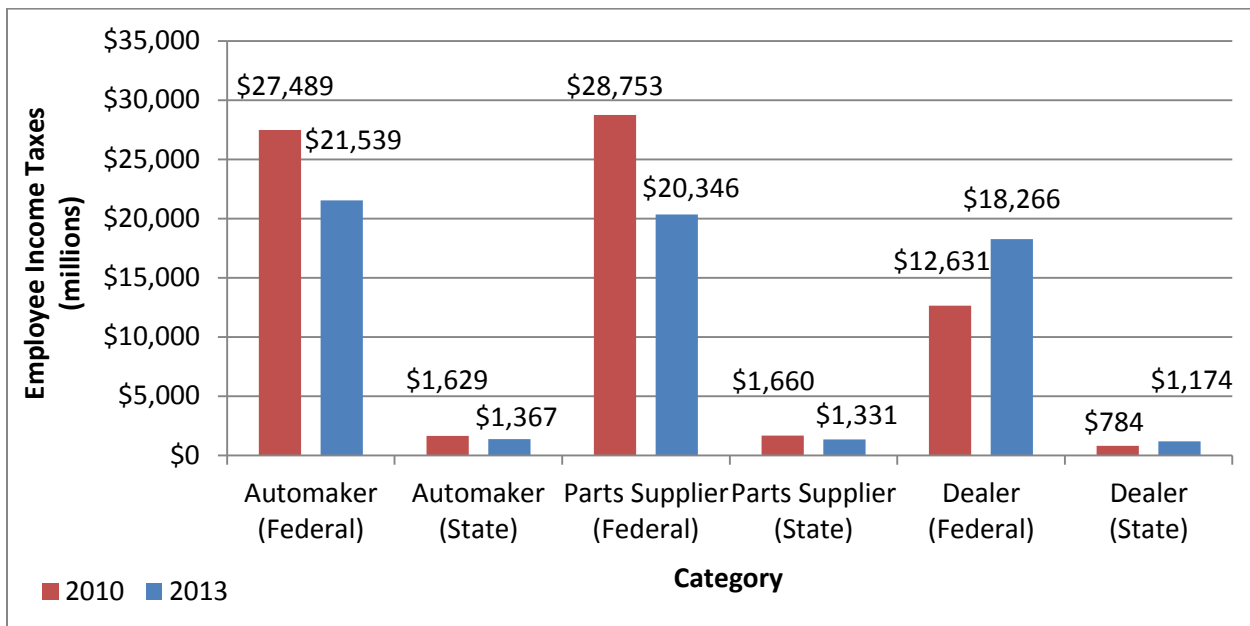
State	Automaker (millions)		Parts Supplier (millions)		Dealer (millions)	
	Federal	State	Federal	State	Federal	State
Alabama	\$453.5	\$19.5	\$374.9	\$16.1	\$203.3	\$8.7
Alaska	\$1.0	\$0.0	\$1.4	\$0.0	\$2.6	\$0.0
Arizona	\$77.9	\$3.1	\$109.7	\$4.3	\$351.1	\$13.9
Arkansas	\$110.4	\$5.6	\$149.4	\$7.6	\$119.0	\$6.0
California	\$985.9	\$78.1	\$1,018.3	\$80.7	\$2,449.8	\$194.2
Colorado	\$146.7	\$8.3	\$153.3	\$8.7	\$335.0	\$19.0
Connecticut	\$242.8	\$37.2	\$310.4	\$47.6	\$363.3	\$55.7
Delaware	\$144.9	\$8.3	\$201.8	\$11.6	\$372.0	\$21.4
Florida	\$361.0	\$0.0	\$359.0	\$0.0	\$977.0	\$0.0
Georgia	\$527.2	\$33.8	\$465.2	\$29.8	\$475.5	\$30.5
Hawaii	\$3.8	\$0.1	\$5.4	\$0.1	\$10.0	\$0.2
Idaho	\$6.7	\$0.0	\$9.8	\$0.0	\$18.1	\$0.0
Illinois	\$1,508.9	\$112.1	\$1,360.0	\$101.0	\$790.3	\$58.7
Indiana	\$1,243.0	\$71.0	\$1,420.9	\$81.1	\$316.9	\$18.1
Iowa	\$130.0	\$5.0	\$199.4	\$7.6	\$158.9	\$6.1
Kansas	\$132.3	\$7.7	\$125.7	\$7.3	\$148.4	\$8.6
Kentucky	\$671.1	\$42.9	\$508.5	\$32.5	\$177.7	\$11.3
Louisiana	\$143.8	\$8.2	\$150.4	\$8.6	\$218.5	\$12.5
Maine	\$8.1	\$0.5	\$11.2	\$0.7	\$20.7	\$1.3
Maryland	\$207.2	\$27.8	\$240.7	\$32.3	\$451.4	\$60.6
Massachusetts	\$330.8	\$35.2	\$351.6	\$37.4	\$540.5	\$57.5
Michigan	\$4,556.5	\$232.5	\$2,859.1	\$145.9	\$567.1	\$28.9
Minnesota	\$281.1	\$20.9	\$321.2	\$23.8	\$334.2	\$24.8
Mississippi	\$241.3	\$9.7	\$125.0	\$5.0	\$103.8	\$4.2
Missouri	\$484.6	\$24.4	\$350.3	\$17.7	\$306.5	\$15.5
Montana	\$6.5	\$0.2	\$9.4	\$0.2	\$17.3	\$0.4
Nebraska	\$66.7	\$2.3	\$124.6	\$4.4	\$95.6	\$3.4
Nevada	\$72.8	\$0.0	\$107.2	\$0.0	\$197.6	\$0.0
New Hampshire	\$26.8	\$0.0	\$39.5	\$0.0	\$72.8	\$0.0
New Jersey	\$547.4	\$54.6	\$506.5	\$50.5	\$774.8	\$77.2
New Mexico	\$8.5	\$0.2	\$12.3	\$0.2	\$22.6	\$0.4
New York	\$1,387.6	\$169.4	\$1,442.9	\$176.1	\$1,504.4	\$183.6
North Carolina	\$399.4	\$25.6	\$522.5	\$33.5	\$463.3	\$29.7
North Dakota	\$11.4	\$0.1	\$16.5	\$0.2	\$30.5	\$0.4
Ohio	\$2,110.3	\$176.7	\$2,055.9	\$172.1	\$627.5	\$52.5
Oklahoma	\$109.2	\$4.8	\$131.2	\$5.8	\$216.4	\$9.6
Oregon	\$72.6	\$3.4	\$131.8	\$6.2	\$201.5	\$9.5
Pennsylvania	\$653.7	\$48.3	\$836.3	\$61.7	\$800.9	\$59.1
Rhode Island	\$7.9	\$0.7	\$10.8	\$0.9	\$19.8	\$1.7
South Carolina	\$340.0	\$17.0	\$312.3	\$15.7	\$198.1	\$9.9
South Dakota	\$8.6	\$0.0	\$12.7	\$0.0	\$23.4	\$0.0
Tennessee	\$660.0	\$0.0	\$564.0	\$0.0	\$272.0	\$0.0
Texas	\$1,011.0	\$0.0	\$911.0	\$0.0	\$1,526.0	\$0.0
Utah	\$45.6	\$1.4	\$118.3	\$3.7	\$127.1	\$3.9
Vermont	\$2.7	\$0.1	\$3.8	\$0.2	\$7.0	\$0.4
Virginia	\$358.0	\$31.0	\$529.2	\$45.8	\$521.8	\$45.2
Washington	\$77.0	\$0.0	\$130.0	\$0.0	\$317.0	\$0.0
West Virginia	\$107.4	\$5.6	\$104.5	\$5.5	\$82.7	\$4.3
Wisconsin	\$445.1	\$33.9	\$527.8	\$40.2	\$328.9	\$25.1
Wyoming	\$1.9	\$0.0	\$2.8	\$0.0	\$5.2	\$0.0
Total	\$21,538.6	\$1,367.2	\$20,346.5	\$1,330.5	\$18,265.9	\$1,174.1

Source: Center for Automotive Research 2014

Comparison of 2013 Data to 2010 Data

The income tax estimates for the 2012 tax study were based on CAR’s 2010 economic contribution study, which assumed an industry at typical levels of production rather than an industry in the midst of a major recession. As a result, the “2010” estimates are actually higher than the 2013 estimates, which come from a model that attempts to accurately estimate the actual economic contribution of 2013. Because the industry had largely recovered from the recession, but had not yet returned to pre-recession levels of production and employment, the 2013 numbers are lower than those presented in the 2010 paper. The federal total in 2013 was \$60.2 billion compared to the \$68.9 billion in 2010 and the state total in 2013 was \$3.9 billion compared to \$4.1 billion in 2010.

Figure 4: Estimated Income Taxes Paid in the United States, 2010 and 2013



Note: Income tax estimates include taxes on direct, intermediate, and spin-off workers. The 2010 income tax data were based on 2008 employment levels.

Source: Center for Automotive Research 2014

SECTION 3: VEHICLE USE TAXES, LICENSES, AND FEES

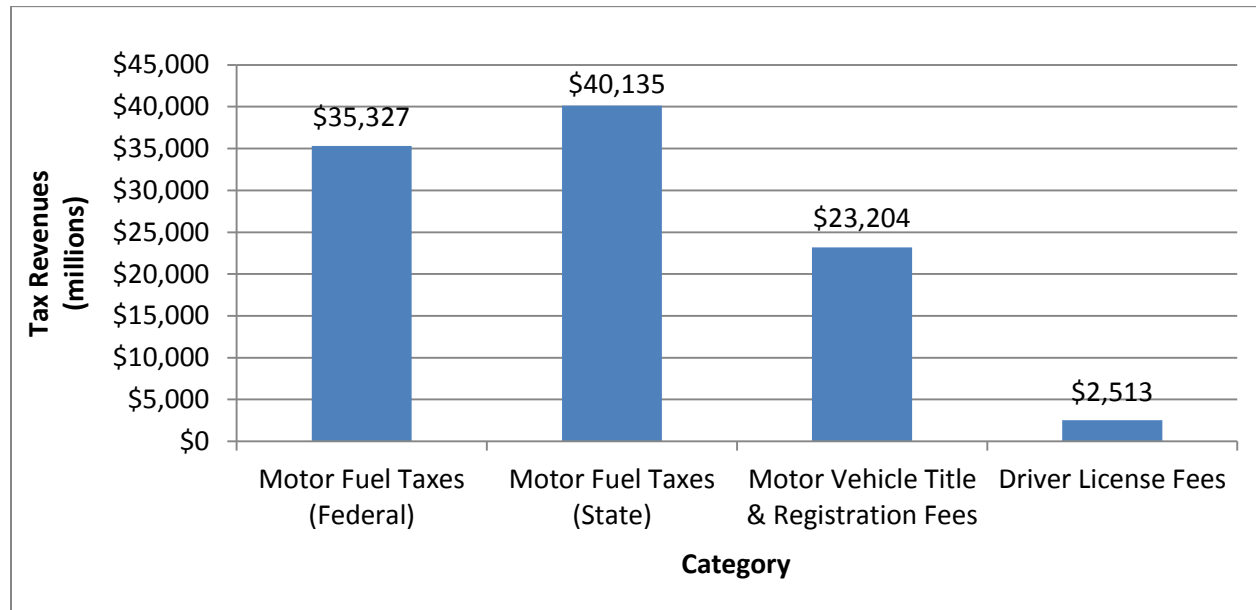
For this section government sources were used to document revenues for various use taxes and fees, including motor fuel taxes, motor vehicle registration fees, and driver license fees.¹¹ These data were aggregated to the national level and is displayed in Table 7 and Figure 5. State level data can be found in Table 8.

Table 7: Use Tax Revenues, Federal 2012 and State 2013

Category	Revenues (millions)
Motor Fuel Taxes (State)	\$40,134.5
Motor Fuel Taxes (Federal)	\$35,326.8
Motor Vehicle Registration Fees (State)	\$23,203.9
Driver License Fees (State)	\$2,513.3
Total State	\$65,951.7
Total Federal	\$35,326.8

Sources: U.S. Census 2013, Office of Highway Policy Information 2013

Figure 5: Use Tax Revenues, 2013



Sources: U.S. Census 2013, Office of Highway Policy Information 2013

¹¹ Ibid. Census 2013.

OHPI (2013). "Highway Statistics 2012." Office of Highway Policy Information, Federal Highway Administration, U.S. Department of Transportation. <<http://www.fhwa.dot.gov/policyinformation/statistics.cfm>>.

The streams of income measured in this section provide combined revenue of nearly \$66.0 billion. The bulk of the revenue came from motor fuel taxes, which brought in more than \$40.1 billion. Motor vehicle title and registration fees brought in another \$23.2 billion and driver license fees provided more than \$2.5 billion to state revenues.

Table 8: Use Tax Revenues by State, 2013

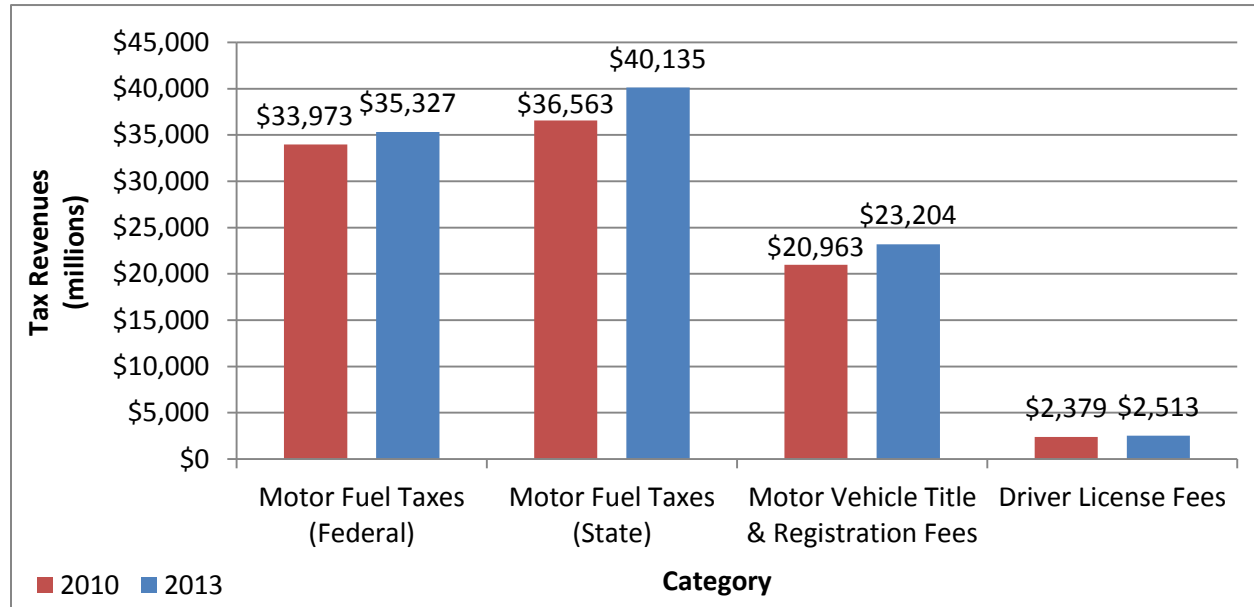
State	Motor Fuel Taxes (millions)	Motor Vehicle Title & Registration Fees (millions)	Driver License Fees (millions)
Alabama	\$530,244,000	\$204,960,000	\$21,031,000
Alaska	\$41,608,000	\$58,822,000	\$0
Arizona	\$781,426,000	\$193,816,000	\$29,620,000
Arkansas	\$455,914,000	\$149,982,000	\$17,486,000
California	\$5,492,850,000	\$3,579,253,000	\$311,239,000
Colorado	\$626,619,000	\$462,676,000	\$30,945,000
Connecticut	\$483,881,000	\$209,745,000	\$42,607,000
Delaware	\$112,616,000	\$51,237,000	\$5,712,000
Florida	\$2,332,191,000	\$1,227,158,000	\$203,842,000
Georgia	\$1,000,626,000	\$457,490,000	\$49,334,000
Hawaii	\$92,516,000	\$175,341,000	\$389,000
Idaho	\$244,738,000	\$133,204,000	\$11,403,000
Illinois	\$1,259,834,000	\$1,584,922,000	\$103,140,000
Indiana	\$803,376,000	\$336,161,000	\$218,479,000
Iowa	\$440,365,000	\$540,619,000	\$14,237,000
Kansas	\$415,352,000	\$205,760,000	\$21,256,000
Kentucky	\$838,344,000	\$184,760,000	\$16,050,000
Louisiana	\$583,025,000	\$105,963,000	\$12,178,000
Maine	\$237,675,000	\$107,906,000	\$10,728,000
Maryland	\$740,556,000	\$450,618,000	\$34,569,000
Massachusetts	\$651,375,000	\$381,189,000	\$107,398,000
Michigan	\$1,001,570,000	\$934,136,000	\$56,343,000
Minnesota	\$860,833,000	\$668,947,000	\$44,130,000
Mississippi	\$412,966,000	\$151,627,000	\$37,793,000
Missouri	\$701,078,000	\$266,955,000	\$17,039,000
Montana	\$216,155,000	\$149,104,000	\$9,067,000
Nebraska	\$297,483,000	\$95,343,000	\$6,200,000
Nevada	\$297,387,000	\$162,250,000	\$21,729,000
New Hampshire	\$143,132,000	\$92,324,000	\$12,603,000
New Jersey	\$524,557,000	\$615,425,000	\$53,515,000
New Mexico	\$235,375,000	\$168,125,000	\$3,528,000
New York	\$1,634,932,000	\$1,377,900,000	\$145,008,000
North Carolina	\$1,893,576,000	\$581,590,000	\$112,726,000
North Dakota	\$211,700,000	\$113,651,000	\$5,135,000
Ohio	\$1,704,594,000	\$714,947,000	\$82,767,000
Oklahoma	\$434,719,000	\$649,232,000	\$15,517,000
Oregon	\$498,778,000	\$512,729,000	\$39,447,000
Pennsylvania	\$2,046,738,000	\$837,215,000	\$61,907,000
Rhode Island	\$94,191,000	\$66,202,000	\$4,991,000
South Carolina	\$520,501,000	\$210,000,000	\$9,449,000
South Dakota	\$142,364,000	\$66,660,000	\$3,739,000
Tennessee	\$834,999,000	\$270,469,000	\$46,945,000
Texas	\$3,228,437,000	\$1,934,422,000	\$132,626,000
Utah	\$373,242,000	\$195,363,000	\$19,207,000
Vermont	\$106,840,000	\$69,563,000	\$7,410,000
Virginia	\$910,038,000	\$452,626,000	\$62,311,000
Washington	\$1,194,910,000	\$509,854,000	\$91,739,000
West Virginia	\$408,914,000	\$2,456,000	\$105,877,000
Wisconsin	\$968,338,000	\$452,850,000	\$40,610,000
Wyoming	\$70,986,000	\$80,385,000	\$2,298,000
Total	\$40,134,464,000	\$23,203,932,000	\$2,513,299,000

Source: U.S. Census 2013

Comparison of 2013 Data to 2010 Data

As can be seen in Figure 6, between 2010 and 2013, revenues from fuel excise taxes, title and registration fees, and driver license fees all increased (2-5 percent compound annual growth rate). Appendix B contains further discussion on the increases in fuel tax revenues.

Figure 6: Use Tax Revenues, 2010 and 2013



Sources: U.S. Census 2013, Office of Highway Policy Information 2013, Hill et al. 2010

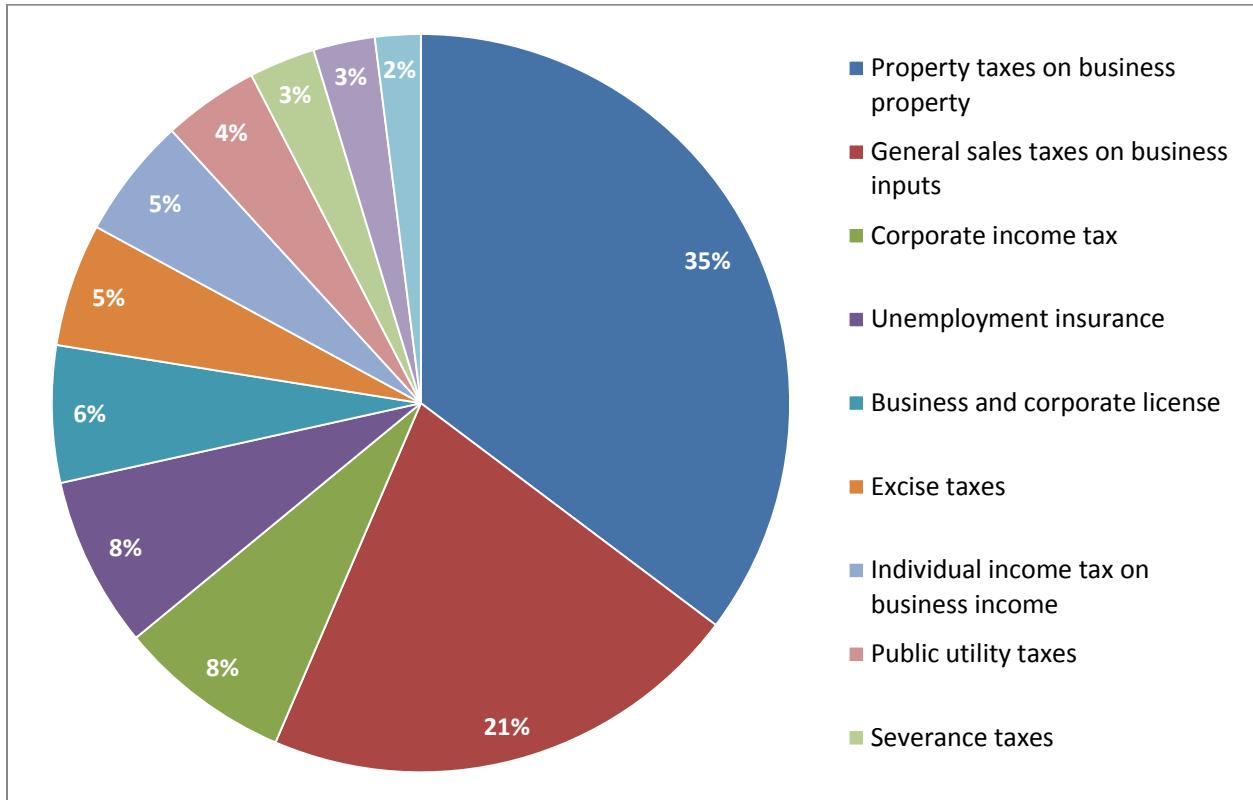
The previous CAR tax study published in 2012 used an estimate of \$29 billion for 2010 highway excise taxes. That estimate was obtained from a January 2011 Congressional Budget Office (CBO) report.¹² The CBO document also estimated that 2013 highway excise taxes would be \$36 billion. The federal motor fuel tax data in Figure 6 is from Office of Highway Policy Information (OHPI) revenue reports, which documented federal motor fuel excise tax collections of nearly \$34 billion in 2010 and more than \$35 billion in 2013.

The discrepancy between the CBO estimate and the revenue report from OHPI for 2010 fuel excise tax revenues could possibly be due to the use of preliminary data in the 2011 CBO document, the use of different metrics for calculating highway excise taxes, or some other methodological difference. The OHPI publications are a more direct report of federal fuel excise tax revenue data.

¹² CBO. (2011). "Table 4-7: CBO's Projections of Other Sources of Revenues (Billions of Dollars)." *The Budget and Economic Outlook: Fiscal Years 2011 to 2021*. Congressional Budget Office. Page 101. January 2011. <http://www.cbo.gov/sites/default/files/01-26_fy2011outlook.pdf>.

SECTION 4: BUSINESS TAXES

Figure 7: State Tax Revenues from Businesses by Type of Tax, 2012



Source: Phillips et al. 2013

As outlined by Ernst and Young and shown in Figure 7 above, there are 11 main types of tax revenues states collect from businesses.¹³ This section of the report provides estimates for two of the categories – corporate income tax and corporate license fees – paid by automakers, parts suppliers, and dealerships. These estimates can be seen aggregated in Table 9 and by state in Table 10.

Table 9: Total Estimated State Corporate Income Tax and License Fees, 2013

Industry Sector	Corporate Income Taxes and License Fees (millions)
Automakers and Suppliers	\$394,838,578
Dealerships	\$994,986,653
Total	\$1,389,825,231

Source: Phillips et al. 2013

¹³ Phillips, Andrew, Robert Cline, Caroline Sallee, Michelle Klassen, and Daniel Sufanski. (2013). "Total State and Local Business Taxes: State-by-State Estimates for Fiscal Year 2012." Ernst & Young LLP. Prepared for the Council on State Taxation. July 2013. <<http://www.cost.org/workarea/downloadasset.aspx?id=84767>>.

Table 10: Estimated State Corporate Income Taxes and License Fees by State, 2013

State	Corporate Income Taxes and License Fees (millions)	
	Automakers and Suppliers	Dealerships
Alabama	\$14,054,750	\$14,535,950
Alaska	\$42,315	\$2,192,304
Arizona	\$1,017,850	\$27,015,354
Arkansas	\$2,418,943	\$8,826,795
California	\$8,701,343	\$169,168,428
Colorado	\$327,242	\$13,828,514
Connecticut	\$1,134,521	\$15,627,150
Delaware	\$129,525	\$4,909,410
Florida	\$2,073,967	\$62,359,770
Georgia	\$4,320,620	\$29,234,040
Hawaii	\$1,728	\$2,753,312
Idaho	\$312,849	\$5,261,696
Illinois	\$23,942,621	\$59,264,040
Indiana	\$39,748,841	\$23,073,600
Iowa	\$4,226,922	\$17,694,747
Kansas	\$2,443,618	\$9,059,924
Kentucky	\$28,549,407	\$9,132,617
Louisiana	\$542,953	\$15,750,270
Maine	\$67,988	\$6,041,742
Maryland	\$403,767	\$25,379,145
Massachusetts	\$660,274	\$29,425,440
Michigan	\$70,069,213	\$19,934,640
Minnesota	\$3,241,978	\$22,038,632
Mississippi	\$7,515,154	\$5,927,401
Missouri	\$5,703,803	\$19,063,000
Montana	\$66,152	\$4,328,775
Nebraska	\$1,692,330	\$8,638,716
Nevada	\$40,386	\$0
New Hampshire	\$443,166	\$8,826,400
New Jersey	\$767,223	\$47,876,400
New Mexico	\$344,243	\$10,473,392
New York	\$5,083,064	\$65,514,966
North Carolina	\$14,800,051	\$32,612,712
North Dakota	\$724,905	\$3,507,269
Ohio	\$36,209,830	
Oklahoma	\$2,589,696	\$24,649,680
Oregon	\$1,065,733	\$11,316,888
Pennsylvania	\$6,165,092	\$62,498,839
Rhode Island	\$28,901	\$4,049,100
South Carolina	\$10,272,209	\$10,281,700
South Dakota	\$246,677	\$0
Tennessee	\$51,999,201	\$20,271,680
Texas	\$24,465,904	
Utah	\$2,186,763	\$7,123,600
Vermont	\$215,750	\$3,312,881
Virginia	\$2,134,971	\$23,803,560
Washington	\$61,133	
West Virginia	\$1,504,062	\$6,030,640
Wisconsin	\$10,073,568	\$22,371,536
Wyoming	\$5,376	\$0
Total	\$394,838,578	\$994,986,653

Note: The table does not include non-manufacturing operations for automakers and suppliers. Automaker and supplier data are not available for several states where the size of the industry does not meet disclosure requirements.

Sources: U.S. Census 2013, Bureau of Economic Analysis 2013, Center for Automotive Research 2014

Corporate income taxes paid to states by automaker manufacturing operations, parts supply manufacturing operations, and dealerships are estimated to be nearly \$1.4 billion. For manufacturing operations, the state-level Gross Domestic Product (GDP) contributions for each state, for North American Industry Classification System (NAICS) codes 3361 (auto assembly), 3362 (auto body manufacturing and stampings) and 3363 (auto parts manufacturing) were obtained from the Bureau of Economic Analysis.¹⁴ This figure was calculated as a percent of each state’s total gross state product (GSP). The total state revenues collected from corporate income taxes and corporate license fees were next multiplied by the percent of state-level GDP by auto manufacturing relative to the GSP for each state. Figure 8 provides an example of these calculations for greater clarification.

Figure 8: Example of Calculations for Corporate Taxes and License Fees

Column A State	Column B 2012 State Auto Mfg GDP, millions \$	Column C 2012 State GDP, millions \$	Column D Auto Mfg as % State GDP	Column E State Tax Revenue from Corporate Income Taxes, \$1,000s	Column F State Tax Revenue from Corporate Licenses, \$1,000s	Column G Calculation of Taxes Paid by Auto Mfg., \$s	Column H Calculation of License Fees Paid by Auto Mfg., \$s	Corporate Income Taxes & License Fees Paid by Automotive Manufacturers
Alabama	5,133	189,542	2.7081%	382,202	136,786	10,350,439	3,704,311	14,054,750
Kentucky	6,814	177,967	3.8288%	646,875	98,774	24,767,548	3,781,859	28,549,407
Michigan	31,640	416,769	7.5917%	900,667	22,300	68,376,256	1,692,957	70,069,213
Ohio	10,390	548,526	1.8942%	262,226	1,649,423	4,966,999	31,242,831	36,209,830
Tennessee	7,241	280,485	2.5816%	1,256,173	758,051	32,429,359	19,569,843	51,999,201
Texas	7,420	1,463,021	0.5072%	N/A	4,824,007	N/A	24,465,904	24,465,904
Calculation or Source of Data	BEA	BEA	Col B / Col C	Census	Census	(Col D x Col E) x 1,000	(Col D x Col F) x 1,000	Col G + Col H

Sources: U.S. Census 2013, Bureau of Economic Analysis 2013, Center for Automotive Research 2014

The estimate of \$1.4 billion in corporate taxes paid to states is likely an understatement. To obtain a more complete picture of corporate state income taxes, one would have to examine company filings, such as 10-K filings with the U.S. Securities and Exchange Commission (SEC), on a company-by-company basis. As an example, SEC filings for General Motors indicate the company alone paid \$145 million in state and local taxes in 2013, while the CAR estimate of the automotive manufacturing total paid is \$395 million. However, there is a key difference between the CAR estimate and actual, total taxes paid: the figure of \$395 million does not include the non-manufacturing operations for automakers and suppliers. Furthermore, automaker and supplier data is not available for several states where the size of the industry does not meet government disclosure requirements.

¹⁴BEA. (2014). "Gross domestic product (GDP) by state (millions of current dollars)." U.S. Bureau of Economic Analysis. October 2014. <<http://www.bea.gov/itable/iTable.cfm?ReqID=70&step=1#reqid=70&step=1&isuri=1>>.

SECTION 5: EXCLUDED TAX AND FEE REVENUES

In compiling the data to estimate tax revenues across the industry, there were some taxes that the authors could not access or proved to be too difficult to obtain. These revenues are detailed in this section.

Sales taxes generated by non-dealer automotive services or aftermarket retail sales of automotive parts have not been estimated for this study. For instance, sales taxes on work done at independent repair shops, parts purchased from automotive parts stores, and third party used automobile sales were not included in the CAR sales tax estimates.

Another source of tax revenue not compiled in the CAR estimate is the personal property tax,¹⁵ which taxes the value of property other than real estate. This paper does not include personal property taxes because these taxes are collected by many levels of government, such as city, county, or township governments, in addition to state governments, making it cumbersome to collect this data.

Additionally, business property taxes paid by auto industry companies are not estimated in this study. The revenues to states from all business property taxes are approximately 2.5 percent of all state government tax revenues.¹⁶ Because not all states collect property taxes, and property taxes account for more than 2 percent of state tax revenues in only 13 states,¹⁷ the automotive-related business property taxes are fairly insignificant and would not substantially change the results of this study. See Figure 9 below.¹⁸

Property taxes are a significant source of revenue for local governments. However, the U.S. Census Bureau reports that there are approximately 39,000 local government entities within the United States (municipalities, townships, and counties), making it extremely difficult to quantify for this study the full total of automotive property taxes paid.

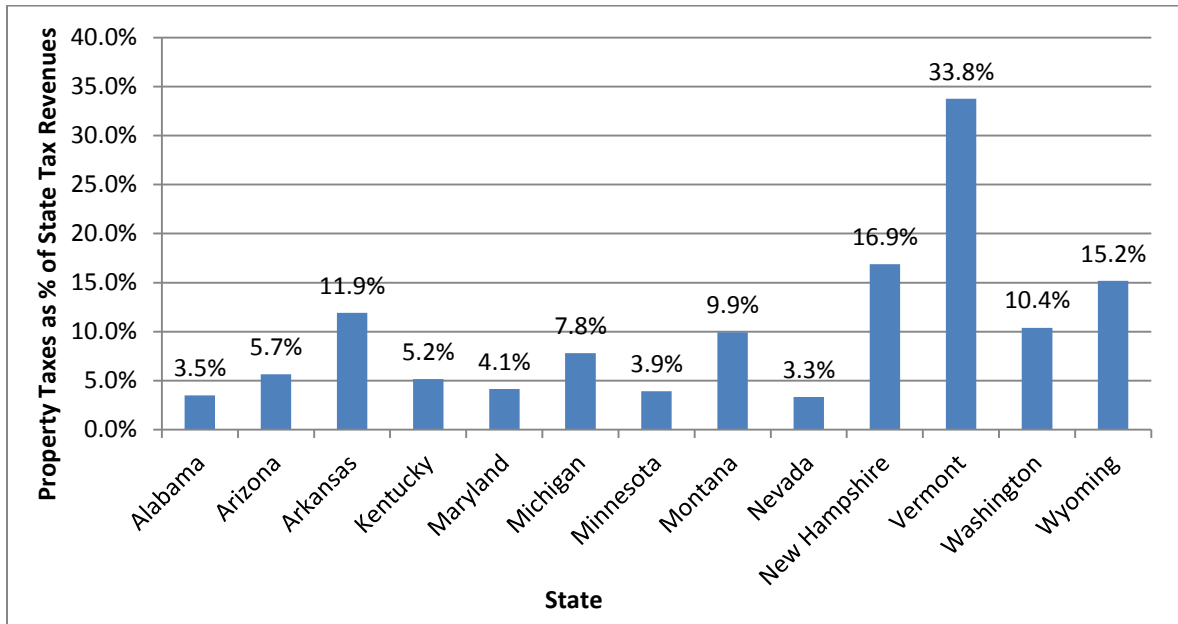
¹⁵ For instance, personal property taxes include motor vehicles, boats, recreational vehicles, and motorcycles. Within the United States, personal property taxes for motor vehicles vary widely from state to state and even county to county. Some states, such as Kentucky and Louisiana, assess automotive personal property at the state level. A number of other states, including Missouri, New Hampshire, and South Carolina, assess personal property taxes at the county level, or through other local governments. Also, a sizeable number of states, including Delaware, New Mexico and Pennsylvania have no personal property tax for automobiles. Some states choose to assess an excise tax rather than personal property tax. Still other states assess personal property taxes in general, but exempt cars from this tax (for example, Ohio).

¹⁶ O'Sullivan, Sheila, Russell Pustejovsky, Edwin Pome, Angela Wongus, and Jesse Willhide. (2014). "State Government Tax Collections Summary Report: 2013." G13-STC. April 8, 2014. <<http://www2.census.gov/govs/statetax/2013stcreport.pdf>>.

¹⁷ Census. (2014). "State Government Tax Collections by Category: 2013 - United States – States." 2013 Annual Survey of State Government Tax Collections. U.S. Census, Department of Commerce. April 8, 2014. <<https://www.census.gov/govs/statetax/>>.

¹⁸ Note: This estimate does not include property taxes paid by individuals. Ibid. Phillips et al. 2013.

Figure 9: Portion of State Revenues Constituted by Property Tax Revenues, 2013



Source: U.S. Census 2014

SECTION 6: TOTAL ESTIMATED TAX CONTRIBUTION

After estimating the tax revenue provided by the automotive industry across a variety of sources, CAR researchers have calculated that the tax revenue contribution of the automotive sector in 2013 was at least \$110.0 billion in state government tax revenue and \$95.5 billion in federal government tax revenue. As a result of the pervasive nature of the automotive sector, the industry generates tax revenues for every state government in the nation. CAR researchers found that state tax revenues from the automotive sector constituted a significant portion of total state revenues, as they averaged 13 percent of total state tax revenues nationally. A state level account of all of the estimates used in this report can be seen in Table 11 at the end of this section.

At the state level, the figures produced in this report can be considered a lower-bound estimate for the automotive sector's contribution to state government tax revenues. The lower-bound nature of this estimate is due to the fact that some types of revenue were not counted in this report, such as corporate income taxes on the non-manufacturing operations of automakers and parts supply companies, personal property taxes, and miscellaneous business taxes. These various taxes and fees account for additional revenues above those estimated and are beyond the scope of this report. The \$110.0 billion in state government tax revenue that was estimated in this report breaks down into the following categories:

- \$38.9 billion was generated from taxes on the sales and service of new and used vehicles.
- \$3.9 billion was generated from income taxes on direct, intermediate, and spin-off employment at auto manufacturers, auto parts suppliers, and dealerships.
- \$66.0 billion was generated from use taxes and fees including fuel taxes, registration fees, and driver licensing fees.
- \$1.4 billion was generated from business taxes such as corporate income taxes and business license fees.

Similarly, the scope of this work limited the types of federal tax revenues provided by the automotive industry that could be estimated in this study. The automotive industry's was responsible for 3.4 percent of federal revenues in 2013. Of the at least \$96.0 billion in 2013 federal government tax revenue that the automotive industry was responsible for generating:

- \$60.2 billion was generated from income taxes on direct employment at auto manufacturers, auto parts suppliers, and dealerships.
- \$35.3 billion was generated from federal motor fuel taxes.

This study demonstrates that the U.S. automotive sector has a large contribution throughout the nation. The industry provides support to state and federal governments in the form of taxes and fees collected from consumers, employees, drivers, and the auto companies themselves, representing a diverse set of revenue sources. Economic forecasts from CAR indicate that U.S. automotive sales, production, and employment will increase over the next several years as the economy and automotive industry continue to recover. If these forecasted trends are realized in the coming years, tax revenues generated by the automotive sector could increase to even greater levels than those calculated in this report.

Table 11: Total of All Estimated Taxes and Fees by State

State	Sales Tax Revenues (\$ millions)			Use Tax Revenues (\$ millions)			Business Taxes (\$ millions)		State and Local Employee Personal Income Taxes (\$ millions)			TOTAL ALL TAXES PAID TO STATE GOVERNMENTS (\$ millions)		
	New Vehicles	Used Vehicles	Parts/ Services	Fuel	Registration	License	Manufacturers	Dealerships	Automaker	Supplier	Dealer	AUTO SECTOR	TOTAL	% AUTO
Alabama	116	64	47	530	205	21	14	15	19	16	9	1,056	9,266	11
Alaska	0	0	0	42	59	0	0	2	0	0	0	103	5,133	2
Arizona	564	309	135	781	194	30	1	27	3	4	14	2,062	13,472	15
Arkansas	239	131	45	456	150	17	2	9	6	8	6	1,069	8,586	12
California	3,725	2,042	757	5,493	3,579	311	9	169	78	81	194	16,438	133,184	12
Colorado	225	123	46	627	463	31	0	14	8	9	19	1,564	11,246	14
Connecticut	343	188	70	484	210	43	1	16	37	48	56	1,494	16,137	9
Delaware	55	30	0	113	51	6	0	5	8	12	21	301	3,346	9
Florida	1,766	968	359	2,332	1,227	204	2	62	0	0	0	6,921	34,588	20
Georgia	0	0	103	1,001	457	49	4	29	34	30	31	1,738	17,794	10
Hawaii	46	25	9	93	175	0	0	3	0	0	0	351	6,093	6
Idaho	111	61	22	245	133	11	0	5	0	0	0	589	3,579	16
Illinois	1,012	555	206	1,260	1,585	103	24	59	112	101	59	5,076	38,715	13
Indiana	524	287	106	803	336	218	40	23	71	81	18	2,508	16,931	15
Iowa	0	0	56	440	541	14	4	18	5	8	6	1,092	8,374	13
Kansas	215	118	45	415	206	21	2	9	8	7	9	1,055	7,620	14
Kentucky	250	137	51	838	185	16	29	9	43	32	11	1,602	10,816	15
Louisiana	229	125	46	583	106	12	1	16	8	9	12	1,147	9,224	12
Maine	104	57	19	238	108	11	0	6	1	1	1	545	3,884	14
Maryland	479	263	97	741	451	35	0	25	28	32	61	2,211	18,118	12
Massachusetts	597	327	121	651	381	107	1	29	35	37	58	2,345	23,901	10
Michigan	517	284	105	1,002	934	56	70	20	232	146	29	3,395	25,083	14
Minnesota	379	208	82	861	669	44	3	22	21	24	25	2,338	21,032	11
Mississippi	155	85	44	413	152	38	8	6	10	5	4	919	7,403	12
Missouri	334	183	68	701	267	17	6	19	24	18	15	1,652	11,141	15
Montana	0	0	0	216	149	9	0	4	0	0	0	380	2,645	14
Nebraska	165	91	34	297	95	6	2	9	2	4	3	709	4,719	15
Nevada	205	113	42	297	162	22	0	0	0	0	0	841	7,027	12
New Hampshire	0	0	0	143	92	13	0	9	0	0	0	257	2,370	11
New Jersey	966	530	196	525	615	54	1	48	55	50	77	3,116	29,077	11
New Mexico	66	36	23	235	168	4	0	10	0	0	0	544	5,202	10
New York	958	525	195	1,635	1,378	145	5	66	169	176	184	5,436	73,667	7
North Carolina	368	202	118	1,894	582	113	15	33	26	33	30	3,412	23,769	14
North Dakota	91	50	19	212	114	5	1	4	0	0	0	495	5,299	9
Ohio	883	484	172	1,705	715	83	36	0	177	172	53	4,479	27,331	16
Oklahoma	347	190	97	435	649	16	3	25	5	6	10	1,781	8,893	20
Oregon	0	0	0	499	513	39	1	11	3	6	9	1,082	9,161	12
Pennsylvania	974	534	198	2,047	837	62	6	62	48	62	59	4,890	33,966	14
Rhode Island	82	45	17	94	66	5	0	4	1	1	2	317	2,940	11
South Carolina	59	59	65	521	210	9	10	10	17	16	10	986	8,721	11
South Dakota	48	26	13	142	67	4	0	0	0	0	0	300	1,534	20
Tennessee	567	311	115	835	270	47	52	20	0	0	0	2,218	12,367	18
Texas	2,528	1,386	514	3,228	1,934	133	24	0	0	0	0	9,748	51,714	19
Utah	174	95	45	373	195	19	2	7	1	4	4	920	6,329	15
Vermont	62	34	13	107	70	7	0	3	0	0	0	297	2,879	10
Virginia	412	226	105	910	453	62	2	24	31	46	45	2,316	19,187	12
Washington	515	282	100	1,195	510	92	0	0	0	0	0	2,694	18,667	14
West Virginia	112	61	27	409	2	106	2	6	6	5	4	740	5,378	14
Wisconsin	367	201	75	968	453	41	10	22	34	40	25	2,236	16,523	14
Wyoming	31	17	6	71	80	2	0	0	0	0	0	208	2,186	9
Total	21,997	12,084	4,831	40,134	23,204	2,513	395	995	1,367	1,331	1,174	110,025	846,215	13

Source: Center for Automotive Research 2014

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APPENDIX A: ABBREVIATIONS

AAM – Alliance of Automobile Manufacturers

AIAM – Association of International Automobile Manufacturers

BEA – Bureau of Economic Analysis

CAR – Center for Automotive Research

FHWA – Federal Highway Administration

GDP – Gross Domestic Product

I-O – Input-Output

MEMA – Motor & Equipment Manufacturers Association

NADA – National Automotive Dealers Association

NAICS – North American Industry Classification System

OHPI – Office of Highway Policy Information

REMI – Regional Economic Models, Inc.

RGDP – Real Gross Domestic Product

VMT – Vehicle Miles Traveled

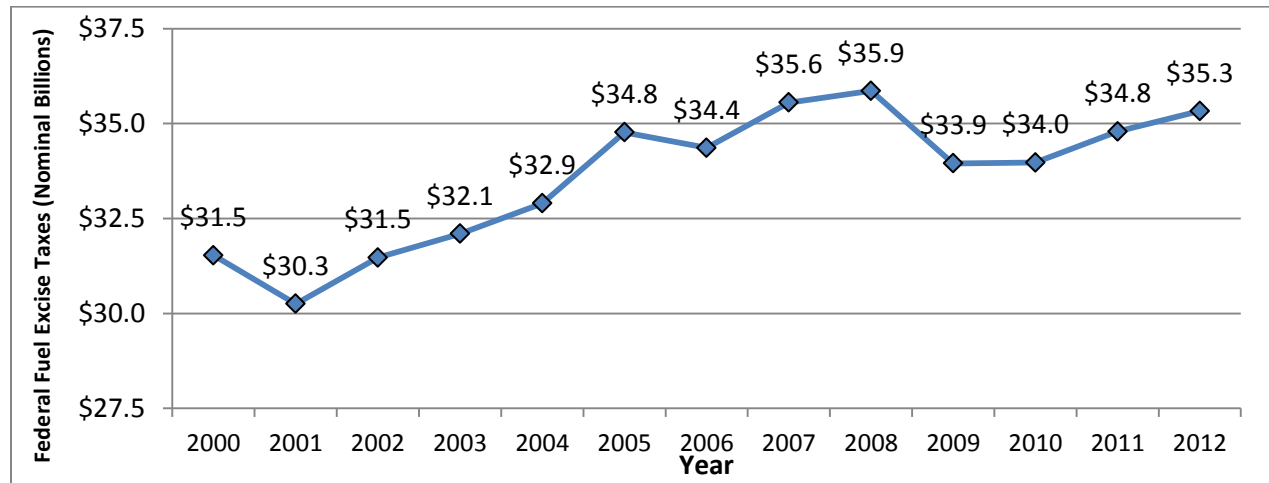
APPENDIX B: FUEL TAXES AND CONSUMPTION

This appendix further details the quantification and trends of fuel tax revenues and fuel consumption. Federal fuel excise tax rates have remained constant while vehicles are being driven fewer miles and getting higher fuel economy, which should lead to lower tax revenues from fuel excise taxes. At the same time, annual federal fuel tax revenues have increase since 2008, creating a quandary as to how these contradictory circumstances are possible.

Federal Fuel Excise Tax Revenue Data Used

Official data about federal excise taxes on fuel is available from the Office of Highway Policy Information (OHPI), an office within the Federal Highway Administration (FHWA). While data are not yet available for 2013 revenues, in 2012, federal taxes on gasoline, diesel, and special motor fuels totaled \$35.3 billion. The 2012 figure is an increase from the \$33.9 billion collected in 2010.¹⁹ While the federal fuel excise tax revenues have increased since 2009, as of the end of 2012, even in nominal terms, tax revenues had not returned to their previous 2008 high of \$35.9 billion. Figure B1 displays federal fuel excise tax revenues from 2000 to 2012.

Figure B1: Federal Excise Taxes on Gasoline, Diesel, and Specialty Motor Fuels, 2000-2012



Source: Office of Highway Policy Information 2001-2013

The previous CAR tax study that was published in 2012 used an estimate of \$29 billion for highway excise taxes in 2010, which was obtained from a January 2011 Congressional Budget Office (CBO) report.²⁰ The CBO document also estimated that 2013 highway excise taxes would be \$36 billion. The discrepancy between the two government data sources for the 2010 amount could possibly be due to the use of preliminary data in the 2011 CBO document, potentially the use of a different metric for calculating highway excise taxes, or some other difference. In any

¹⁹ OHPI. (2001-2013). "Table FE-10: Status of the Federal Highway Trust Fund – 2000-2012." *Office of Highway Policy Information Highway Statistics Series* (Years 2000-2012). Office of Highway Policy Information, Federal Highway Administration U.S. Department of Transportation. Accessed October 20, 2014. <<https://www.fhwa.dot.gov/policyinformation/statistics.cfm>>.

²⁰ CBO. (2011). "Table 4-7: CBO's Projections of Other Sources of Revenues (Billions of Dollars)." *The Budget and Economic Outlook: Fiscal Years 2011 to 2021*. Congressional Budget Office. Page 101. January 2011. <http://www.cbo.gov/sites/default/files/01-26_fy2011outlook.pdf>.

case, the OHPI publications are a more direct source of federal fuel excise tax data revenues and should be preferred over CBO projections.

The Mystery of Increasing Federal Fuel Excise Tax Revenues

The federal government reports that receipts from motor vehicle fuel excise taxes increased by more than \$1 billion from 2010 to 2012. This presents a puzzle, as vehicle miles traveled (VMT) has been trending sideways, while fuel efficiency has been increasing. Federal fuel excise tax rates have remained unchanged since 2005, when the gasohol excise tax exemption of 5.2 cents per gallon was replaced by an equivalent tax credit, due to the *American Jobs Creation Act of 2004*.²¹ Recent revenue increases cannot be attributed to changes in tax rates.

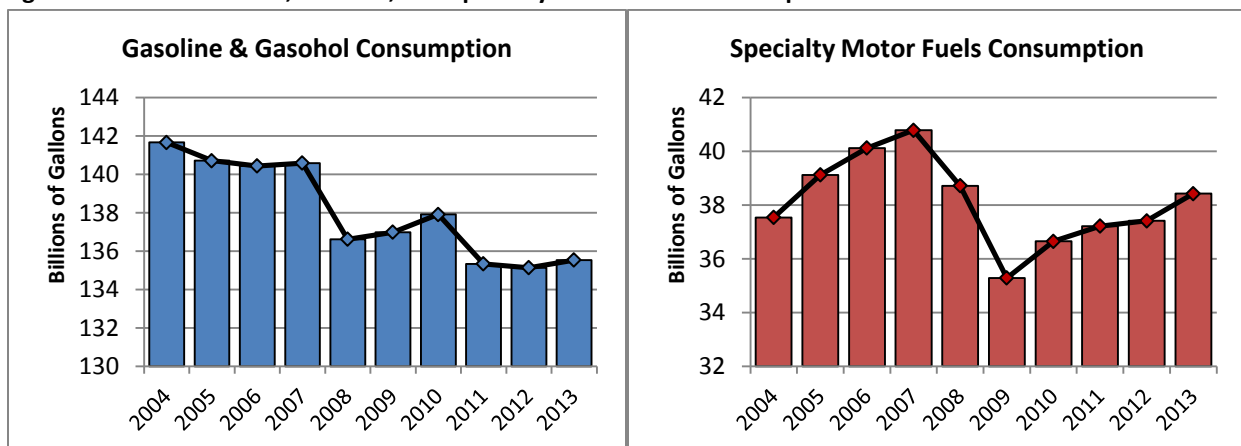
Table B1: Federal Tax Rates on Motor Fuels

Fuel	Cents per Gallon	Date of Effect
Gasoline	18.4	10/1/1997
Diesel	24.4	10/1/1997
Liquefied Petroleum Gas	13.6	10/1/1997
Gasohol	18.4	1/1/2005

Source: Office of Highway Policy Information 2013

Reviewing other data, this quandary remains. The *Monthly Motor Fuel Reported by States* series indicates a decrease in consumption of gasoline and gasohol of nearly 2.8 billion gallons, though increased consumption of specialty fuels (such as diesel and liquefied petroleum gas) amounted to more than 760 million gallons. The data do not break out the different specialty fuels; however, even if all specialty fuels were taxed at the diesel rate of 24.4 cents per gallon, federal fuel tax collections in 2012 would remain below the 2010 level.²²

Figures B2 & B3: Gasoline, Gasohol, and Specialty Motor Fuels Consumption



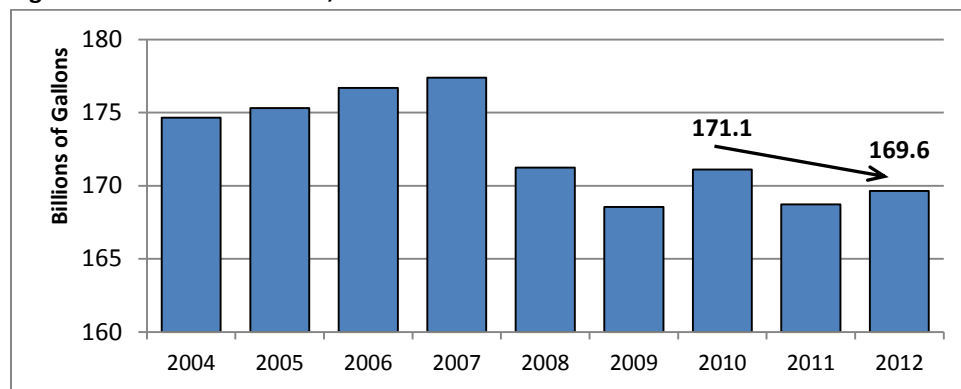
Source: Office of Highway Policy Information 2014

²¹ Lazzari, S. (2005). "Alcohol fuels tax incentives after the 2004 reforms." The Library of Congress, Congressional Research Service. (July 2005). Accessed via PolicyArchive <<http://www.policyarchive.org/handle/10207/2489>>.

²² OHPI. (2014). "Monthly Motor Fuel Reported by States." Various years. Office of Highway Policy Information, Federal Highway Administration U.S. Department of Transportation. Accessed October 20, 2014. <http://www.fhwa.dot.gov/policyinformation/motorfuelhwy_trustfund.cfm>.

Likewise, data from the OHPI *Highway Statistics* series show a 1.46 billion gallon decrease in net gallons of motor fuels taxed, from 2010 to 2012. Nonetheless, other *Highway Statistics* data report an increase in motor fuel excise tax collections from 2010 to 2012. Depending on the particular table referenced, this increase totals either \$1.35 billion or nearly \$2 billion.²³

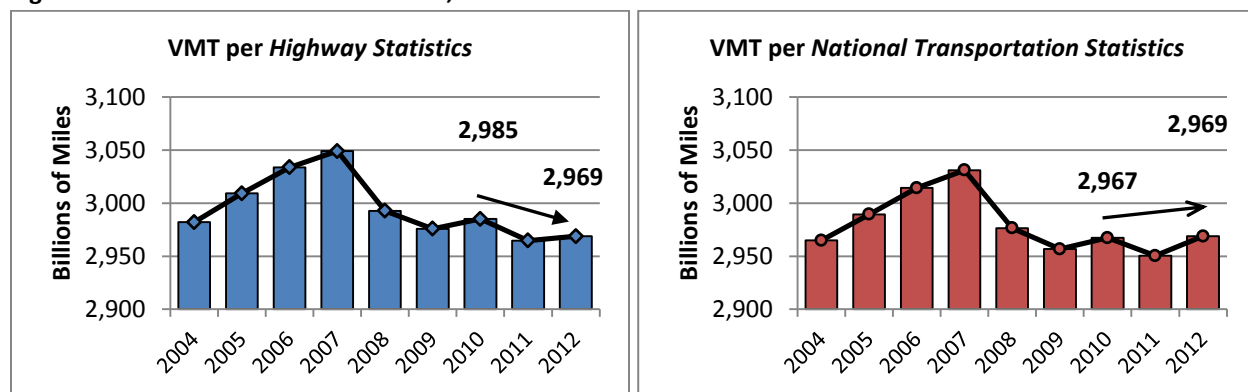
Figure B4: Net Gallons Taxed, 2004-2012



Source: Office of Highway Policy Information 2013

Other data are also in conflict. The *2012 Highway Statistics* indicates that VMT decreased by more than 16 billion miles from 2010 to 2012, yet *National Transportation Statistics* reports that VMT increased by approximately 1.55 billion miles from 2010 to 2012. Further confusing the matter, the same source indicates a dramatic decrease in fuel consumption, with fleet fuel economy increasing by 0.22 miles per gallon, and consumption of motor fuels falling by more than 2 billion gallons.

Figures B5 & B6: Vehicle Miles Traveled, 2004-2012



Sources: Office of Highway Policy Information 2013, Bureau of Transportation Statistics 2014

Counter to expectations, the federal government reports that motor vehicle fuel excise tax revenues have increased over the last few years. Reviewing data related to the calculation of those taxes largely aligns with a priori knowledge, suggesting that revenues should instead be

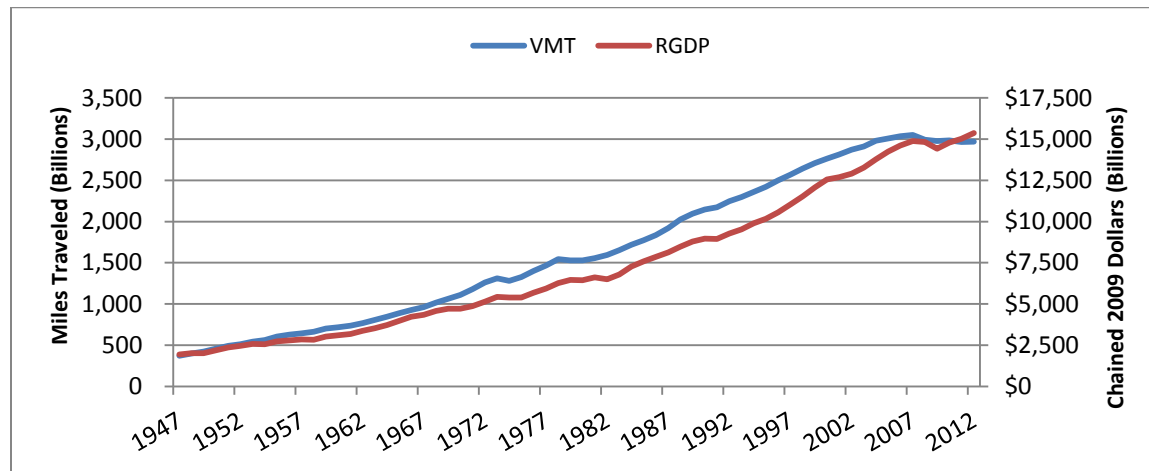
²³ OHPI. (2011 & 2013). "Tables FE-10 and FE-210." *Office of Highway Policy Information Highway Statistics Series* (Years 2010 & 2012). Office of Highway Policy Information, Federal Highway Administration U.S. Department of Transportation. Accessed October 20, 2014. <<https://www.fhwa.dot.gov/policyinformation/statistics.cfm>>.

decreasing. The mystery of the reported increase in motor fuel excise tax revenues remains unraveled.

Further Discussion of VMT Trends

Historically, annual VMT in the United States grew at a steady pace, reliably following the course of economic growth. However, around 2004 a divergence occurred. Initially, this was expressed as a slight decrease in the additional VMT per new dollar of real GDP (RGDP). This separation has become particularly pronounced since 2009, as VMT is trending sideways, while the economy again grows. This change has led many to proclaim the end of the motor vehicle's dominant role in American society. Below, Figures B7 and B8 illustrate the long-term trend, and the recent separation, respectively.

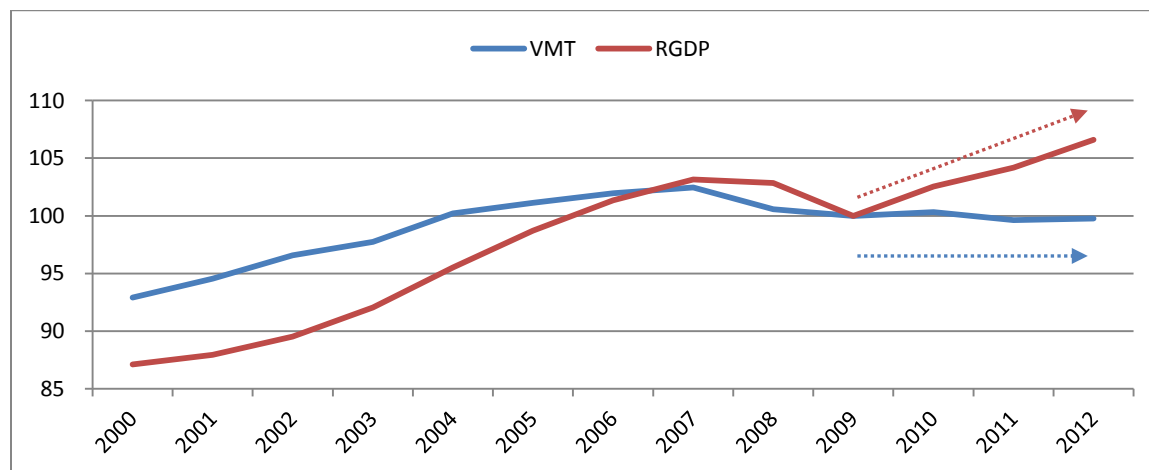
Figure B7: Vehicle Miles Traveled and Real Gross Domestic Product, 1947-2012



Note: The use of chained dollars is a method of adjusting real dollar amounts for inflation over time. Chained dollars accounts for inflation using a basket of goods that changes annually, as opposed to constant dollars, which account for inflation using an unchanging basket of goods.

Sources: Office of Highway Policy Information 2013, Federal Reserve Bank of St. Louis 2014

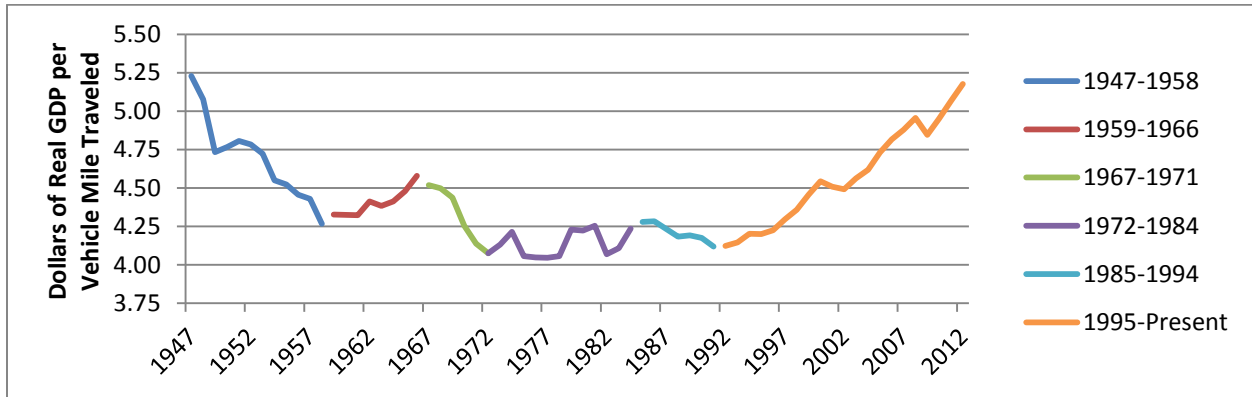
Figure B8: Indices of Vehicle Miles Traveled and Real Gross Domestic Product (2009=100), 2000-2012



Sources: Office of Highway Policy Information 2013, Federal Reserve Bank of St. Louis 2014

Before making bold assertions, such as the end of the motor vehicle, it is important to view these changes within a broader context. Review of Figure B8 shows that VMT and real GDP have not always followed an identical path. Rather, the specific relationship of these variables has changed several times throughout the post-war period. Examining the ratio of real GDP to VMT presents an image of volatility. Further analysis suggests the existence of multiple regimes throughout the history of this relationship.

Figure B9: Dollars of Real GDP per Vehicle Miles Traveled



Sources: Office of Highway Policy Information 2013, Federal Reserve Bank of St. Louis 2014

Figure B9 illustrates how the relationship between VMT and Real GDP has evolved over time. Throughout the period covered by available data, the dollars-per-mile-traveled ratio has seldom remained steady. From 1947 through 1958 this ratio trended downwards sharply, before reversing course from 1959 through 1966. From 1967 through 1971 the ratio rapidly decreased. From 1972 through 1984, the relationship cycled between increases and decreases, trending sideways overall. The ratio of real GDP to VMT again fell, though slightly, from 1985 through 1994. In the present era, 1995 through 2012, the ratio has continuously increased, slowing or falling only slightly during the recessions of 2001 and 2008-2009. The 2012 value, at 5.176 dollars of real GDP per vehicle mile traveled, nearly matches the earliest value recorded, 5.229 in 1947.

While the relationship between VMT and real GDP has existed within a fairly narrow band – approximately 4.05 to 5.23 dollars of real GDP per mile traveled – over the 66 years for which data are available, it has not been so constant as conventional wisdom may suggest. Rather, the relationship has changed several times, with analysis suggesting six regimes. Additionally, when viewed in this manner, the early 2000s do not represent a new divergence, but a continuation of a trend begun a decade before.