

State Notes

TOPICS OF LEGISLATIVE INTEREST

Summer 2019



Motor Fuel Prices, Motor Fuel Taxes, and Transportation Revenues By David Zin, Chief Economist and Michael Siracuse, Fiscal Analyst

Introduction

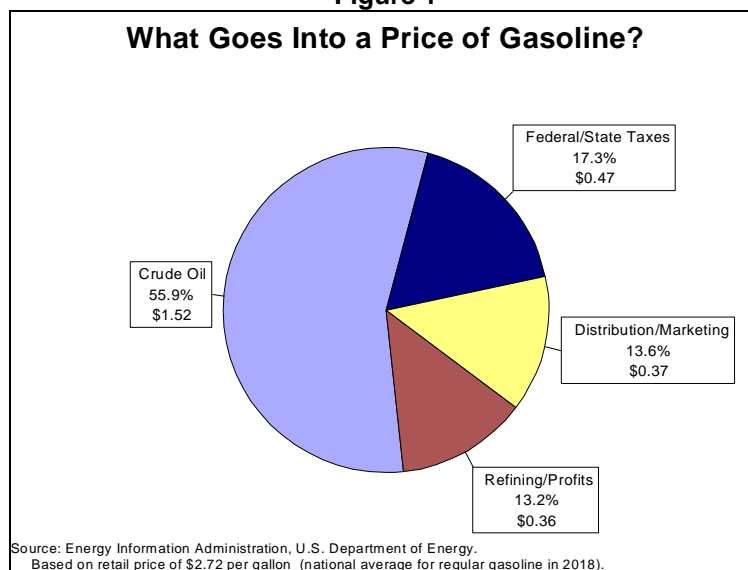
Motor fuel prices and road funding have been perennial issues even before President Eisenhower authorized the construction of the United States interstate system in 1956. The marked rise in fuel prices after the Organization of Petroleum Exporting Countries (OPEC) 1973 oil embargo generated a new round of concerns about motor fuel prices that eventually resulted in permanently changing the American perception of vehicle fuel economy. While the Federal gas tax was not used to support road funding until the Highway Trust Fund was created in 1956, motor fuel taxes at both the state and Federal level now are generally regarded as representing a "user fee" to help fund road construction and repair. Despite the support these taxes have provided, the quality of transportation infrastructure has declined across the country. In Michigan, Governor Whitmer's Fiscal Year (FY) 2019-20 Budget Recommendation offered the latest gubernatorial proposal to address road quality. This Notes Article will briefly discuss motor fuel prices, motor fuel taxes and other taxes levied on the sale of motor fuels, and the history of transportation funding.

Motor Fuel Prices

As of July 2, 2019, the price of a gallon of regular gasoline in the United States averaged \$2.73, up from \$2.71 the day before, and \$2.67 the week before, but down from the month-prior average of \$2.82 and the year-ago price of \$2.86. As these figures suggest, the price of motor fuels is volatile. While the range of prices just listed illustrates swings of about 7.1% in the price of gasoline, larger swings are not atypical. For example, during the four weeks from October 29, 2018, to November 26, 2018, the price of gas fell 14.5%, while during the four weeks between November 28, 2016, and December 26, 2016, the price increased 15.0%.

Volatile fuel prices primarily reflect fluctuations in manufacturing and distribution costs, but also perceived expectations of fuel supply and demand in both local, national, and global markets, as well as virtually nonexistent "menu costs" (the cost to a firm for changing their prices, discussed below) associated with changing prices. Figure 1 illustrates the major components of the cost of a gallon of gasoline nationally. In 2018, the price of crude oil represented approximately 56% of the price of a gallon of gas, with refining costs and profits, distribution and marketing, and Federal and state taxes roughly equally splitting the remaining cost. As will be discussed later, tax rates on motor fuels do not change frequently, so the volatility in motor fuel prices reflects swings in the other components--and swings in the price of oil will tend to dominate swings in refining and distribution costs because the price of crude represents four times the share of the total price of those other factors.

Figure 1

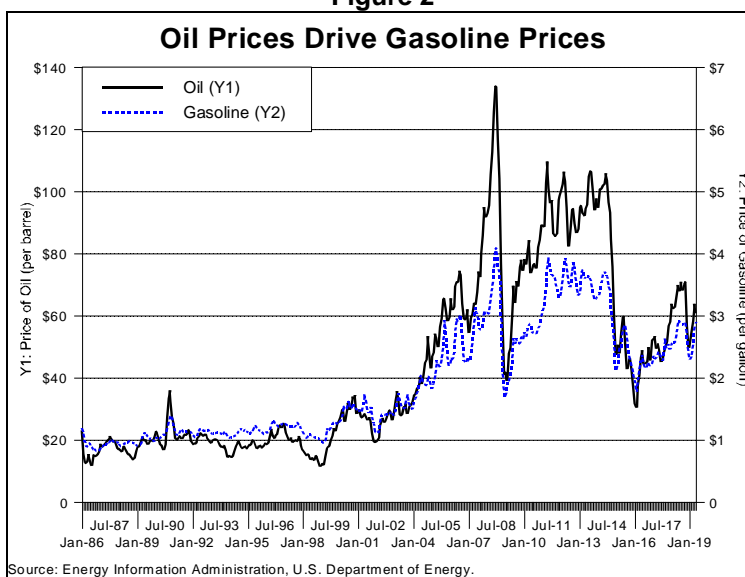


Oil prices and fuel prices reflect both current supply and demand, as well as expectations of supply and demand in the future. Refinery outages or pipeline closures, whether due to routine repairs/maintenance or accidents, can significantly affect supply, especially at the local and regional level (just as holidays can affect demand). Expectations also affect fuel prices. For example, if global economic growth is expected to increase in the near future or OPEC announces planned output limits, fuel prices will rise as firms try to acquire supply at current prices. Similarly, announcements of excess production/supply or slowing global economic growth will lower prices as producers anticipate greater supply or lower demand.

Markets for both oil and gasoline trade daily, and prices fluctuate constantly. While these fluctuations are true for all commodities, motor fuel retailers are in a unique position relative to other retailers in their ability to change prices in response to these fluctuations. A department store that has tagged all of their apparel with prices, or a restaurant that has printed menus (thus the term "menu costs"), will incur substantial costs if items are repriced as the price of cotton or food changes daily. However, fuel retailers face little in the way of costs to reprice fuel; fuel retailers literally type in a number for the pump and change the price on their marquee, which causes retail prices for fuel to exhibit much of the same volatility seen in commodity markets.

Despite the daily volatility in oil and fuel prices, long-term trends do exist and frequently exhibit prolonged periods of relative stability. [Figure 2](#) illustrates monthly averages for crude oil prices and retail gasoline prices over the last 33 years, since January 1986. As countries become more developed, their energy demands substantially increase. As a result, the rise of "newly industrialized countries", particularly Brazil, Russia, India and China, has substantially increased global energy demands and helped substantially increase the prices of oil and gasoline between 1999 and 2008. The global slowdown in growth that occurred during the Great Recession of 2008-2009 pushed oil prices lower, while the relatively weak growth seen globally since 2010 has combined with increased oil production (particularly by the United States) to create some relative stability in oil prices--although at much higher levels than during the 1980s.

Figure 2

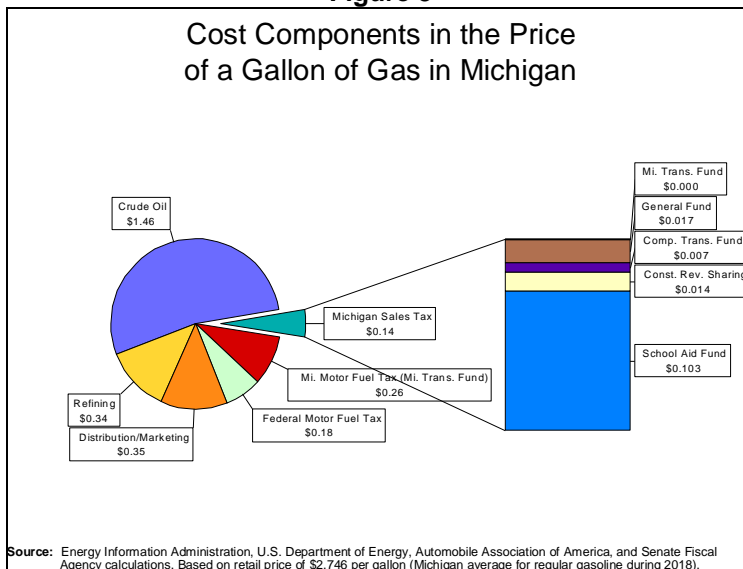


Motor Fuel Taxes

In Michigan, three taxes are included in the retail price of gasoline: the Federal gasoline tax (18.4 cents per gallon), the Michigan sales tax (levied at a rate of 6.0% on a base that includes the Federal tax), and the Michigan gasoline tax (26.3 cents per gallon). The same three taxes are included in the retail price on diesel, although the Federal diesel fuel tax rate is 24.4 cents per gallon. As shown in [Figure 3](#), during 2018 the price for gasoline in Michigan averaged \$2.746 per gallon, implying that \$1.459 represented the price of crude oil, \$0.355 represented marketing and distribution costs, \$0.344 represented refining and profits,

\$0.263 represented the Michigan gasoline tax, \$0.184 represented the Federal gasoline tax, and \$0.141 represented the Michigan sales tax.

Figure 3



Michigan first enacted a fuel tax in 1925, at a rate of two cents per gallon. Two years later, in 1927, the rate was increased to three cents per gallon. Michigan's diesel fuel tax was adopted in 1947, at a rate of five cents per gallon. Most states tax motor fuels with a per unit tax, such as the 26.3 cents per gallon levied by Michigan. The last three times Michigan changed the tax on gasoline were 1984 (when it was raised to 15 cents per gallon), 1997 (19 cents per gallon), and 2017 (26.3 cents per gallon). One difficulty with per-unit taxes is that the taxes rarely automatically adjusted each year for inflation. As a result, changes in the tax rate require legislative action and until that action occurs, the inflation-adjusted value of the revenue generated from the tax will decline. The 2015 legislation that increased Michigan's tax rate to 26.3 cents per gallon in 2017 also included provisions to begin annual inflationary adjustments (lesser of inflation or 5%) in the tax rate beginning January 1, 2022.

Compared to other states, [Table 1](#) shows Michigan's gasoline tax ranked 27th in 2019 and was lower than any other Great Lakes state. Michigan is one of nine states (including the Great Lakes states of Illinois and Indiana) that also levies sales tax on motor fuel. When sales taxes are incorporated to form a combined gasoline tax and fuel tax rate, Michigan ranks 10th. However, because of the interplay of different factors that affect the price of gasoline, high tax rates do not necessarily equate to comparatively high retail prices for gasoline. As of the week of July 23, 2019, Michigan's retail price of gasoline ranked 16th, below several states with lower combined state sales and gasoline tax rates. For example, Arizona's tax rate ranks 44th, while the retail price of gasoline ranks 13th. In contrast, Nevada's tax rate ranks 36th but the retail price ranks fourth. Similarly, Florida's tax rate ranks eighth, but the retail price ranks 30th, while West Virginia's tax rate ranks fifth and the retail price ranks 26th. While some high tax states, such as California, Connecticut, and Illinois do exhibit high retail prices, and some low tax states, such as Mississippi, New Hampshire, and New Mexico, also exhibit comparatively lower retail prices, tax rates have a relatively loose, although positive, correlation with prices.¹ The variation in the wholesale price (which excludes taxes) across states further indicates that other factors such as transportation costs, regional cost of living variations and inflation, and local market determinants of supply and demand play major roles in retail price differences across states.

¹ Using the July 23, 2019, data, the correlation was 0.46, where 1.00 means perfectly correlated, and 0.00 means no correlation whatsoever, and in a simple regression of retail price against a constant and the combined state tax rate, the equation explained less than 20% of the variation in prices.

Table 1

State Gasoline Taxes and Prices, 2019									
State	Gasoline Tax Rate (cents/gallon)	Rank	State* Sales Tax (effective cents/gallon)	Combined State Rates (cents/gallon)	Rank	Wholesale Price of Gas 2018	Rank	Retail Price of Gas 07/23/2019	Rank
Alabama	18.000	46		18.000	47	1.829	45	\$2.410	48
Alaska	8.950	50		8.950	50		N/A	3.173	6
Arizona	19.000	43		19.000	44	2.058	7	2.809	13
Arkansas	21.800	39		21.800	40	1.866	37	2.429	47
California	53.300	2	6.982	60.282	1	2.303	1	3.706	1
Colorado	22.000	38		22.000	39	1.962	10	2.672	29
Connecticut	46.677	4		46.677	6	1.929	14	2.893	10
Delaware	25.580	30		25.580	31	1.906	18	2.534	40
Florida	32.025	15	13.187	45.212	8	1.877	31	2.650	30
Georgia	27.500	25	9.135	36.635	13	1.843	42	2.650	30
Hawaii	16.000	49	13.481	29.481	27		N/A	3.665	2
Idaho	33.000	13		33.000	18	2.130	2	2.921	8
Illinois	39.100	6	15.506	54.606	3	1.880	26	3.027	7
Indiana	30.000	20	16.021	46.021	7	1.846	40	2.749	19
Iowa	30.500	19		30.500	23	1.885	23	2.606	36
Kansas	25.500	31		25.500	32	1.868	35	2.530	41
Kentucky	26.000	28		26.000	30	1.895	19	2.613	35
Louisiana	20.125	40		20.125	41	1.847	39	2.404	49
Maine	30.000	20		30.000	24	1.980	9	2.717	24
Maryland	36.700	8		36.700	12	1.887	22	2.690	27
Massachusetts	24.000	32		24.000	33	1.908	17	2.751	17
Michigan	26.300	27	14.275	40.575	10	1.865	38	2.785	16
Minnesota	28.600	24		28.600	28	1.874	33	2.636	33
Mississippi	18.400	45		18.400	46	1.868	35	2.386	50
Missouri	17.400	47		17.400	48	1.883	24	2.537	39
Montana	32.000	16		32.000	20	2.009	8	2.801	15
Nebraska	30.600	18		30.600	22	1.888	21	2.619	34
Nevada	23.805	35		23.805	36	2.124	3	3.268	4
New Hampshire	23.825	34		23.825	35		N/A	2.641	32
New Jersey	41.400	5		41.400	9	1.880	26	2.809	13
New Mexico	18.875	44		18.875	45	1.942	12	2.593	37
New York	25.750	29	10.106	35.856	15	1.931	13	2.885	11
North Carolina	36.450	9		36.450	14	1.833	43	2.564	38
North Dakota	23.000	36		23.000	37	1.924	15	2.689	28
Ohio	38.500	7		38.500	11	1.844	41	2.705	25
Oklahoma	20.000	41		20.000	42	1.879	28	2.468	45
Oregon	34.000	12		34.000	17	2.099	5	3.174	5
Pennsylvania	57.600	1		57.600	2	1.882	25	2.918	9
Rhode Island	35.000	11		35.000	16		N/A	2.751	17
South Carolina	22.750	37		22.750	38	1.832	44	2.450	46
South Dakota	30.000	20		30.000	24	1.895	19	2.734	22
Tennessee	27.400	26		27.400	29	1.827	46	2.510	44
Texas	20.000	41		20.000	42	1.879	28	2.521	42
Utah	30.000	20		30.000	24	2.096	6	2.868	12
Vermont	31.190	17		31.190	21	1.917	16	2.744	21
Virginia	16.200	48		16.200	49	1.879	28	2.516	43
Washington	49.400	3		49.400	4	2.108	4	3.309	3
West Virginia	35.700	10	13.285	48.985	5	1.875	32	2.704	26
Wisconsin	32.900	14		32.900	19	1.870	34	2.734	22
Wyoming	24.000	32		24.000	33	1.947	11	2.747	20
U.S. Federal/Avg.	18.400			18.400		1.937		\$3.515	

*Note: In states with local sales tax, local sales taxes are not included in the rate. Also excludes other nonsales tax fees and taxes, such as petroleum fees, leaking underground storage tank taxes, environmental or inspection fees and taxes, and other nonsales tax related taxes and fees.

Sources: Federation of Tax Administrators, Automobile Association of America, U.S. Energy Information Administration, Senate Fiscal Agency (SFA) calculations



Consumers' reactions to significant upward swings in the price of motor fuel can be found in everything from public discussions to legislative proposals to provide price relief to vehicle consumption patterns. These reactions occur despite the relatively small share of expenditure that spending on motor fuels, let alone motor fuel taxes, represents for individual consumers. According to the Bureau of Labor Statistics' Consumer Expenditures Survey, the average consumer unit spending on gasoline and motor oil averages 3.3% of total spending and varies between roughly 3.5% for low income units (in general terms, usually a household) to 2.0% for high income units. (By way of comparison, consumer spending on entertainment averages 5.3% of expenditures, food away from home averages 5.6%, and telephone services average 2.3%). In 2016, average fuel efficiency for the U.S. motor vehicle fleet was 22 miles per gallon, and the average number of miles driven was 13,500 miles per year. At a retail price of \$2.75 (the average price in 2018), these figures equate to the average household spending \$1,687.50 on gasoline and \$161.39 on Michigan fuel taxes per year.

Table 2 provides a history of motor fuel taxes and sales taxes on motor fuels from FY 1997-98 through FY 2017-18. The taxes Michigan levies on motor fuel sales are governed by constitutional provisions. Article IX, Section 9 of the Michigan Constitution requires all specific taxes, except for general sales and use taxes and regulatory fees, that are imposed directly or indirectly on fuels sold to propel motor vehicles upon highways to be used exclusively for transportation purposes. As a result, 100% of Michigan's motor fuel taxes are directed to the Michigan Transportation Fund. Similarly, Article IX, Section 11 requires that 60% of the sales taxes at a rate of 4.0%, and 100% of the sales and use taxes at a rate of 2.0%, be directed to the School Aid Fund. The 100% of the sales and use taxes at a rate of 2.0% was created by Proposal A, which fundamentally restructured the way Michigan funded schools. Section 10 of Article IX also requires that 15% of sales tax collections at a rate of 4% be distributed to cities, villages, and townships on a per capita basis (constitutional revenue sharing).

In addition to the constitutional restrictions on the taxes levied on motor fuels, there are at least two statutory restrictions. First, Michigan Compiled Laws (MCL) 205.75 requires that not less than 27.9% of 25% of the sales collections at a rate of 4% levied on motor fuel, motor vehicles, and vehicle parts and accessories, be deposited into the Comprehensive Transportation Fund. Second, MCL 141.911 and MCL 141.913 combined to earmark 21.3% of all sales tax collections at a rate of 4.0% for statutory revenue sharing to counties, cities, villages, and townships. Because this second earmark does not direct revenue to a separate/specific fund, and statutory revenue sharing is subject to annual appropriation, this second restriction generally is not recognized as binding. With the exception of FY 2000-01, statutory revenue sharing has never received the full 21.3% of sales tax collections levied at a 4.0% rate. Any sales tax revenue from motor fuels that is not constitutionally or statutorily restricted is directed to the General Fund.

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Table 2
Revenue History for Select Michigan Transportation Taxes/Fees and Sales Taxes on Motor Fuel
 (millions of dollars)

Fiscal Year	Gasoline Tax Revenue	Diesel Tax Revenue	Total Motor Fuel Tax Revenue	Percent Change	Vehicle Registration Taxes	Percent Change	Combined Fuel Taxes & Registration Fees	Percent Change	Total Sales Taxes on Motor Fuel	Percent Change	Sales Taxes on Fuel Not Constitutionally Earmarked	Total Sales Tax Revenue	Sales Tax on Motor Fuel Share of Total Sales Tax
1998	\$904.5	\$118.4	\$1,022.9	---	\$665.3	---	\$1,688.2	---	\$277.2	---	\$46.2	\$5,617.3	4.9%
1999	931.7	134.7	1,066.4	4.3%	710.2	6.7%	1,776.6	5.2%	315.0	13.6%	52.5	5,901.7	5.3
2000	923.0	144.1	1,067.1	0.1	755.2	6.3	1,822.2	2.6	446.6	41.8	74.4	6,277.5	7.1
2001	934.4	133.7	1,068.1	0.1	778.2	3.1	1,846.3	1.3	454.9	1.9	75.8	6,352.3	7.2
2002	939.7	143.4	1,083.1	1.4	827.7	6.4	1,910.8	3.5	378.1	(16.9)	63.0	6,441.2	5.9
2003	936.2	157.3	1,093.5	1.0	845.3	2.1	1,938.8	1.5	463.5	22.6	77.3	6,422.6	7.2
2004	932.7	140.8	1,073.5	(1.8)	934.3	10.5	2,007.8	3.6	514.0	10.9	85.7	6,473.5	7.9
2005	922.8	146.7	1,069.5	(0.4)	866.3	(7.3)	1,935.7	(3.6)	655.8	27.6	109.3	6,599.1	9.9
2006	906.7	149.0	1,055.7	(1.3)	870.4	0.5	1,926.1	(0.5)	792.7	20.9	132.1	6,638.1	11.9
2007	884.0	144.1	1,028.1	(2.6)	874.7	0.5	1,902.8	(1.2)	789.3	(0.4)	131.5	6,552.2	12.0
2008	849.2	140.4	989.6	(3.7)	857.9	(1.9)	1,847.5	(2.9)	1,025.1	29.9	170.9	6,773.3	15.1
2009	846.3	117.9	964.3	(2.6)	842.4	(1.8)	1,806.7	(2.2)	634.2	(38.1)	105.7	6,089.1	10.4
2010	842.0	120.3	962.3	(0.2)	844.9	0.3	1,807.2	0.0	757.0	19.4	126.2	6,176.8	12.3
2011	832.0	125.9	957.9	(0.5)	862.5	2.1	1,820.4	0.7	978.7	29.3	163.1	6,710.9	14.6
2012	818.8	126.8	945.6	(1.3)	878.9	1.9	1,824.5	0.2	1,019.3	4.1	169.9	6,955.2	14.7
2013	822.0	129.2	951.1	0.6	909.4	3.5	1,860.6	2.0	1,030.4	1.1	171.7	7,050.2	14.6
2014	821.0	138.1	959.1	0.8	943.5	3.8	1,902.6	2.3	1,018.3	(1.2)	169.7	7,362.6	13.8
2015	867.0	137.0	1,004.0	4.7	981.2	4.0	1,985.2	4.3	762.6	(25.1)	127.1	7,247.0	10.5
2016	873.3	137.8	1,011.1	0.7	1,021.8	4.1	2,032.9	2.4	619.1	(18.8)	103.2	7,299.6	8.5
2017	1,142.6	215.7	1,358.3	34.3	1,213.1	18.7	2,571.4	26.5	677.2	9.4	112.9	7,791.8	8.7
2018	1,219.8	246.4	1,466.2	7.9	1,297.9	7.0	2,764.1	7.5	802.1	18.4	133.7	8,074.0	9.9

Sources: Comprehensive Annual Financial Report, Michigan Department of Technology, Management and Budget; Automobile Association of America; Senate Fiscal Agency calculations.

Transportation Revenue

The constitutional restriction directing motor fuel taxes to transportation purposes reflects the idea that both motor fuel taxes and transportation funding generally follow a "user fee" model for government funding. Taxes can be categorized along on a spectrum that ranges from "user fees", where the tax or fee is not paid unless the payer partakes of the good or service (and rise as more of the good or service is consumed), or "ability to pay" where the public nature of government activities is funded from those who pay according to specified provisions, regardless of the payer's consumption levels. Transportation funding in Michigan is heavily based on the "user fee" approach, as not only are motor fuel taxes exclusively directed to transportation purposes, but vehicle registration fees are as well. Combined motor fuel taxes and vehicle registration fees accounted for approximately 76% of the State-funded portion of the FY 2017-18 Department of Transportation Budget, and 85% in FY 2012-13 (before the State started adding significant revenue from the General Fund to the Transportation budget). The overwhelming majority of the remaining non-General Fund State revenue in the Transportation budget also reflects "user fee" revenues, such as the aviation fuel tax and bridge tolls from the Blue Water Bridge. Furthermore, while the Federal Highway Trust Fund, which provides the majority of Federal revenue in the Transportation budget, has been supplemented by general Federal revenues in recent years, the overwhelming majority of Federal revenue also reflects "user fee" revenue such as Federal motor fuel taxes.

Table 3 illustrates state and local road spending, both in total and for capital outlay (i.e. road construction), on a per-person basis in 2016. Because states differ in how responsibilities and funding for roads are allocated between the state and local units, data are shown for both combined state and local spending and for spending by the state. Regardless of the measure, Michigan ranks near or at the bottom among states in road funding on a per-person basis. Table 4 presents data from a different source, that compares state-level capital outlay spending in both 2016 and 2017 (after road funding increases based on the 2015 legislation took effect) on both a per-person basis and lane-mile basis. The data confirm Michigan's low rank for road funding on a per-person basis. However, when the number of lane-miles are taken into account Michigan ranks nearer to the national average, particularly after the increases in 2017.

While Table 3 illustrates that Michigan ranks low even when state and local road funding are combined, Table 5 highlights how Michigan splits transportation revenue between the state and local level. When both grants-in-aid and direct spending by the state for local units is accounted for, Michigan ranks third nationally in the amount of revenue directed to local roads, and accounts for nearly 6.0% of the nation's state resources directed to local roads (despite having roughly 3.0% of the nation's population). If these data were adjusted on a population basis, Michigan would rank first in the amount of state funding directed to local roads. Michigan's low rank in Table 3 reflects low spending per person, even on a combined state and local basis. However, Michigan's high ranking in Table 5 reflects that compared to other states, Michigan directs a larger share of its road funding to local units. Essentially Table 3 indicates the size of the "pie" spent on road funding, while Table 5 illustrates the rank on how that pie is split between state roads and local roads.

As mentioned above, the "user fees" for transportation funding historically have not adjusted for inflation. The rate for the Federal gasoline tax, which rose to 18.4 cents per gallon in 1993, is not adjusted to inflation. Michigan motor fuel taxes will not automatically adjust to inflation until 2022. Michigan's vehicle registration fees, the other major source of transportation revenue, only adjust for inflation indirectly; the fees are at set dollar amounts, but depend upon the list price for the automobile when it is first registered. As a result, the fixed value of the registration will rise as the list price of vehicles increases, but that adjustment will only apply to the new vehicles registered each year. For the existing vehicle fleet, the fees decline 10% each year for three years after the vehicle purchase and then remain fixed for the remaining life of the vehicle. Thus, whether total registration fee revenue keeps pace with inflation will depend on a complex mix of changes in vehicle prices, vehicle sales patterns (both the total stock of vehicles as well as replacement rates), and the mix of vehicles registered or purchased (for example, if buying patterns shift to more expensive or less expensive vehicles).

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Table 3

State and Local Highway Spending, Per Person, 2016								
State	State & Local, Combined				State Only			
	Total	Rank	Capital Outlay	Rank	Total	Rank	Capital Outlay	Rank
Alabama	\$498	37	\$253	36	\$332	27	\$217	28
Alaska	2,134	2	1,201	2	1,739	1	1,009	1
Arizona	354	50	194	47	209	45	142	43
Arkansas	580	20	324	19	395	18	270	16
California	437	41	164	50	195	48	83	48
Colorado	521	30	225	42	247	42	136	45
Connecticut	573	22	283	28	372	22	238	25
Delaware	798	11	559	5	630	6	500	4
District of Columbia	517	31	309	23	-	-	-	-
Florida	470	39	309	24	332	26	256	19
Georgia	401	45	247	38	249	40	184	35
Hawaii	541	27	257	35	318	31	118	46
Idaho	500	36	269	32	309	33	194	34
Illinois	746	13	502	9	471	13	393	7
Indiana	409	43	243	39	257	39	204	31
Iowa	824	9	476	10	481	12	376	9
Kansas	683	14	374	14	382	21	262	17
Kentucky	623	17	405	12	512	11	374	10
Louisiana	512	33	317	21	329	28	239	24
Maine	766	12	297	26	520	10	252	21
Maryland	566	23	282	29	395	19	277	15
Massachusetts	557	24	284	27	399	17	237	26
Michigan	385	48	149	51	131	50	78	49
Minnesota	904	6	528	6	388	20	249	22
Mississippi	555	26	275	30	320	30	214	29
Missouri	393	47	179	49	203	47	118	47
Montana	830	8	343	16	604	9	286	14
Nebraska	834	7	523	7	468	14	384	8
Nevada	490	38	243	40	212	44	153	41
New Hampshire	532	28	208	44	314	32	156	40
New Jersey	527	29	333	17	358	24	259	18
New Mexico	469	40	251	37	324	29	198	32
New York	598	19	351	15	227	43	163	37
North Carolina	420	42	274	31	358	23	252	20
North Dakota	2,404	1	1,578	1	1,348	2	1,002	2
Ohio	515	32	305	25	297	34	235	27
Oklahoma	653	16	392	13	443	15	313	12
Oregon	511	34	223	43	282	38	138	44
Pennsylvania	815	10	504	8	610	8	463	5
Rhode Island	401	44	226	41	289	36	213	30
South Carolina	399	46	206	45	297	35	158	39
South Dakota	1,214	4	736	3	761	4	622	3
Tennessee	340	51	184	48	207	46	144	42
Texas	503	35	320	20	333	25	244	23
Utah	375	49	197	46	248	41	162	38
Vermont	999	5	413	11	632	5	307	13
Virginia	556	25	259	33	430	16	198	33
Washington	574	21	314	22	284	37	163	36
West Virginia	679	15	328	18	629	7	324	11
Wisconsin	614	18	259	34	191	49	67	50
Wyoming	1,224	3	622	4	831	3	414	6
Total	\$542		\$300		\$325		\$218	

Source: Bureau of the Census, Annual Survey of State and Local Government Finances

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Table 4

State Capital Outlay Spending for State-Owned Public Roads, 2016 and 2017								
State	2016				2017			
	Spending Per Person	Rank	Spending Per Lane Mile	Rank	Spending Per Person	Rank	Spending Per Lane Mile	Rank
Alabama	\$160	39	\$26,256	36	\$162	43	\$26,712	36
Alaska	1,214	1	76,996	11	1,217	1	76,786	10
Arizona	152	42	53,725	13	141	47	50,701	14
Arkansas	310	13	24,555	39	408	6	32,377	30
California	56	50	43,140	21	47	50	36,380	25
Colorado	204	35	49,394	17	171	42	41,760	23
Connecticut	291	19	105,767	5	263	21	95,523	8
Delaware	474	4	37,869	23	531	4	42,720	22
Florida	296	17	138,865	2	271	20	128,442	3
Georgia	127	47	26,786	34	156	44	33,151	29
Hawaii	136	45	78,135	10	206	33	117,929	4
Idaho	178	38	24,310	40	179	40	24,911	38
Illinois	329	11	100,046	7	277	19	84,041	9
Indiana	204	34	49,408	16	196	35	45,898	17
Iowa	297	15	40,880	22	329	10	45,470	18
Kansas	268	21	32,495	26	154	45	18,678	42
Kentucky	373	8	26,702	35	308	11	22,051	40
Louisiana	233	30	27,693	32	246	25	29,282	34
Maine	318	12	24,149	41	382	8	29,091	35
Maryland	235	29	95,588	8	241	27	98,112	7
Massachusetts	156	40	112,401	3	256	24	182,774	2
Michigan	102	49	37,087	24	124	49	45,018	19
Minnesota	254	26	47,975	18	190	37	36,114	26
Mississippi	243	27	25,855	37	288	16	30,597	32
Missouri	125	48	9,772	49	124	48	9,763	50
Montana	428	6	17,707	44	381	9	15,940	44
Nebraska	301	14	25,411	38	285	17	24,204	39
Nevada	206	33	44,012	20	246	26	51,729	13
New Hampshire	179	37	28,571	30	193	36	30,940	31
New Jersey	297	16	307,972	1	259	23	269,841	1
New Mexico	188	36	13,219	47	182	38	12,853	47
New York	218	32	111,951	4	205	34	104,878	6
North Carolina	264	23	15,567	46	299	14	17,782	43
North Dakota	729	2	31,919	27	812	2	35,579	28
Ohio	229	31	53,812	12	206	32	48,566	16
Oklahoma	369	9	47,743	19	405	7	52,376	12
Oregon	133	46	29,311	29	223	29	49,703	15
Pennsylvania	364	10	52,790	14	262	22	38,040	24
Rhode Island	256	25	94,501	9	177	41	65,496	11
South Carolina	149	44	8,193	50	213	31	11,847	48
South Dakota	378	7	18,261	43	302	13	14,696	46
Tennessee	153	41	27,254	33	148	46	26,519	37
Texas	257	24	36,617	25	308	11	44,405	20
Utah	150	43	28,442	31	182	39	35,588	27
Vermont	294	18	30,569	28	288	15	30,012	33
Virginia	240	28	15,756	45	223	28	14,726	45
Washington	265	22	104,206	6	282	18	113,207	5
West Virginia	453	5	11,690	48	450	5	11,513	49
Wisconsin	269	20	52,279	15	221	30	43,037	21
Wyoming	536	3	19,883	42	554	3	20,321	41
Total	\$222		\$38,194		\$220		\$38,003	

Source: Highway Statistics (2016 & 2017 issues), Federal Highway Administration, U.S. Dept. of Transportation

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Table 5

State Expenditures and Grant-in-Aid for Local Roads, 2017

State Expenditures and Grant-in-Aid for Local Roads, 2017								
State	Direct Expenditures by State					Grants-in-Aid to Local Gov't		
	Capital Outlay	Rank	Maintenance	Admin. & Hwy Police	Total	Total	Total	Rank
Alabama	\$71,389	27	\$169,452	\$24,918	\$265,759	\$229,038	\$494,797	18
Alaska	-	-	-	-	-	778	778	48
Arizona	92,333	23	-	1,285	93,618	752,707	846,325	10
Arkansas	-	-	92,362	138,543	230,905	-	230,905	30
California	136,685	16	128,392	1,286	266,363	4,001,215	4,267,578	1
Colorado	150,580	14	-	-	150,580	327,003	477,583	20
Connecticut	-	-	-	-	-	95,076	95,076	38
Delaware	-	-	-	-	-	-	-	-
District of Columbia	339,036	4	10,556	28,332	377,924	-	377,924	24
Florida	179,115	11	-	-	179,115	434,190	613,305	14
Georgia	205,914	10	9,187	-	215,101	240,346	455,447	21
Hawaii	-	-	-	-	-	39,167	39,167	42
Idaho	44,997	28	-	-	44,997	183,180	228,177	31
Illinois	96,400	21	11,940	-	108,340	492,172	600,512	15
Indiana	-	-	73,940	-	73,940	419,584	493,524	19
Iowa	-	-	-	-	-	906,157	906,157	7
Kansas	106,257	19	-	-	106,257	154,501	260,758	27
Kentucky	270,014	7	56,280	3,672	329,966	-	329,966	25
Louisiana	5,259	33	4,041	-	9,300	74,152	83,452	40
Maine	16,989	30	213,589	46,640	277,218	-	277,218	26
Maryland	85,298	24	-	-	85,298	175,102	260,400	28
Massachusetts	219,660	8	1,056	-	220,716	342,985	563,701	17
Michigan	1,347,738	1	-	-	1,347,738	33,000	1,380,738	3
Minnesota	-	-	-	-	-	942,399	942,399	6
Mississippi	127,081	17	-	2,513	129,594	103,201	232,795	29
Missouri	147,789	15	-	-	147,789	277,104	424,893	22
Montana	-	-	-	-	-	27,680	27,680	44
Nebraska	312,458	5	134,384	94,791	541,633	338,764	880,397	9
Nevada	-	-	-	-	-	-	-	-
New Hampshire	-	-	-	255	255	59,802	60,057	41
New Jersey	7,092	31	-	-	7,092	142,116	149,208	33
New Mexico	-	-	-	-	-	26,682	26,682	45
New York	806,913	2	-	12,471	819,384	441,582	1,260,966	4
North Carolina	-	-	-	-	-	147,181	147,181	34
North Dakota	33,702	29	-	3,621	37,323	103,694	141,017	35
Ohio	393,060	3	-	-	393,060	1,146,398	1,539,458	2
Oklahoma	163,319	13	-	1,416	164,735	-	164,735	32
Oregon	97,812	20	13,609	1,343	112,764	457,206	569,970	16
Pennsylvania	214,739	9	-	-	214,739	406,824	621,563	12
Rhode Island	5,741	32	-	121	5,862	1,504	7,366	46
South Carolina	-	-	77,782	433	78,215	53,425	131,640	36
South Dakota	94,815	22	-	-	94,815	-	94,815	39
Tennessee	81,390	25	-	-	81,390	313,537	394,927	23
Texas	280,484	6	-	-	280,484	473,996	754,480	11
Utah	-	-	-	-	-	32,013	32,013	43
Vermont	73,272	26	77	-	73,349	27,453	100,802	37
Virginia	-	-	-	-	-	963,946	963,946	5
Washington	172,585	12	-	30,607	203,192	691,000	894,192	8
West Virginia	-	-	-	-	-	6,394	6,394	47
Wisconsin	124,784	18	-	30,455	155,239	465,070	620,309	13
Wyoming	-	-	-	-	-	-	-	-
Total	\$6,504,700		\$996,647	\$422,702	\$7,924,049	\$16,549,324	\$24,473,373	

Source: Highway Statistics 2017, Federal Highway Administration, U.S. Dept. of Transportation

The lack of inflationary adjustments in the sources of transportation revenue has been compounded by changes in average fuel economy and motor fuel consumption patterns. As new vehicles' fuel efficiency has improved, it has reduced the number of gallons consumers need to purchase in order to travel any given distance. Between 1997 and 2016, light vehicle fuel efficiency (average miles per gallon) increased 11.9%, meaning that for the average vehicle on the road to drive an average of 15,000 miles per year required 761.4 gallons in 1997 but only 680.6 gallons in 2016. As a result, revenue from a flat rate per gallon tax on motor fuel would have declined 10.6% due to improved fuel economy, even without considering the effect of inflation (which increased by 49.5% as measured by the U.S. Consumer Price Index). Significant changes in the price of motor fuel, such as the 30% increase in the average price of a gallon of gasoline between 2007 and 2008, have prompted consumers to purchase more fuel efficient vehicles and pursue other options to reduce fuel consumption. Often these behavioral changes are asymmetric; once a more fuel efficient vehicle has been purchased, consumers rarely sell the vehicle to purchase a less efficient vehicle when prices fall. Consequently, the number of gallons of fuel purchased in 2008 declined 3.9% between 2007 and 2008, and continued to decline until 2013. In 2018, the number of gallons of gasoline sold in Michigan was 6.2% less than what was consumed in 2002.

As a result of these factors, the inflation-adjusted value of Michigan's primary sources of transportation revenue declined until the 2015 road funding package took effect in 2017, particularly after 2004 (when it was clear the fuel price increases experienced in the immediately preceding years were likely to be permanent, and even higher prices became common). One difficulty in evaluating how much buying power transportation funding has lost due to inflation is in determining the appropriate measure of inflation. As the SFA discussed in an earlier *State Notes* article, there are a variety of ways to measure inflation.² While the Detroit Consumer Price Index (CPI) often is used to evaluate inflation for Michigan, it evaluates prices for a fixed, quality-adjusted basket of goods purchased by consumers. Thus, the Detroit CPI is more likely to represent the inflation-adjusted impact of transportation funding on consumers' budgets than the buying power of transportation funding to maintain the road system. Over the years, the Bureau of Labor statistics has produced several indices designed to measure the price of materials used for highway and road construction. These indices are part of the Producer Price Index (PPI), and they show a markedly different change over the 1998-2018 period than the Detroit CPI. While the Detroit CPI, on a fiscal year basis, increased 45.7% between FY 1997-98 and FY 2017-18, the Highway Materials PPI (and its successor measures) increased 99.9%. Furthermore, while the Highway Materials PPI captures inflation in construction materials, it does not include the cost of labor (which nationally averages between 20% and 30% of total road construction/repair costs). Nationally, the Employment Cost Index (ECI) for construction workers increased 50.5% between 2002 (when the series starts) and 2018, compared to a 29.8% increase in the Detroit CPI and an 88.4% in the Highway Materials PPI. These figures suggest that when considering the purchasing power of transportation funding the Detroit CPI considerably understates the cost of labor and materials for road construction and repair.

Table 6 illustrates the value of motor fuel taxes and vehicles registration taxes adjusted for two inflation measures: the Detroit CPI and the Highway Materials PPI. As seen in the table, even after the 2017 increases in fuel taxes and registration fees, transportation funding remains constrained. When adjusted for the Detroit CPI, motor fuel tax revenue in FY 2017-18 was 1.6% below the level in FY 1997-98; and while combined fuel taxes and vehicle registration revenue was up 12.4% from FY 1997-98, FY 2016-17 and FY 2017-18 were the only years since FY 2003-04 that inflation-adjusted transportation revenue exceeded the FY 1997-98 level. When adjusted for the Highway Materials PPI, motor fuel tax revenue in FY 2017-18 was down 28.3% from the FY 1997-98 level, and combined fuel taxes and vehicle registration revenue were down 18.1%. (Also see Figure 4.)

The inflation-adjusted shortfalls in transportation revenue carry additional significance given the manner in which road repair costs accelerate over time. As the Senate Fiscal Agency identified in an earlier *State Notes* article, a dollar of preventative maintenance during the first decade of a road's life eliminates or delays having to spend \$6 to \$14 on rehabilitation or reconstruction.³ As a result, the \$15.4 billion inflation-adjusted shortfall in road funding, and associated reduced maintenance, between FY 2004-05 and FY 2017-18 will likely cost far more than \$15.4 billion when the necessary road repairs are finally made.

² Zin, David. "Half Empty or Half Full: Perspectives on Adjusting Tax Provisions for Inflation", *State Notes*, Spring 2016.

³ Siracuse, Michael, "The Rising Costs of Road Repair", Senate Fiscal Agency, *State Notes*, Winter 2019.

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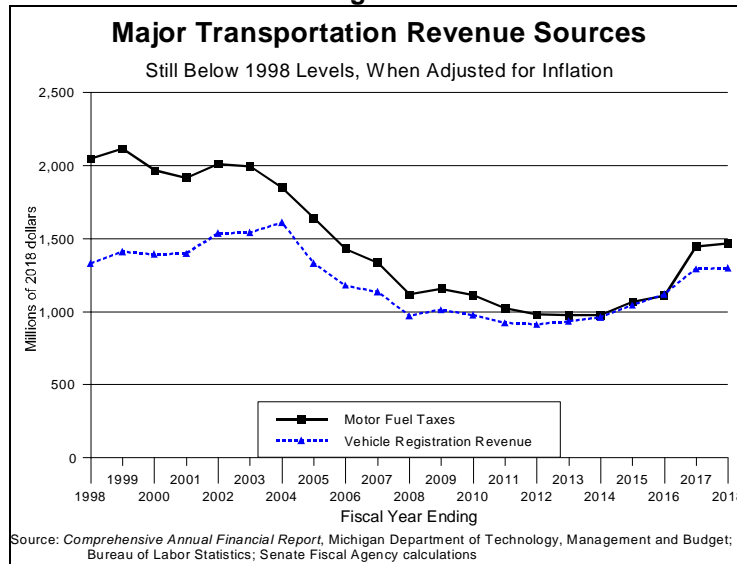


Table 6
Major Transportation Revenue Sources and Inflation
 (millions of dollars)

Fiscal Year	Total Motor Fuel Tax Revenue	Vehicle Registration Taxes	Combined Fuel Taxes & Registration Fees	FY Detroit CPI	CPI-Adjusted (2018 dollars)			Highway Materials PPI	PPI-Adjusted (2018 dollars)		
					Motor Fuel Tax Revenue	Registration Taxes	Combined		Motor Fuel Tax Revenue	Registration Taxes	Combined
1998	\$1,022.9	\$665.3	\$1,688.2	158.9	\$1,489.8	\$969.1	\$2,458.9	51.7	\$2,045.1	\$1,330.2	\$3,375.3
1999	1,066.4	710.2	1,776.6	162.8	1,516.1	1,009.6	2,525.6	52.1	2,114.5	1,408.1	3,522.6
2000	1,067.1	755.2	1,822.2	168.3	1,467.4	1,038.5	2,505.9	56.0	1,966.9	1,392.0	3,358.9
2001	1,068.1	778.2	1,846.3	173.8	1,422.3	1,036.3	2,458.6	57.6	1,916.3	1,396.3	3,312.6
2002	1,083.1	827.7	1,910.8	177.5	1,412.3	1,079.2	2,491.5	55.7	2,007.8	1,534.3	3,542.1
2003	1,093.5	845.3	1,938.8	182.0	1,390.6	1,074.9	2,465.5	56.7	1,993.5	1,541.0	3,534.5
2004	1,073.5	934.3	2,007.8	184.4	1,347.4	1,172.7	2,520.1	60.0	1,848.1	1,608.4	3,456.4
2005	1,069.5	866.3	1,935.7	189.0	1,309.6	1,060.8	2,370.4	67.3	1,641.4	1,329.6	2,971.0
2006	1,055.7	870.4	1,926.1	195.9	1,247.2	1,028.3	2,275.5	76.3	1,430.1	1,179.1	2,609.1
2007	1,028.1	874.7	1,902.8	199.0	1,195.7	1,017.3	2,213.0	79.6	1,334.1	1,135.0	2,469.1
2008	989.6	857.9	1,847.5	204.6	1,119.4	970.5	2,090.0	91.5	1,117.0	968.4	2,085.4
2009	964.3	842.4	1,806.7	202.8	1,100.6	961.5	2,062.1	86.1	1,156.9	1,010.8	2,167.7
2010	962.3	844.9	1,807.2	204.7	1,088.1	955.3	2,043.5	89.3	1,112.7	977.0	2,089.7
2011	957.9	862.5	1,820.4	210.0	1,055.8	950.6	2,006.4	96.7	1,023.3	921.4	1,944.7
2012	945.6	878.9	1,824.5	215.1	1,017.6	945.9	1,963.6	99.7	979.5	910.5	1,890.0
2013	951.1	909.4	1,860.6	219.1	1,004.8	960.8	1,965.6	100.5	978.0	935.1	1,913.2
2014	959.1	943.5	1,902.6	221.5	1,002.1	985.8	1,987.9	101.4	977.2	961.4	1,938.6
2015	1,004.0	981.2	1,985.2	218.9	1,061.6	1,037.4	2,099.0	97.1	1,067.9	1,043.7	2,111.6
2016	1,011.1	1,021.8	2,032.9	221.1	1,058.2	1,069.4	2,127.6	94.3	1,107.8	1,119.5	2,227.4
2017	1,358.3	1,213.1	2,571.4	225.5	1,394.0	1,244.9	2,638.9	97.0	1,446.0	1,291.4	2,737.4
2018	1,466.2	1,297.9	2,764.1	231.4	1,466.2	1,297.9	2,764.1	103.3	1,466.2	1,297.9	2,764.1
Change											
1998-2018	43.3%	95.1%	63.7%	45.7%	(1.6%)	33.9%	12.4%	99.9%	(28.3%)	(2.4%)	(18.1%)

Sources: Comprehensive Annual Financial Report, Michigan Department of Technology, Management and Budget; Bureau of Labor Statistics; Senate Fiscal Agency calculations

Figure 4



Conclusion

Since motor vehicle transportation became a defining feature of American life, funding for roads has been an issue. Most road funding, at both the Federal and state level, comes from "user fees" levied in the form of motor fuel taxes and, at the state level, vehicle fees such as registration fees. Motor fuel prices vary significantly over time, primarily reflecting swings in the price of crude oil, but also local variations in the supply and demand for fuel. Motor fuel taxes generally represent about 17% of the retail price of gasoline, and, in Michigan, the State gasoline tax averages about 9.6% of the retail price. Michigan's motor fuel taxes rank in the middle compared to other states, although because Michigan also levies the sales tax on motor fuel, Michigan exhibits an above average total State tax on a gallon of gasoline. Across states, there is a limited correlation between the price of fuel and a State's motor fuel tax rate.

Historically, motor fuel taxes have not been adjusted for inflation, although the 2015 transportation funding legislation will begin adjusting the motor fuel tax rate for inflation beginning in 2022. As a result, transportation revenue has generally not kept pace with inflation and the shortfall has been amplified as consumption patterns have changed in response to higher fuel prices and improved vehicle fuel economy. Despite the fuel tax and registration fee increases that went into effect in 2017, Michigan's inflation-adjusted transportation revenue remains below the level it was in FY 1997-98, the last time Michigan increased the gasoline tax (although the 1998 tax increase was mitigated by a substantial bonding program that was adopted to provide additional funding).

Revenue constraints have affected Michigan's transportation spending. Shortfalls created by road funding not keeping pace with inflation have substantially increased the cost of efforts to rebuild the road system to its historical condition levels. Compared to other states, Michigan ranks 49th in capital outlay spending on roads, and slightly above average on the amount spent per lane-mile of roadway--even after the funding increases that went into effect in 2017. A substantial portion of Michigan's transportation revenues are directed to local units, where Michigan ranks third in the dollar amount of state funding provided to local units of government for roads (first on a per-person basis), and accounts for almost 6.0% of all state dollars directed nationally to local roads.

Michigan is not alone in facing funding difficulties for its transportation network. Many of the same problems--the failure of funding to keep pace with inflation, improving fuel economy reducing fuel consumption, relatively flat vehicle sales--have affected all states. Like Michigan did in 2015, many states have increased the "user fees" associated with road funding, with 10 states increasing their motor fuel tax rates between January 1, 2019, and August 1, 2019. Michigan continues to experience road infrastructure needs and both the Governor and the Legislature are considering a variety of solutions. Regardless of what options are ultimately enacted, history suggests that the challenges of providing adequate road funding will continue to affect states for years to come.