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CHRIS DOUGLAS

ROADS IN MICHIGAN:

Quality, Funding & Recommendations



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Mackinac Center for Public Policy 140 West Main Street P.O. Box 568 Midland, Michigan 48640
989-631-0900 Fax: 989-631-0964 Mackinac.org mcpp@mackinac.org

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Roads in Michigan: Quality, Funding and Recommendations

By Chris Douglas

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Introduction

Michigan's roads and bridges are a pressing concern. A Gallup poll in 2014 found their condition to be a top concern of voters.¹ Surveys commissioned by the Michigan Chamber of Commerce in 2014 and Fix MI State in 2018 obtained similar results.²

Roads are vital to Michigan's economy. Approximately \$860 billion in freight moves through Michigan's highways, rails and ports every year. Thirty-eight percent of the half-trillion annual trade between U.S. and Canada's flows through Michigan.

This study examines the funding and condition of Michigan's roads and bridges and presents policy recommendations regarding them. The first section of this study describes the different types of roads in Michigan, which government entity is responsible for each type and their current estimated condition. The section after that explains how road funding works. The next section then discusses how public goods such as roads should be priced and funded, based on standard economic theory. It also attempts to measure the level to which Michigan's roads are underpriced and underfunded. The final section concludes with some policy recommendations.

Current Conditions of Michigan's Roads and Bridges

How Road and Bridge Quality is Evaluated

The Pavement Surface Evaluation and Rating system was developed by the University of Wisconsin Transportation Information Center to evaluate and rate a road's condition. The PASER system ranks a road on a 1-10 scale by trained observers who assess the road and assign the ranking.³ Graphic 1 provides more information about the PASER scale:

Graphic 1: PASER Rankings

Ranking	Condition	Appearance	Maintenance Needed
9-10	Excellent	Like new	None
8	Very Good	No longitudinal cracks, all cracks sealed or tight	Little or no maintenance required
6-7	Good	Minor cracks and traffic wear	Routine maintenance such as crack filling and sealcoating
4-5	Fair	Larger cracks, loss of surface asphalt and noticeable wear on the asphalt	Patching and surface overlay
3	Poor	Substantial cracking, patches in poor condition, potholes and surface distortion	Mill and resurface or total reconstruction
2	Very Poor	Severe cracking and distortion, numerous potholes with patches in poor condition	Total reconstruction with extensive repair to the road's base
1	Failed	Extensive loss of road's integrity	Road needs to be rebuilt from scratch

The Michigan Transportation Asset Management Council, a legislatively created group comprised of state and local government representatives, advises and assists Michigan’s road agencies. It surveys and collects data on the conditions of Michigan roads.⁴ TAMC condenses some of the PASER ratings into three categories to rate road conditions. It groups ratings 1-4 into one category called “poor,” ratings 5-7 are grouped together as “fair” and ratings 8-10 are grouped and called “good.”⁵ These categories help government agencies identify what type of work needs to be done on a road. Generally speaking, good roads need little or no maintenance, roads in fair condition need routine and preventative maintenance and roads in poor condition require structural improvements.⁶

Bridges in Michigan are rated using the National Bridge Inventory Rating Scale, which rates bridges on a 0-9 scale. It was established by the Federal Highway Administration, and rates three elements of a bridge: the deck, superstructure and substructure.⁷ The entire bridge is rated based on the lowest score of these three elements.⁸ In other words, if any one of these components of a bridge is rated “poor,” the entire bridge is given a “poor” rating. Graphic 2 summarizes this rubric.⁹

Graphic 2: National Bridge Inventory Rating Scale

Rating	Condition	Appearance
9	Excellent	No problems noted.
8	Very Good	No problems noted.
7	Good	Some minor problems.
6	Satisfactory	Structural elements show minor deterioration.
5	Fair	All primary structural elements are sound but may have minor corrosion, cracking or chipping. May include minor erosion on bridge piers.
4	Poor	Advanced corrosion, deterioration, cracking and chipping. Also significant erosion of concrete bridge piers.
3	Serious	Corrosion, deterioration, cracking and chipping, or erosion of concrete bridge piers have seriously affected deck, superstructure, or substructure. Local failures are possible.
2	Critical	Advanced deterioration of deck, superstructure, or substructure. May have cracks in steel or concrete, or erosion may have removed substructure support. It may be necessary to close the bridge until corrective action is taken.
1	Imminent Failure	Major deterioration or corrosion in deck, superstructure, or substructure, or obvious vertical or horizontal movement affecting structure stability. Bridge is closed to traffic but corrective action may put back in light service.
0	Failed	Out of service, beyond corrective action

As with road ratings, TAMC condenses these ratings into three categories, with ratings 0-4 grouped into the “poor” category, 5-6 are considered “fair” and 7-9 are grouped together as “good.”¹⁰

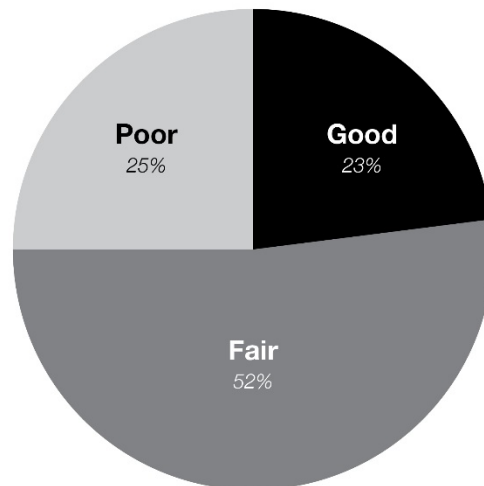
State Trunkline Roads and Bridges

Roads in Michigan are grouped into two general categories: trunkline and nontrunkline roads. Trunkline roads are state roads that carry an “I,” “US” or “M” designation. State trunkline roads comprise 8 percent of Michigan road miles yet carry 53 percent of all passenger traffic and about 70 percent of all truck traffic.¹¹

A centerline mile is the total length of the road measured along its centerline. The 9,668 centerline miles of trunkline roads correspond to approximately 30,000 lane-miles, or the number of centerline miles of road multiplied by the number of lanes. Building and maintaining trunkline roads is the responsibility of the Michigan Department of Transportation.

Graphic 3 summarizes the condition of Michigan’s trunkline roads in 2017. Twenty-three percent of the lane-miles of trunkline roads are in good condition, 52 percent are in fair condition, and 25 percent are in poor condition.

Graphic 3: Condition of Michigan’s State Trunkline Roads, 2017



Source: Michigan Transportation Asset Management Council

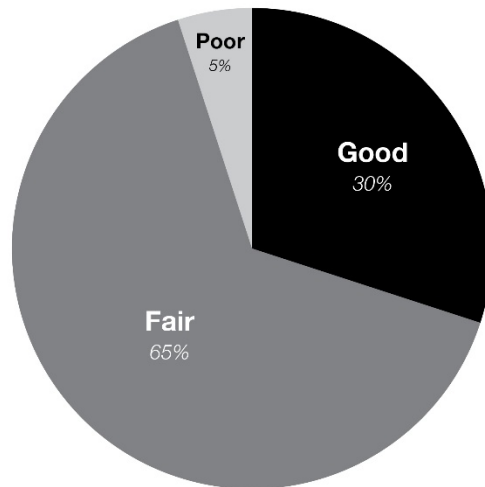
Overall, for state trunkline roads, the glass could be reasoned to be half full. On one hand, 75 percent of the lane miles carrying over half of Michigan’s passenger traffic and nearly three-quarters of its truck and commercial traffic are in fair or good condition. Most of these important roads, then, need only routine and preventative maintenance to maintain or improve their quality. On the other hand, MDOT forecasts that the condition of these roads will worsen substantially over the next several years.

MDOT projects the “remaining service life” of a lane mile: how long a road has before it needs to be rehabilitated or reconstructed. The good news is that about 85 percent of the lane miles on trunkline roads are projected to have a remaining service life of three years or more in 2018. But MDOT projects that by 2024, only about one-third of trunkline roads will have a three-year or longer RSL.¹² This means that two-thirds of Michigan’s trunkline roads will fall into the poor

rating category and need to be reconstructed by 2024. Further, MDOT estimates that trunkline pavement condition peaked in 2008 and that in each year between 2018 and 2024, 7 percent of trunkline miles, or 2,000 lane-miles, will deteriorate into poor condition until only one-third of trunkline miles are in fair or good condition.¹³

Michigan has approximately 4,500 state trunkline bridges. As Graphic 4 shows, 30 percent were in good condition, 65 percent in fair condition and only 5 percent were in poor condition in 2017.

Graphic 4: Condition of Michigan’s State Trunkline Bridges, 2017



Source: Michigan Transportation Asset Management Council

According to MDOT forecasts, trunkline bridges, like trunkline roads, will deteriorate over the next several years. But their deterioration will be more gradual, with nearly 93 percent still being in fair or good condition by 2024.¹⁴

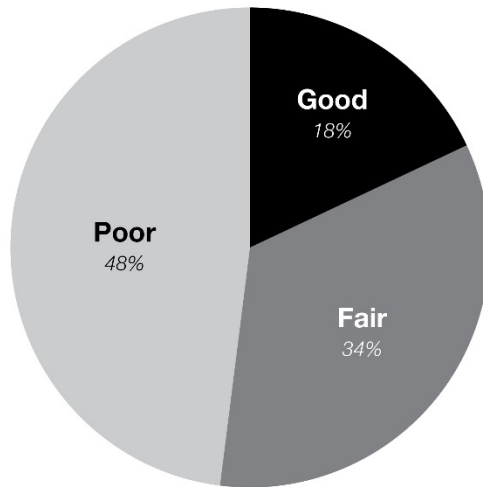
County Roads and Bridges

County roads and bridges are considered nontrunkline, and are the responsibility of county road commissions. A county road is categorized as either a primary or a local road, based on its importance as assigned by the board of directors of the county road commission and subject to the approval of the State Transportation Commission. Primary county roads may be located within city and village limits. Roads within townships are also under the jurisdiction of the county road commission.

Primary county roads are “federal-aid roads,” meaning that federal funding can be used to repair and reconstruct them. According to the Michigan Department of Transportation, about one-third of Michigan’s roads are eligible for federal aid.¹⁵ Local county roads, alternatively, are “non-federal-aid roads.” Local road agencies collect data on the pavement condition of all federal-aid roads, but on only some non-federal-aid roads.¹⁶ There are approximately 90,000 centerline miles of county roads in Michigan and 5,800 country bridges.¹⁷

The condition of county roads is substantially worse than that of state trunklines. Graphic 5 shows that nearly half the federal-aid lane miles of county roads — about 48,000 lane miles — were in poor condition, 34 percent were in fair condition and only 18 percent were in good condition in 2017.

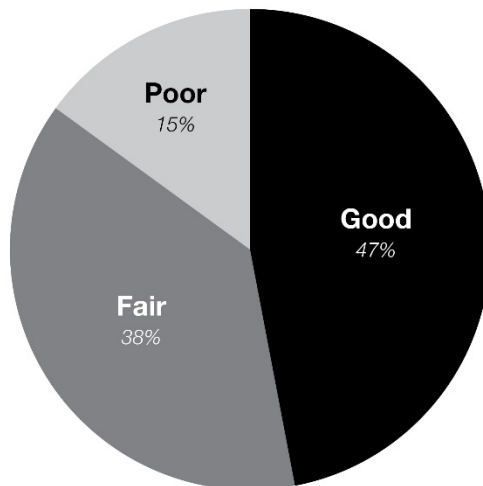
Graphic 5: Condition of Michigan’s Federal-Aid County Roads, 2017



Source: Michigan Transportation Asset Management Council

The condition of county bridges is better. Nearly half of federal-aid county bridges were rated in good condition and only 15 percent in poor condition in 2017, as Graphic 6 illustrates.

Graphic 6: Condition of Michigan’s Federal-Aid County Bridges, 2017



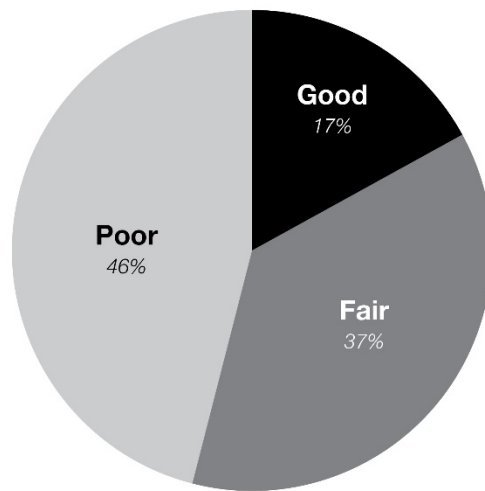
Source: Michigan Transportation Asset Management Council

City and Village Roads

Roads in cities and villages that are not under the jurisdiction of the county road commission are maintained by their respective municipality. The city or village council designates important streets as “major streets,” with the designation subject to the approval of the State Transportation Commission. There are approximately 21,400 centerline miles of city and village roads in Michigan. Major streets are federal-aid eligible while other local city and village streets are not.¹⁸ There are almost 4,400 centerline miles of federal-aid city and village roads, corresponding to approximately 11,000 lane miles.¹⁹

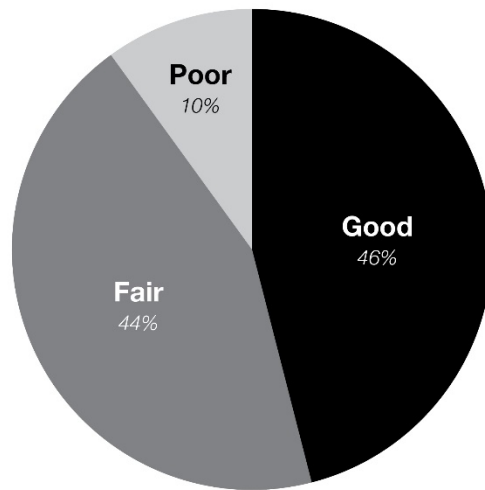
The condition of federal-aid city and village roads is similar to that of county roads. As Graphic 7 illustrates, 46 percent were in poor condition and only 17 percent were in good condition in 2017. The condition of city and village bridges is also similar to those in the counties: 46 percent were in good condition in 2017 and only 10 percent were in poor condition, as Graphic 8 shows.

Graphic 7: Condition of Michigan Federal-Aid City and Village Roads, 2017



Source: Michigan Transportation Asset Management Council

Graphic 8: Condition of Michigan Federal-Aid City and Village Bridges, 2017



Source: Michigan Transportation Asset Management Council

Graphic 9: Summary of Michigan Federal-Aid Road and Bridge Conditions, 2017

Roads					
Road Type	Centerline Miles	Lane Miles	Good	Fair	Poor
Trunkline	13,006	30,000	23%	52%	25%
County	22,642	48,000	18%	34%	48%
City/Village	4,398	11,000	17%	37%	46%
Total	40,046	88,000	20%	40%	40%
Bridges					
Road Type	Number	Good	Fair	Poor	
Trunkline	4,500	30%	65%	5%	
County	5,800	47%	38%	15%	
City/Village	900	46%	44%	10%	
Total	11,200	40%	49%	11%	

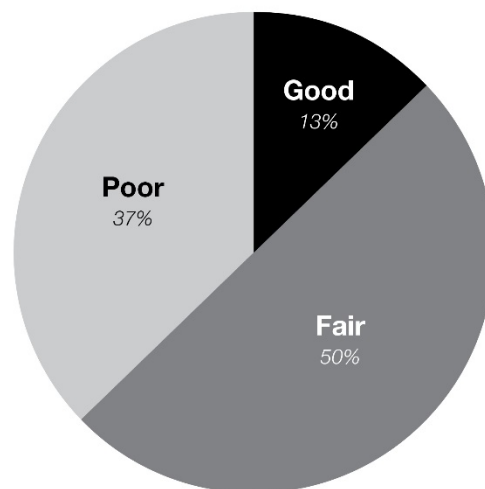
Non-Federal-Aid Roads

Roads considered “local” and maintained by counties, cities and villages are not eligible for federal aid. There are approximately 165,000 lane miles of these roads.²⁰ These roads include subdivision streets in townships that are under the jurisdiction of the county road commission and neighborhood streets in cities and villages under the jurisdiction of their municipality.

These road agencies are not required to collect PASER data on these types of roads, although some do. Consequently, TAMC only had data from 125 different local government agencies for

9,239 lane miles of these roads in 2017, which is only about 6 percent of the total.* As seen in Graphic 10, more than a third of these roads are in poor condition. Despite the small sample size, TAMC believes that it is safe to assume that the pavement conditions of non-federal-aid roads is worse than that of federal-aid roads.²¹

Graphic 10: Condition of Michigan Non-Federal-Aid Roads, 2017



Source: Michigan Transportation Asset Management Council

How Road Funding Works in Michigan

Road funding in Michigan takes several forms. Federal funding comes from the Federal Highway Administration's Highway Trust Fund, which is funded by federal gasoline and diesel taxes. State funding typically comes from state fuel taxes, vehicle registration fees, income taxes and supplemental appropriations from the Legislature. Counties, cities and villages also provide funding for their own roads through road millages, general tax revenue and via special assessment districts. Public Act 51 of 1951, commonly referred to as just "Act 51," governs how state revenue for roads and bridges is allocated and spent, with some of it dedicated for state roads and others shared with local governments for their use.²²

Federal Road Funding

Federal road funding from the Highway Trust Fund comes primarily from the federal 18.4 cents-per-gallon gasoline tax and 24.4 cents-per-gallon diesel tax. Federal highway funds are available

* There appears to be some discrepancy in these figures as reported by the Michigan Transportation Asset Management Council. The online dashboard displays the numbers provided here, but its 2017 annual report includes different figures. That report states that 71 agencies submitted ratings for 17,092 lane miles in 2017. Based on that data, 49 percent were rated poor, 38 percent fair and 19 percent good in 2017. "Michigan's 2017 Roads & Bridges Annual Report" (Michigan Transportation Asset Management Council), 9, <https://perma.cc/T385-BV9L>.

for projects identified as federal-aid-eligible highways.²³ Federal funds provide an 80 percent match of local or state funding for eligible projects and cannot be used for routine maintenance.²⁴

A common misperception is that Michigan is a “donor state” with regards to the federal Highway Trust Fund, meaning taxpayers pay more in federal fuel taxes than they receive in federal highway funding. According to data obtained by the Detroit Free Press in 2014, Michigan has not been a donor state since 2003. For example, Michigan paid \$1.01 billion to the Highway Trust Fund in 2012 but received \$1.05 billion from it.²⁵ Federal highway funding makes up a little less than 30 percent MDOT’s budget.²⁶ MDOT receives 75 percent of Michigan’s federal road funding, with county road commissions and cities and villages sharing the remaining 25 percent.²⁷

Michigan Fuel Taxes and Vehicle Registration Fees

Revenue from Michigan’s 26.3 cents-per-gallon gasoline and diesel taxes and its vehicle registration fees make up the bulk of the revenue that goes into the Michigan Transportation Fund. Money from the fund is then disbursed to MDOT, county road commissions and cities and villages. Vehicle registration fees contributed \$1.2 billion to the MTF in 2017 while fuel taxes contributed \$1.4 billion. Vehicle title fees contributed \$40 million.²⁸

Michigan’s gasoline and diesel taxes were set at 19 cents per gallon and 15 cents per gallon, respectively, in 1997 and not indexed for inflation. They were increased in 2017 to 26.3 cents per gallon and will be indexed to inflation beginning in 2022. Vehicle registration fees were also increased by an average of 20 percent in 2017.²⁹

The state also assesses a 6 percent sales tax on fuel purchases, but nearly all of that revenue is dedicated to public schools and local governments.³⁰ Electric vehicles are assessed a \$100 annual surcharge and hybrid vehicles are assessed a \$30 annual surcharge to offset the fact that owners of these vehicles either do not pay fuel taxes or pay substantially less than owners of conventional vehicles do.³¹

Gasoline taxes for passenger cars are collected at the pump. Diesel taxes for interstate trucks operates much differently. Interstate trucks are covered by the International Fuel Tax Agreement, which provides a method for truck drivers to pay the appropriate amount of fuel taxes based on how many miles they drive in each jurisdiction. Truck drivers maintain a logbook that records the number of miles traveled in Michigan, calculate the diesel that was required to travel those miles, and then pay the Michigan diesel tax on that amount of fuel, plus the 6 percent sales tax.³²

The registration fees for passenger cars are based on the vehicle’s age and estimated base price.³³ Registration fees for commercial trucks are based on the truck’s gross vehicle weight and range from \$590 per year for trucks weighing 24,000 pounds to \$3,741 per year for trucks weighing over 160,000 pounds.³⁴

There are exceptions, however. Trucks used as moving vans or to operate a carnival get a special registration rate that is 80 percent of the usual rate.³⁵ It is unclear how much this reduces revenue to the MTF. Trucks that carry farm commodities, milk and logs also pay a substantially reduced registration fee that is not based on gross vehicle weight but instead is equal to 74 cents per 100

pounds of the weight of the tractor or empty truck.³⁶ This reduces MTF revenues by an estimated \$40 million per year.³⁷ Approximately one-third of commercial trucks registered in Michigan pay this reduced registration fee.*

The annual registration fee paid by farm, milk and logging trucks is often less than that for a typical passenger car. In December 2012, farm trucks paid an average annual registration fee of \$72.21, milk trucks paid \$129.80 and logging trucks paid \$107.30.³⁸ The cost of a typical passenger car's registration fee was approximately \$120.³⁹

There is a widespread belief that Michigan's weight restriction laws for commercial trucks are more generous than those in other states and this is largely responsible for the poor condition of Michigan's roads. Most states use a truck's "gross vehicle weight" to determine the maximum allowable weight on the road. A 1982 federal law limits GVW on federal-aid eligible roads to 80,000 pounds for an 18-wheel truck. Michigan instead uses axle load restrictions, which set the maximum allowable weight on a single axel. This allows for trucks weighing in excess of 80,000 pounds on Michigan roads, with a maximum of 164,000 pounds spread over 11 axles. Michigan's weight restrictions are grandfathered in under the 1982 law. If Michigan repealed them, it could not reinstate them and would have to operate under the federal limits.⁴⁰

According to MDOT, pavement research shows that a single heavy truck does less pavement damage than two lighter trucks carrying the same combined load. This is, in part, because the weight-per-axle can be less for a single truck pulling two trailers compared to that of two lighter trucks each pulling a single trailer. MDOT also argues that repealing Michigan's law would add 10,000 to 15,000 trucks on the road, resulting in increased traffic and business costs.⁴¹ However, how Michigan's weight limits are set is less important than the question of whether the taxes and fees trucks pay is in line with the damage they do to Michigan's roads. As shown later in this study, the fuel taxes and registration fees trucks pay are less than the estimated cost of the pavement damage they inflict.

How Michigan Transportation Fund Revenue is Distributed

Several government units, both state and local, receive money from the Michigan Transportation Fund, including the Michigan Department of Transportation, county road commissions, cities, villages and townships.

Michigan Department of Transportation

Michigan vehicle registration fees and fuel taxes generated approximately \$2.6 billion in revenue in fiscal year 2017. Approximately \$24 million of this was used for administrative overhead, with the biggest component being \$20 million used to operate the Secretary of State. A total of \$63 million in transportation revenues went to the Economic Development Fund and the Recreation Improvement Fund. Another \$154 million was spent on administrative grants, debt service and

* In December 2012, there were approximately 80,000 trucks registered who paid the full registration fee based on GVW and 47,000 registered farm, milk, and logging trucks that paid the discounted registration fee. See "Michigan's Truck-Weight Law and Truck-User Fees" (Michigan Department of Transportation), <https://perma.cc/9EN7-U2QQ>.

other grant programs. After these deductions, approximately \$2.3 billion in revenue was distributed to MDOT, county road commissions, and cities and villages to maintain and repair roads and bridges.⁴²

The Economic Development Fund was created in Act 51 to fund transportation improvements that support private investment and job creation. Its annual report cites five categories of road improvement projects eligible for assistance: for targeted industry development and redevelopment, to reduce urban traffic congestion, to create an all-season road network in rural counties, to support the development of commercial forests, and to support an all-season road network in urban areas of rural counties.⁴³

Approximately \$41 million in MTF revenues went to the Economic Development fund in fiscal year 2017.⁴⁴

Two percent of gas tax revenue go to the DNR's Recreation Improvement Fund, representing fuel taxes paid by off-road vehicles and motor boats.⁴⁵ The Recreation Improvement Fund, in combination with the Michigan State Waterway Fund, helps fund the operation, maintenance and development of recreation trails, land restoration, inland lake cleanup and harbor and dock infrastructure.*

Another 10 percent of the MTF is earmarked for the Comprehensive Transportation Fund. Money from that fund is used to support public transportation throughout the state. Most of this money is allocated, based on a formula, to local transit agencies. In fiscal 2018, close to \$250 million was disbursed from the MTF for such purposes.⁴⁶

The \$2.3 billion remaining in the MTF after the monies described above were allocated were disbursed based on the following allocations: 39.1 percent goes to MDOT for the state trunkline fund, 39.1 percent goes to county road commissions and 21.8 percent goes to cities and villages.⁴⁷ One percent of the Act 51 distribution to county road commissions is set aside for snow removal in counties that receive more than 80 inches of snow annually.⁴⁸

County Road Commissions

Act 51 distributes MTF funds to county road commissions based on a number of factors. How much each county receives depends on how many miles of certain types of roads it has, how many vehicles are registered there, its population and its annual snowfall.⁴⁹ Graphic 11 summarizes these factors.

* The Waterway Fund receives 80 percent of the revenue generated from the 2 percent of gas tax revenue that is devoted to the Recreation Improvement Fund. Another 14 percent of this revenue is dedicated to snowmobile trail construction and maintenance. "Where the Money Comes From" (Michigan Department of Natural Resources, 2018), <https://perma.cc/3J7M-KYEZ>; "Recreation Improvement Fund" (Michigan Department of Natural Resources, 2018), <https://perma.cc/VFT4-UU8L>.

Graphic 11: MTF Distribution to County Road Commissions

Criterion	Percentage of MTF Distribution	Factor
Primary Road Mileage	6.4%	\$2,164 per mile
Local Road Mileage	16.4%	\$2,374 per mile
Urban Road Mileage	9.9%	\$12,390 per mile for urban primary roads, \$2,065 per mile for urban local roads
Vehicle Registrations	47.9%	37¢ per dollar collected in the county
1/83rd Share to Each County for Primary Roads	9.6%	\$1,056,287 per county
Rural Population	8.8%	\$16.88 per person
Snow Removal	1%	Based on average winter maintenance costs and actual snowfall
Total	100%	\$906,168,948 to counties

Source: Michigan Department of Transportation. Data from July 2017.

As seen from Graphic 11, the number of vehicle registrations within a particular county is the largest determinant of how many MTF dollars a county receives. If a county has, say, 5 percent of all vehicle registrations in the state, then the county will receive 5 percent of MTF dollars that are distributed based on vehicle registrations.

Each month, MDOT releases a set of distribution factors that allows a county to determine the amount of MTF dollars it will receive based on its population and road mileage.⁵⁰ The factors are found by taking the total amount of MTF dollars available for a particular category and dividing that sum by the county's population or number of road miles in that category. For instance, total MTF dollars available for primary county roads is divided by the total miles of primary county roads to arrive at \$2,164 per mile. County road commissions would then multiply the number of primary county roads in their respective counties by \$2,164 to determine their MTF allocation for primary road miles. The road commissions would make a similar calculation for each row in Graphic 11 to determine their total MTF distribution for the year.

The most recent allocation factors are given in the last column in Graphic 11. Each county receives \$1,056,287 from the MTF plus 37 cents for every \$1 residents in the county paid in vehicle registration fees. Rural areas, defined as areas outside of an incorporated municipality, receive an additional \$16.88 per resident. Counties with urban roads receive \$12,390 per mile for urban primary roads and \$2,065 per mile for urban local roads. All counties receive \$2,164 per mile for primary roads and \$2,374 per mile for local roads.⁵¹

It is not clear whether urban counties or rural counties disproportionately benefit from how MTF funds are distributed. On one hand, urban counties have more drivers, which amounts to doing more damage to the roads. On the other hand, rural counties have a large number of roads relative to their population, and it would be more difficult to maintain these roads if MTF dollars were distributed based strictly on population.

Graphic 12 illustrates this tradeoff. Counties are grouped into urban and rural counties based on U.S. Census data. Urban counties receive, on average, almost five times more MTF dollars than

rural counties. However on a per capita basis, rural counties receive 57 percent more MTF dollars than urban counties. Rural counties have three times more miles of road per capita than urban counties. Thus there is a tradeoff in allocating MTF dollars on a population basis, which would benefit urban counties, and a miles of roads basis, which would benefit rural counties. The current MTF distribution formula tries to strike a balance between this tradeoff.

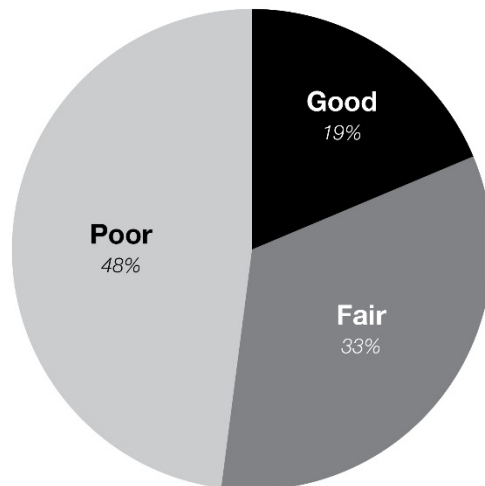
Graphic 12: MTF Distributions for Urban and Rural Counties, 2017

	Urban	Rural
Average MTF Distribution	\$23,029,055.57	\$4,890,398.72
Average Population	149,609	24,598
Distribution Per Capita	\$147.35	\$257.53
Average Miles of Roads	2,136.24	984.78
Miles of Roads Per Capita	0.0143	0.0400

Source: Author's calculations based on data from July 2017 MDOT reports and data from the U.S. Census.

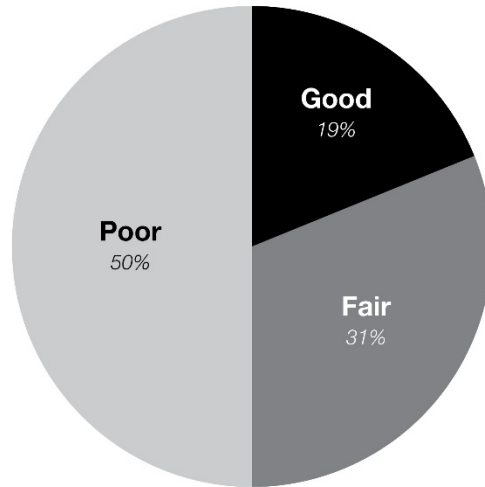
Graphics 13-16 illustrate average road and bridge conditions for urban versus rural counties. They show that there is essentially no difference in average road conditions in urban versus rural counties. And there are only minimal differences in the average condition of bridges. This suggests that Act 51 might be striking the right balance in allocating MTF dollars.

Graphic 13: Average Road Conditions in Rural Counties, 2017



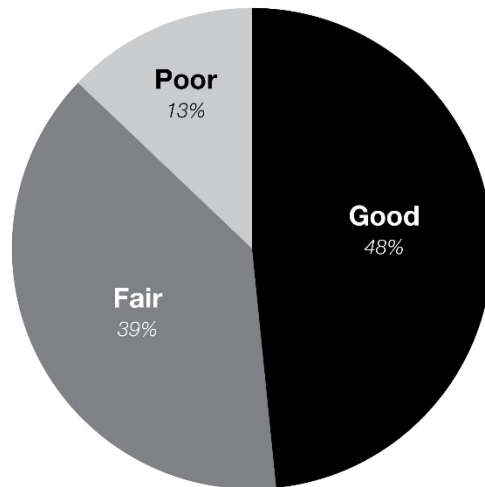
Source: Michigan Transportation Asset Management Council, U.S. Census Bureau

Graphic 14: Average Road Conditions in Urban Counties, 2017



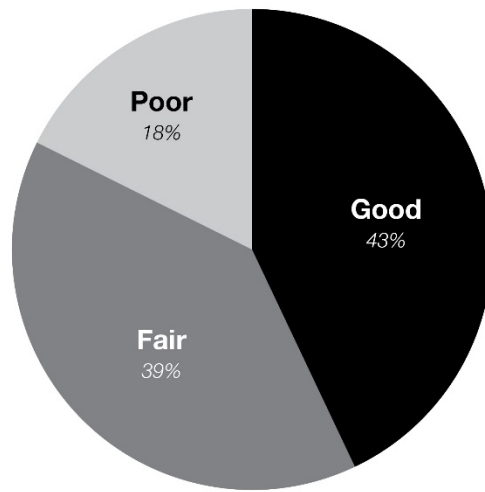
Source: Michigan Transportation Asset Management Council, U.S. Census Bureau

Graphic 15: Average Bridge Conditions in Rural Counties, 2017



Source: Michigan Transportation Asset Management Council, U.S. Census Bureau

Graphic 16: Average Bridge Condition in Urban Counties, 2017



Source: Michigan Transportation Asset Management Council, U.S. Census Bureau

Cities and Villages

Seventy-five percent of MTF funds distributed to cities and villages are used for major streets and 25 percent are used for local streets. Sixty percent of the major and local street distribution is based on population and 40 percent is based on road miles.⁵² The MTF funds used for local streets must be matched by the municipality.⁵³

As it does with counties, each year MDOT uses allocation factors to distribute MTF revenue to cities and villages. The distribution is based on population (as of the latest U.S. Census) and road miles.⁵⁴ Unlike counties, cities and villages with a larger population get a larger per capita allocation from the MTF. That is because the number of miles of major streets in a city or village is multiplied by a population factor to determine the MTF distribution. This population factor increases with the city or village’s population. Graphics 17 and 18, which use data from Plante Moran’s “Estimated Act 51 Revenue Worksheet” for the fiscal year ending June 30, 2018, illustrates the range of the factor:⁵⁵

Graphic 17: MTF Distribution to Cities and Villages

Major Streets		
Criterion	Amount	Factor
Population	\$43.96 per person	n/a
Major Street Mileage	\$12,660.75 per mile	See Graphic 18
Trunkline Mileage	2 x \$12,660.75 per mile	See Graphic 18
Local Streets		
Population	\$14.65 per person	n/a
Local Street Mileage	\$3,335.25 per mile	n/a

Graphic 18: Population Factors

Population		Factor
From	To	
1	2,000	1.0
2,001	10,000	1.1
20,001	30,000	1.2
30,001	40,000	1.3
40,001	50,000	1.4
50,001	60,000	1.5
60,001	70,000	1.6
70,001	80,000	1.7
80,001	95,000	1.8
95,001	160,000	1.9
160,001	320,000	2.0
Over 320,000		See below

Note: For a population over 320,000, a factor of 2.1 is used plus an additional factor of 0.1 for every 160,000 of population over 320,000

A city or village receives \$43.96 per person for major streets and \$14.65 per person for local streets. It also receives \$3,335.26 per mile of local streets. There are a couple of things to note about how major street mileage funds are distributed. First, the amount per mile increases as the municipality's population increases. A municipality receives \$12,660.75 per major street mile times its population factor. Thus a city or village with 1,000 residents would receive \$12,660.75 x 1.0 or \$12,660.75 per major street mile. A city or village with 100,000 residents would receive \$12,660.75 x 1.9 or \$24,055.4 per major street mile. Michigan's largest city, Detroit, with a population of 713,777 in the 2010 census would receive \$12,660.75 x 2.3 or \$29,119.70 per major street mile. Thus, major street mileage funds are skewed toward large cities.

Second, some cities also get funding for trunkline miles. This funding allocation, available to cities with over 25,000 residents, is based on a formula: the city's population factor multiplied by the number of trunkline miles within it. This allocation heavily favors Detroit, which has 22 percent of all trunkline miles in the state that run through cities with a population of 25,000 or more.* Since Detroit's population factor is 2.3, this trunkline mileage distribution nets the city an additional \$17 million per year.

There is no clear reason why this distribution for trunkline mileage exists. As the House Fiscal Agency points out, maintaining trunklines within municipal boundaries is the responsibility of MDOT, not the municipality.⁵⁶ Cities and villages with a population over 25,000 do have to contribute funds toward trunkline improvements, but their contribution is small. Cities with a population over 50,000 have to pay 12.5 percent of the project's cost, cities with a population between 40,000 and 50,000 pay 11.25 percent, and cities with a population between 25,000 and 40,000 pay 8.75 percent of the cost.⁵⁷ Limited access highways, such as interstate highways, are

* As of April 2018, there are 1,332.07 miles of trunkline roads running through Michigan cities with a population of 25,000 or more. Detroit has 290.9 of these miles. "City/Village Population and Mileage: MTF Distribution Month: April, 2018" (Michigan Department of Transportation, May 22, 2018), <https://perma.cc/8FKQ-9NJ9>.

exempt from this cost sharing requirement.⁵⁸ This exemption benefits cities such as Detroit, given the numerous miles of limited access highways that run through it.

In addition to these issues, the per-mile trunkline distribution is double what is allocated for major street maintenance and repair, which cities are responsible for maintaining. Approximately \$61.5 million was distributed to cities for trunkline maintenance in 2017, even though cities are not responsible for maintaining these roads.*

In short, distributions from the Michigan Transportation Fund to cities and villages function in a similar way to counties in that the distribution is based on population and road mileage. Multiplying major road mileage by a population factor and giving municipalities with a population over 25,000 an allocation based on trunkline miles (which is also multiplied by the population factor) skews the distribution toward larger cities. Money distributed to counties is not, by contrast, skewed this way.

Counties, cities and villages have some flexibility in how they spend MTF dollars. With some exceptions, they can transfer some of their earmarked funding for other purposes. For example, counties can divert up to 30 percent of their funding earmarked for primary roads to local roads, if they choose. Conversely, they can shift 15 percent of their funding earmarked for local roads to maintaining and constructing primary roads. They can spend another 15 percent of local road funding on primary roads, in the case of an emergency or with the specific approval from MDOT.⁵⁹ Cities and villages can also use MTF funding earmarked for major streets on local streets, provided that the work is for maintenance and not construction and that it does not exceed 50 percent of the municipality's major street funding, unless it adopts an asset management process and sends a copy of the plan to MDOT.⁶⁰

Local Road Millages

Some counties, townships, cities and villages supplement their MTF distribution with local property tax levies. Graphic 19 gives information on these local road millages, based on data from 2017.

Graphic 19: Local Road Millages

Unit of Government	Number With Road Millage	Total Units of Government	Percent with Road Millage	Average Millage Rate
County	27	83	33%	1.2298 mils
Township	472	1240	38%	1.7248 mils
City/Village	150	533	28%	2.7235 mils

Source: Michigan Department of Treasury

A mill is a \$1 tax per \$1,000 of assessed taxable value, which is approximately equal to one-half of the sale price of the property. A homeowner with a \$200,000 house in a city levying a 2.7235 millage would owe a \$272.35 property tax toward the city's roads. It's difficult to determine the

* Trunkline mileage funds are allocated based on two times the population factor, times the number of trunkline miles in the city, times \$12,660.75 per mile. "City/Village Allocation Factors" (Michigan Department of Transportation, 2018), <https://perma.cc/U9PQ-PTWX>.

impact these local millages have local governments' ability to maintain their roads, as they depend heavily on the millage rate and the local property value in the jurisdiction. They could, however, be a significant source of road funding for some municipalities.

There is some evidence that road millages improve road quality for cities and villages. However, it is hard to determine the relationship between the road conditions and road millages in a county because both counties and townships can levy millages, but PASER data is only available at the county level. With this limited data, it would be impossible to know if an individual township's road condition was improved by its millage.

Since cities and villages are responsible for maintaining certain roads and PASER data exists at the city and village level, it is possible to calculate a correlation between municipal millages and road conditions. For cities, there is a strong correlation between the two. Fifty-eight percent of roads in cities without a road millage are in poor condition, on average. If a city has a road millage, each mill is correlated with a six-point reduction in the percentage of its roads that are in poor condition, a result that is statistically significant. In other words, a city with a one-mill road millage will have 52 percent of its roads in poor condition, on average, compared to 58 percent for a city with no road millage.

The correlation is weaker for villages. Forty-seven percent of roads in villages without road millages are in poor condition. Each mill of a road millage is only correlated with a three-tenths of a point reduction in the percentage of roads in poor condition, a result that is not statistically significant. One potential explanation for this is that villages have smaller populations than cities and typically less taxable property value, so a road millage in a village might not collect as much revenue as a road millage in a city, limiting the number of improvements the village can undertake. A village might just need a substantially higher millage rate than a city to get the dollars needed to improve its average quality in a way that would make a significant difference. The average road millage for villages is 3.3 mils, one mill higher than the average rate for cities.

Special Assessment Districts

Neighborhood streets in a subdivision within a township are under the jurisdiction of the county road commission. County road commissions typically maintain, repave and reconstruct these roads frequently, likely because they give priority to other, more-travelled roads under their jurisdiction. Nevertheless, residents who wish to have these types of roads maintained can petition to create a "special assessment district" for the purpose of levying a tax on property owners in a defined area. SAD taxes must increase the value of properties in the district.⁶¹

Residents in a proposed SAD must get 50 percent of property owners to sign a petition for the SAD plan to move forward. Once this happens, a public hearing is held for residents to express support for or opposition to creating a district. If a majority of the board of directors of the county road commission votes to create it, the work to be supported by the special assessment is bid-out and a second public hearing is held to discuss the required costs. If final approval is given by the board to authorize the work and assessment, the SAD is created and the cost shared amongst its residents.⁶²

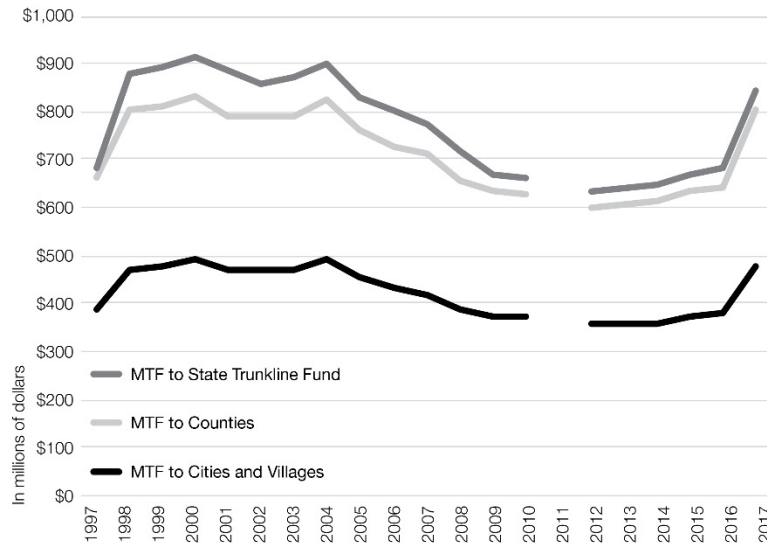
According to the Michigan Department of Treasury, only three municipalities have SADs dedicated to road funding: the townships of Clarence, Porter and Lenox in Calhoun, Van Buren and Macomb counties, respectively. The vast majority of special assessment districts used in the state are for fire services.*

MTF Revenue Trends

To summarize, nearly half of all county, city, and village roads in Michigan are rated as being in poor condition, with over half of Michigan’s trunkline roads projected to be in that state by 2024. How did Michigan’s roads end up in this condition?

The main problem appears to be that MTF revenues have not kept up with inflation, as shown by Graphic 20. Several years near the beginning of the century were especially difficult for the fund, with revenues falling even without adjusting for inflation.

Graphic 20: Inflation-adjusted MTF Revenue Distributions, 1997-2017



Source: County Road Association of Michigan, Michigan Department of Transportation

Before the fuel tax and vehicle registration fee increased in 2017, MTF revenue had fallen by 25 percent from its peak in 2000. Even with the tax and fee increase, MTF revenue still remains approximately \$70 million below that peak.

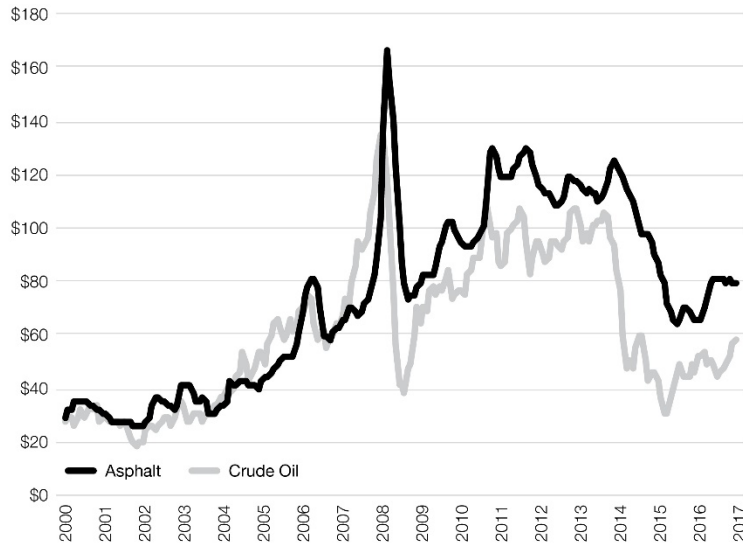
Complicating matters further, the cost of maintaining and constructing roads steadily increased. In other words, the real purchasing power of the money government officials have to spend on road maintenance declined substantially.

For instance, the price of crude oil plays a substantial role in determining how far road dollars will go as it is an important ingredient in asphalt. Graphic 21 plots the monthly price of a barrel of West Texas Intermediate crude oil versus the monthly price of a ton of liquid asphalt. Since the

* This data can be found here: <https://eequal.bsasoftware.com/MillageSearch.aspx>.

price of a ton of asphalt is roughly five times that of a barrel of crude oil, dividing the price of asphalt by five makes the relationship between the two easier to see. Note that the two lines appear to move in tandem.

Graphic 21: Price of Crude Oil vs. Price of Ton of Liquid Asphalt

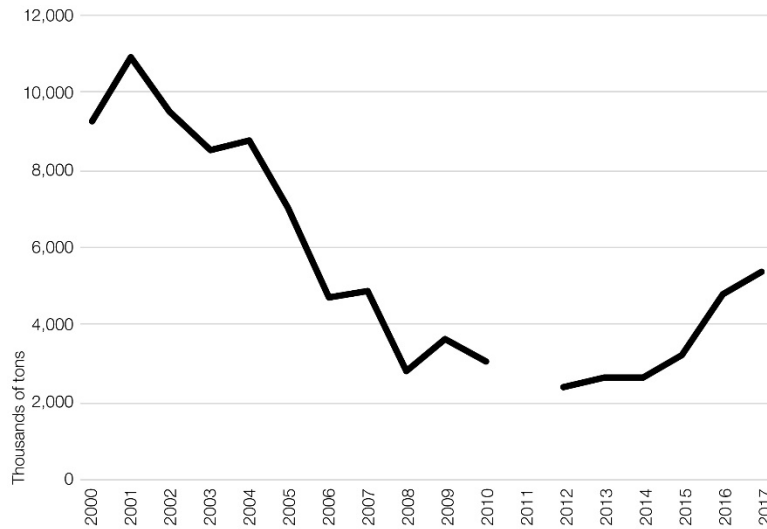


Source: Maryland Asphalt Association, Federal Reserve Bank of St. Louis

Graphic 22 illustrates how much asphalt could be purchased if all MTF revenue was used only on asphalt. Obviously, MTF revenues are used for things other, too. This figure simply shows how fuel tax and vehicle registration fee revenue are not keeping up with the increasing price of asphalt. Between 2008 and 2015, MTF revenues were only able to purchase, on average, less than one-quarter the amount of asphalt as in the year 2000. Even after the fuel tax and vehicle registration fee increase in 2017, MTF revenues could only purchase half the asphalt they could in 2000.

This problem is worsened by the fact that drivers might respond to higher crude oil prices — and increased gas prices — by driving less. Rising crude oil prices discourages drivers from spending on fuel, which reduces the state's tax revenue for roads. At the same time, the price increases in crude oil makes asphalt more expensive. In other words, increases in crude oil prices harm road financing from both ends: they reduce revenues and make road work more expensive.

Graphic 22: How Much Asphalt MTF Revenues Could Purchase, 2000-2017



Source: Author's calculations based on data from the Michigan Department of Transportation, Maryland Asphalt Association

Graphic 23 describes the problem in more detail. Between 2000 and 2016, MTF revenues increased an average of 0.8 percent per year. During the same time period, inflation (as measured by the consumer price index) averaged 2.1 percent per year and crude oil prices increased by an average of 5.5 percent per year. Asphalt prices increased by an average of 7.3 percent per year.* The table below also illustrates this trend for the years before the Great Recession. Between 2000 and 2007, MTF revenues increased by an average of 1.1 percent per year. Inflation averaged 2.7 percent growth annually, while crude oil and asphalt increased by a yearly average of 14.5 percent and 11.4 percent, respectively. In short, MTF dollars failed to keep up with costs, which likely impacted the condition Michigan’s roads are in now and projected to be in the near future.

Graphic 23: Purchasing power of MTF revenues, annual average change, 2000-2016

Period	MTF Revenues	Inflation	Crude Oil	Asphalt
2000-2007	1.1%	2.7%	14.5%	11.4%
2000-2016	0.8%	2.1%	5.5%	7.3%

For much of 2001, the nation was in a recession, which the National Bureau of Economic Research estimates ended in November of that year.⁶³ But while the rest of the nation recovered following this downturn, Michigan’s economy entered a “one-state recession” that lasted until 2007 when the state, along with the rest of the nation, entered the Great Recession, which ran from December 2007 through June 2009.

Graphic 24 compares the performance of Michigan’s economy with the national economy between the end of the 2001 recession and the start of the Great Recession, as well as from the

* I use the time period 2000-2016 because 2017 is an outlier in that MTF revenues increase by 26 percent due to the increase in the gas tax and vehicle registration fee. This pulls the average for the entire time period up to a 2 percent increase, which gives a misleading picture about what was happening to MTF revenues during this time period.

end of the 2001 recession to 2017. From 2002 to 2007, the national economy grew by an average of 2.7 percent annually, while Michigan’s economy shrank by an average of 0.6 percent annually, as measured by gross domestic product. Per capita personal income shrank by an average of 0.3 percent annually in Michigan, while nationally it grew by an average of 1.2 percent annually. The Michigan unemployment rate was also, on average, 1.6 percentage points higher than the national unemployment rate. As seen from Graphic 24, the national economy outperformed the Michigan economy for the entire 2002-2017 time period.

The slowdown in the economy resulted in a slowdown in vehicle miles driven and thus a reduction in dollars going into the MTF. Nationwide, drivers traveled about 12 percent more miles in 2016 than in 2002.⁶⁴ In contrast, Michigan drivers traveled only 1 percent more miles over the same period.⁶⁵ Thus Michigan’s road funding experienced a double-whammy: tax revenue went down even as the cost of maintaining roads went up.

Graphic 24: Michigan vs. National Economy, 2002-2017

Michigan			
Period	GDP Growth	Unemployment	Per Capita Personal Income Growth
2002-2007	-0.6%	6.9%	-0.3%
2002-2017	0.4%	7.9%	0.3%
National Average			
Period	GDP Growth	Unemployment	Per Capita Personal Income Growth
2002-2007	2.7%	5.3%	1.2%
2002-2017	1.8%	6.3%	1.0%

Pricing Out Road Use in Michigan

Background: Optimal Financing of Public Goods

In a free market, the price of a good adjusts based on supply and demand so that the price covers the full cost of producing it. This helps producers sustainably produce the good. It also ensures that consumers of the good consider its full costs before deciding whether to purchase it, meaning that the good is used “efficiently.” Consumers will only purchase a good if the benefits derived from doing so exceed the price of purchasing it.

Efficiency is less likely when producers of a good are unable to directly charge a price to consumers for it. Public goods, such as roads, are “nonexcludable,” which means that producers are unable to prevent consumers who do not pay for them from using them anyway.* In this case, consumers do not fully consider the cost of using the public good and thus use it even if the actual costs associated with doing so would exceed the benefits they get from it. Producers are unable to raise

* Some roads are excludable, of course. Gated communities, for example, exclude some users from accessing their private roads. This discussion pertains to publically accessible roads that are typically maintained by governments.

the revenue needed to sustain production of the good, so the good becomes overused and degraded.

The solution to this problem is to charge users a fee they cannot avoid if they wish to use a nonexcludable public good, and make sure that this fee covers the costs of supplying the good. An example is a toll on a limited-access highway. Suppose driving on a particular stretch of road results in \$5 in damage to it. Setting a toll of \$5 would require consumers to bear the full cost of the trip and ensure that the only trips taken on the road were ones for which the benefit exceeds the cost. The toll would allow the road to be maintained, keeping it in a state of good repair.

If such a direct user fee is not practical, a less direct user fee, such as a gasoline tax, could work. If driving on this same stretch of road requires the driver to pay \$5 in gasoline taxes, only trips where the benefit exceeded the cost would be taken. If the gasoline tax was set at an appropriate level, consumers would bear the full cost of using the roads.*

The key point is that a user fee equal to the cost of using the public good results in the efficient use of the public good, much like a price set in a free market results in the efficient use of a private good. If the user fee is set too low, the public good tends to be overused. Conversely, if the fee is too high, a beneficial public good is under-utilized.

Estimating the Costs of Using Michigan's Roads

The Congressional Budget Office surveyed the academic literature and obtained estimates of the cost that passenger vehicles and commercial trucks create in pavement damage by driving one mile.⁶⁶ The CBO cautions that these costs “cannot be calculated precisely, and even the best available estimates are accompanied by significant uncertainty.”⁶⁷ Graphic 25 summarizes these costs:[†]

Graphic 25: Estimated pavement damage cost by different types of vehicles, dollars per mile

Vehicle Type	Rural Roads	Urban Roads
Passenger	\$0.00	\$0.00
40,000 pounds, 4-axle	\$0.01	\$0.04
60,000 pounds, 4-axle	\$0.09	\$0.26
60,000 pounds, 5-axle	\$0.04	\$0.16
80,000 pounds, 5-axle	\$0.19	\$0.60

Despite the stated limitations of these types of estimates, they are nevertheless instructive. It's clear that heavy, commercial trucks produce the most costs when it comes to pavement damage. In fact, the cost per mile of pavement damage for passenger vehicles is only a fraction of one cent and rounds down to zero. Further, the costs of pavement damage per mile driven is more

* This assumes, of course, that all of the revenue from such a gas tax would be used exclusively for road repairs. Some of the revenue from Michigan's current fuel taxes is devoted to a number of other purposes beside road maintenance, such as supporting public transit and maintaining and improving off-road trails, as described above. Therefore, Michigan's current fuel tax can only be considered a loose type of user fee for using government-maintained public roads.

† Estimates were originally reported in 2000 dollars and have been adjusted to constant January, 2018 dollars.

expensive in urban areas than rural ones. Heavy commercial trucks on urban roads appear to do the most damage to roads.

Another instructive exercise might be to compare how much Michigan drivers currently pay in fuel taxes (a type of user fee) to these estimates. Passenger vehicles pay, on average, 3 cents per mile to drive on Michigan's roads. Average vehicle mileage for all passenger cars is 23.4 miles per gallon.⁶⁸ Passenger cars currently pay 44.7 cents per gallon in federal and state gasoline taxes and an average of one cent per mile in vehicle registration fees.* This equates to a cost of 3 cents per mile in gasoline taxes and vehicle registration fees to drive a mile. MDOT estimates that an 80,000-pound truck, or a typical semi-truck, pays about 11 cents per mile in state and federal user fees.⁶⁹

These estimates suggest that commercial trucks are not paying the full cost of the pavement damage they cause on Michigan's roads. Alternatively, passenger vehicles overpay for the damage they inflict. In terms of pavement damage, commercial trucks are subsidized by passenger cars.[†]

Challenges with Funding Michigan's Roads

MDOT estimates that the average cost to reconstruct or rehabilitate one lane mile is \$1.3 million.[‡] As mentioned, 25 percent of trunkline roads are in poor condition and there are about 30,000 lane miles of trunkline roads in Michigan. Thus it would cost approximately \$9.7 billion to immediately reconstruct or rehabilitate Michigan's trunkline roads that are presently in poor condition. Forty-eight percent of federal-aid county roads, and 46 percent of federal-aid city and village roads are in poor condition too. This equates to another 28,500 lane miles in poor condition. Trunklines tend to have higher construction costs than other types of roads, so if it costs on average \$1 million per lane mile to reconstruct or rehabilitate a nontrunkline road, it would cost approximately \$28.5 billion to immediately reconstruct all city and county federal-aid roads that are in poor condition. There are 165,000 lane miles of non-federal-aid roads in Michigan with an estimated 37 percent in poor condition, which would cost another \$61 billion to reconstruct. Thus Michigan would need nearly \$100 billion to reconstruct all of its roads that are in poor condition, or roughly \$3 billion per year for 30 years.

Dedicating more funding for roads is challenging for a number of reasons. First, Michigan voters recently sent policymakers a very clear message about raising state taxes to pay for some of the projected costs of improving roads. Proposal 1 of 2015, which would have increased the sales tax,

* The average vehicle registration fee in Michigan is about \$120. Americans drive an average of about 14,000 miles per year, which works out to be about 1 cent per mile in vehicle registration fees. Emma Ockerman, "Michigan Vehicle Registration Will Soon Go up by 20%," *Detroit Free Press*, Dec. 20, 2016, <https://perma.cc/JPH8-FZTB>; Federal Highway Administration, "Average Annual Miles per Driver by Age Group" (Federal Highway Administration, Mar. 29, 2018), <https://perma.cc/W5D6-KYSK>.

† There are other costs to using roads than just pavement damage, what economists call externalities. Congestion, air and noise pollution and the cost of automobile accidents are a few of these costs, and these are also estimated by the CBO in their report. This current study focuses on pavement damage, because the improvement of such is the primary purpose of the state's road funding revenue.

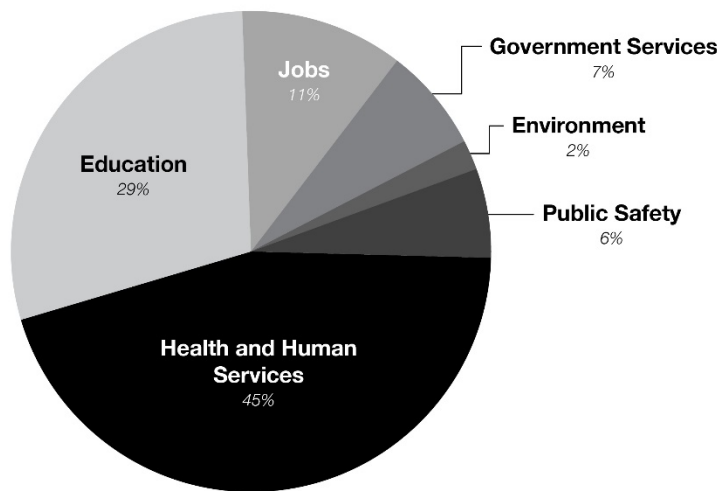
‡ "Fast Facts 2018" (Michigan Department of Transportation, Jan. 2018), <https://perma.cc/HS8E-3WHJ>. § The "Jobs" category appears to consist of funding for transportation, workforce and economic development, and licensing and regulatory affairs, with the largest component being the \$4.1 billion in total transportation funding.

fuel taxes and vehicle registration taxes, and raise an estimated \$2 billion additional state revenue, was rejected by 80 percent of voters.⁷⁰

Second, although the Legislature has allocated more of its general purpose funds to roads in recent years, this is probably not a good strategy for getting roads the funding they need moving forward. The Legislature has a large range of spending interests, and funding for roads would constantly be competing with all these interests.

In addition, dedicating a significant amount of the state’s general fund to roads would be a radical shift in spending priorities. Graphic 26 below shows the composition of the state government’s \$56.3 billion budget for fiscal year 2018.^{*} Public schools and health and human services represent nearly three-quarters of Michigan’s budget, with HHS comprising nearly half of it.

Graphic 26: Fiscal Year 2018 Executive Budget



Source: State of Michigan Executive Budget

Compare this to Michigan’s budget for fiscal year 2000, as shown in Graphic 27. Adjusted for inflation, Michigan had a \$50 billion budget then and HHS (as indicated by “Community Health” and the “Family Independence Agency”) was only one-third of the Michigan’s budget.[†] HHS spending has since increased from \$17 billion to \$25.5 billion. Even assuming a significant amount of this spending results from programs receiving matched federal funds, this increase still represents at least an additional \$2 billion more annually being spent on HHS purposes.

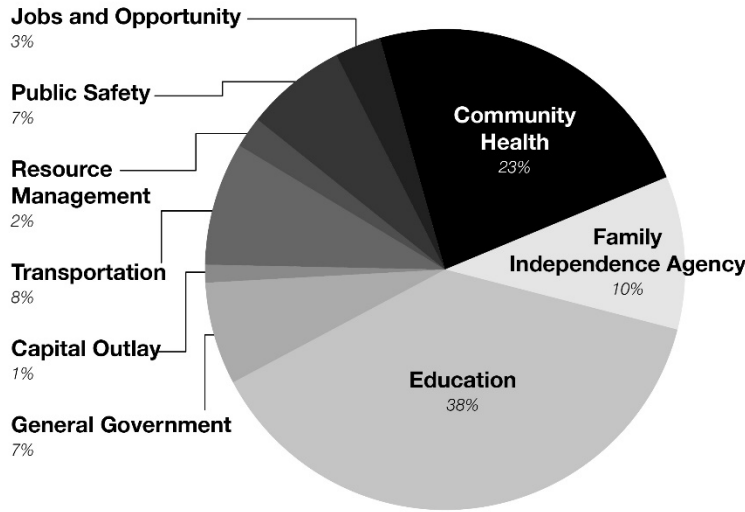
Just from this cursory view, it is clear that the state has prioritized spending on health- and medical-related services above all other priorities. If this trend continues, and especially if state

* The “Jobs” category appears to consist of funding for transportation, workforce and economic development, and licensing and regulatory affairs, with the largest component being the \$4.1 billion in total transportation funding.

† The Family Independence Agency was renamed as the Department of Health and Human Services in 2004. Community Health was merged with Health and Human Services in 2015.

revenues start to decline, it will be even harder for legislators to allocate more general fund money to roads, unless their priorities significantly change.

Graphic 27: Fiscal Year 2000 Executive Budget



Source: State of Michigan Executive Budget

Conclusion and Policy Recommendations

Michigan’s trunkline road system is largely in satisfactory condition right now, but is projected to substantially worsen over the next five years. Nearly half of all county and city and village roads in Michigan are in poor condition, which will take billions of dollars and many years to remedy. Below are 10 recommendations policymakers should consider for both the short and long run.

Recommendation 1: Collect more and better data about road conditions.

Michigan road agencies at all levels of government should collect PASER data for all roads — both federal-aid-eligible and non-federal-aid-eligible. The data should be provided to TAMC, which can then make it available publicly. Townships should report PASER ratings as well, and that information should be separated from countywide PASER data. Having better data about the conditions of roads in Michigan will help policymakers make better decisions about how to allocate scarce resources. Local governments would also benefit, as they could better identify the most pressing needs among their local roads.

Recommendation 2: Remove special exemptions for vehicle registration fees

The Legislature should eliminate the registration discounts for commercial trucks. Commercial trucks cause almost all of the pavement damage to roads and even without the discounts, the roads are substantially underpriced for trucks. These discounts cost the Michigan Transportation Fund millions in lost revenue each year without a clear economic justification.

Recommendation 3: Stop paying local governments for roads they do not maintain

The state distributes money from the Michigan Transportation Fund to cities with more than 25,000 people based on how many trunkline miles they have. The Legislature should stop allocating money to cities in this fashion and instead use this money for the state trunkline fund. MDOT is responsible for maintaining these roads, and there is no reason for cities to get a special distribution for roads they are not responsible for maintaining. The requirement that cities contribute to trunkline projects can be eliminated, since their contribution is already small. Adopting this recommendation would have added approximately \$61.5 million to the trunkline fund in 2017.

Recommendation 4: Prioritize the trunkline system at the state level

MDOT estimates that the trunkline fund needs an additional \$1.13 billion annually to prevent future road deterioration and to get 90 percent of state trunkline roads into fair or good condition.* Since these roads carry the vast majority of all Michigan traffic, maintaining them is critical to the state's economy. Additional funding increases or reprioritization of current funding levels should first be used to improve trunkline maintenance before being dedicated to other purposes. Such spending is likely to provide the most bang for the buck, since these are Michigan's most used roads.

Recommendation 5: Use sales tax from fuel purchases for roads

The Michigan Constitution prohibits sales tax revenue from fuel purchases being used for transportation funding. A constitutional amendment to allow sales tax proceeds from gasoline and diesel sales to be added to the MTF should be considered. This would have added approximately \$270 million in road funding in 2017.†

Recommendation 6: Pilot a Vehicle Miles Traveled tax program

A vehicle-miles-traveled tax would charge drivers a fee per mile driven, similar to a toll.‡ Technology now makes it feasible to toll all roads by recording the number of miles a car or truck drives and to then charge the driver a certain fee per mile. Oregon recently launched the "OReGO" program, which is a VMT tax. A device plugged into a car uses either GPS or the odometer to record the number of miles driven. The vehicle owners is then charged 1.7 cents per mile.§ Drivers in this program receive a credit to offset the amount of fuel taxes they still paid at the pump. The Oregon program works for both passenger and commercial vehicles.

* This is MDOT's own goal and was reached in 2010. "2018-2022 Five-Year Transportation Program" (Michigan Department of Transportation), <https://perma.cc/67RY-DET6>.

† This assumes an average price of \$2.44 per gallon for gasoline and \$2.65 per gallon, in 2017, which are the average prices reported by the U.S. Energy Information Administration. "Weekly Retail Gasoline and Diesel Prices" (U.S. Energy Information Administration, Sep. 10, 2018), <https://perma.cc/L6GX-YKAS>.

‡ For more discussion of VMTs, please see: "Alternative Approaches to Funding Highways" (Congressional Budget Office, Mar. 2011), 14–20, <https://perma.cc/H4FV-HDDQ>.

§ For more information, see <http://www.myorego.org/about>.

A VMT tax does raise concerns about privacy. The Oregon program recognizes this issue and uses a private vendor to handle administering the VMT tax.⁷¹

Once fully implemented, a VMT tax could fully replace state fuel taxes. As it can accurately measure how many miles a person traveled on a public road, it is a more pure form of a user fee than fuel taxes and more economically efficient. Several factors suggest that a VMT tax or something similar will be the future of road funding. Vehicles are becoming more fuel efficient, electric vehicles are becoming more widely used, and the transaction costs of tracking and calculating driving data continue to decline. Michigan would be well-served in implementing a VMT pilot program under the Oregon model.

Recommendation 7: Base vehicle registration fees on weight

Heavier vehicles cause more pavement damage. Basing a vehicle's registration fee on its weight, rather than its base value, would create a more efficient user fee for the roads. Since the amount of pavement damage a vehicle inflicts on a road is chiefly determined by its weight, it makes economic sense for drivers of heavier vehicles to pay more in registration fees than drivers of lighter ones. This approach gives drivers an incentive to drive lighter vehicles that cause less pavement damage.

It would also help deal with the fact that electric and hybrid vehicles pay significantly fewer fuel taxes, or even none, despite using the roads. As these vehicles tend to be heavier than gasoline-powered ones, they would, under such a system, automatically pay more in registration fees. The current surcharge might be then rendered unnecessary.

Recommendation 8: Eliminate the Transportation Economic Development Fund

It is unclear why the state needs to devote some transportation funds for economic development. There are several reasons why policymakers should consider eliminating this funding and dedicating it instead to maintaining trunkline roads.

First, the state already spends hundreds of millions of dollars on economic development and operates an entire department focused on it. If the projects supported by the Transportation Economic Development Fund are worth subsidizing, their advocates could apply for funding through one of the many subsidy programs administered by the Michigan Economic Development Corporation or Michigan Strategic Fund.

Second, as pointed out in the discussion about the costs of pavement damage, commercial vehicles do not appear to pay in registration fees and fuel taxes an amount that matches the cost of the pavement damage they cause. Drivers of passenger vehicles pay more than their fair share, thus subsidizing commercial trucks. Some type of industrial trucks also benefit from substantially reduced registration fees. Already the beneficiaries of some subsidization, businesses do not have a strong case for why they need additional targeted subsidies from the MTF.

Recommendation 9: Help local governments pursue local road millages

Counties, townships, and cities and villages without road millages should be encouraged to consider them. The state could even create an incentive of some kind to promote local governments investigating the feasibility of enacting a millage in their jurisdiction. Local governments should not expect the state to completely bridge the road-funding gap.

In addition, the state might consider helping local governments fund road projects through loan guarantees and or other method to assist their financing of road improvements. Such a system could resemble how school facilities are funded. The state generally does not provide direct assistance for these buildings, and funds for them are raised locally. The state does, however, provide loan assistance to improve the school districts' credit rating and thus lower their borrowing costs.

Recommendation 10: Reduce or eliminate the Comprehensive Transportation Fund

The Comprehensive Transportation Fund is likely the least efficient way for the state to pay for transportation needs. Funding local public transit authorities through statewide fuel taxes and vehicle registration fees is far removed from a user-fee model, which is the most economically efficient form of funding public goods. The costs of these transit systems should be paid by local taxpayers who benefit from these services being available and directly by the users of these services themselves.

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Chris Douglas is currently the department chair of the UM-Flint Economics Department, where he has been on faculty since 2007. He earned his B.S. in electrical engineering and his B.S. in economics from Michigan Technological University in 2001, and his Ph.D. in economics from Michigan State University in 2007. Dr. Douglas teaches Principles of Microeconomics, Principles of Macroeconomics, International Economics, Public Finance, and Sports Economics.