

MOTORIZATION TRENDS IN MINNESOTA

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Motorization Trends in Minnesota

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9. Abstract The analysis of motorization trends in the state of Minnesota is important because it reveals changes in driving behavior that impact transportation planning and funding across the state. Changes in traveling habits have implications for transportation revenue streams in Minnesota, particularly for roadway infrastructure investment. This report presents an analysis of motorization and highway and roadway funding trends in Minnesota between 1980 and 2021. Key motorization patterns include the number of registered vehicles, vehicle miles traveled (VMT), fuel consumption, and vehicle crashes. In addition, this report analyses the evolution of roadway revenues and expenses at the federal, state, and local levels. The analysis in this report includes an overview of the general trends for the state as well as an overview of the changes by county. Data for the analysis come from the Minnesota Transportation Finance Database. The report has several interesting findings about motorization in Minnesota. For instance, the number of registered vehicles has continually increased since 1980, although it has slowed since the 2000s. However, the number of registered vehicles per capita and per county indicate significant declines in recent years. Similarly, the number of alternative fuel vehicles, particularly electric vehicles (EVs), has been increasing. Distance traveled, measured by VMT, and fuel consumption increased, although their per capita measures have also decreased, particularly since 2020. Lastly, while overall the number of vehicle crashes has declined since 2004, the number of fatal crashes rose significantly in 2021. Overall, Minnesota’s trends are consistent with the national pattern. The persistence of these trends in the future will have consequences in future roadway funding. In particular, fuel consumption and its long-term declines due to increases in fuel efficiency standards could cause continuous revenue reductions unless the state roadway funding structure is adjusted.	
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1 Introduction

The analysis of motorization trends in the state of Minnesota is important because it reveals changes in travel behavior that impact transportation planning and funding across the state. Changes in traveling habits have implications for transportation revenue streams in Minnesota, particularly for roadway infrastructure investment.

This report presents an analysis of motorization and highway and roadway funding trends in Minnesota between 1980 and 2021. Key motorization patterns include the number of registered vehicles, vehicle miles traveled (VMT), fuel consumption, and vehicle crashes. In addition, this report analyzes the evolution of roadway revenues and expenses at the federal, state, and local levels. This report includes an overview of the general trends for the state as well as an overview of the changes by county. Data for the analysis come from the Minnesota Transportation Finance Database, a database created by the Transportation Policy and Economic Competitiveness (TPEC) program from the Humphrey School of Public Affairs and the Center for Transportation Studies (CTS).

The report has several interesting findings about motorization in Minnesota. It is worth noting that motorization trends are significantly impacted by the COVID-19 pandemic. The number of registered vehicles has continually increased since 1980, although it has slowed since the 2000s. However, the number of registered vehicles per capita and per county indicate significant declines in recent years. Similarly, the number of alternative fuel vehicles, particularly electric vehicles (EVs), has been increasing. Distance traveled, measured in VMT, and fuel consumption have also increased, although their per capita measures have been decreasing, particularly since 2020. Lastly, while overall the number of vehicle crashes has declined since 2004, the number of fatal crashes rose significantly in 2021. Overall, Minnesota's trends are consistent with the national pattern. The persistence of these trends in the future will have consequences for future roadway funding. In particular, fuel consumption and its long-term declines due to increases in fuel efficiency standards could cause continuous revenue reductions unless the state roadway funding structure is adjusted.

This report is organized as follows. The next section presents an overview of motorization trends in Minnesota. Section 3 presents an analysis of trends in revenue and expenditures for highway and roadway purposes in Minnesota. The final section presents conclusions from the report and draws connections between motorization trends and transportation finance in Minnesota.

2 Motorization Trends in Minnesota

Vehicle ownership, vehicle miles traveled, fuel consumption, and vehicle crashes are key variables for understanding the changing nature of motor vehicle travel in Minnesota. These changes have important implications for transportation planning and funding. We explore the aggregate change in all four measures since 1980, as well as changes by county in recent years. The descriptions of the variables used in the report are as follows. Registered vehicles consider automobiles, buses, trucks, and motorcycles; which are publicly or privately and commercially owned in the state. As part of the vehicle conversation, we also discuss trends in alternative fuel vehicles which include electric vehicles (EVs), plug-in hybrid electric vehicles (PHEVs), and hybrid electric vehicles (HEV). Distance traveled is measured by vehicle miles traveled (VMT). Total fuel consumption reflects both the use of gasoline and special fuels (mostly diesel). Vehicle crashes include fatal crashes, injury crashes, and property damage crashes.

2.1 Registered Vehicles

The number of registered vehicles has consistently grown in Minnesota since 1980, but growth has slowed in recent decades (see Figure 1). The number of vehicles registered almost doubled between 1980 and 2021, from 3 million vehicles in 1980 to 5.5 million vehicles in 2021 (Figure 1a). The number of registered vehicles increased much faster between 1980 and 2000 than between 2000 and 2021, at an average annual rate of 2.2 percent and 0.9 percent, respectively.

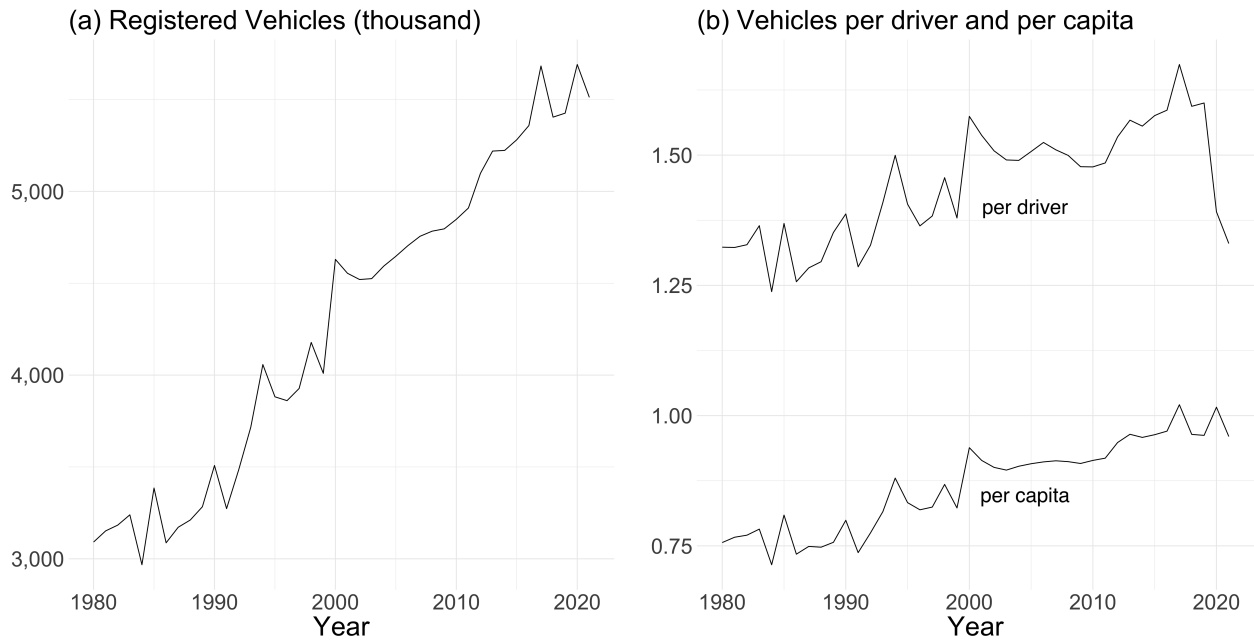


Figure 1: Registered Vehicles in Minnesota

Source: Authors' calculations. Data from the Minnesota Transportation Finance Database (File T).

The number of registered vehicles per driver and per person – as seen in Figure 1b – has also increased since 1980 but at a slower rate, on average 0.1 and 0.7 percent, respectively. In the early 80s, there were seven vehicles for every 10 people in Minnesota; in recent years, that ratio is almost 1:1. Most of this increase occurred between 1980 and 2000. In the 2000s, despite the increase in overall vehicle registration, the number of vehicles per driver and per person declined. Vehicle ownership per driver and per person only started to increase again after 2012. By 2015, the ratio of vehicles per driver was at about the same level as the ratio in 2000. Since 2015 vehicle ownership per driver has varied widely presenting a large decrease in recent years. Such a variation is due to the large increase in licensed drivers, which increased by 20.6 percent between 2019 and 2020.

Figure 2 shows the vehicle registration per capita in Minnesota counties. Figure 2a presents vehicle registration across Minnesota in 2021. According to the 2021 data, people in Greater Minnesota have a higher ratio of vehicles per capita than people in the metro area, with an average of 1.2 and 0.9, respectively. According to the figure, the number of registered vehicles per capita is higher in the northwest and some of the southwest counties (counties in Districts 2 and 8). Figure 2b presents the difference between 2017 and 2021. The graph presents a significant decline in the number of vehicles registered. This variation could be due to changes in data reporting. Researchers contacted Driver and Vehicle

Services at the Department of Public Safety (DPS) and learned that the Department rolled out a new motor vehicle system on November 16, 2020, which led to a difference in reporting in 2021. ¹

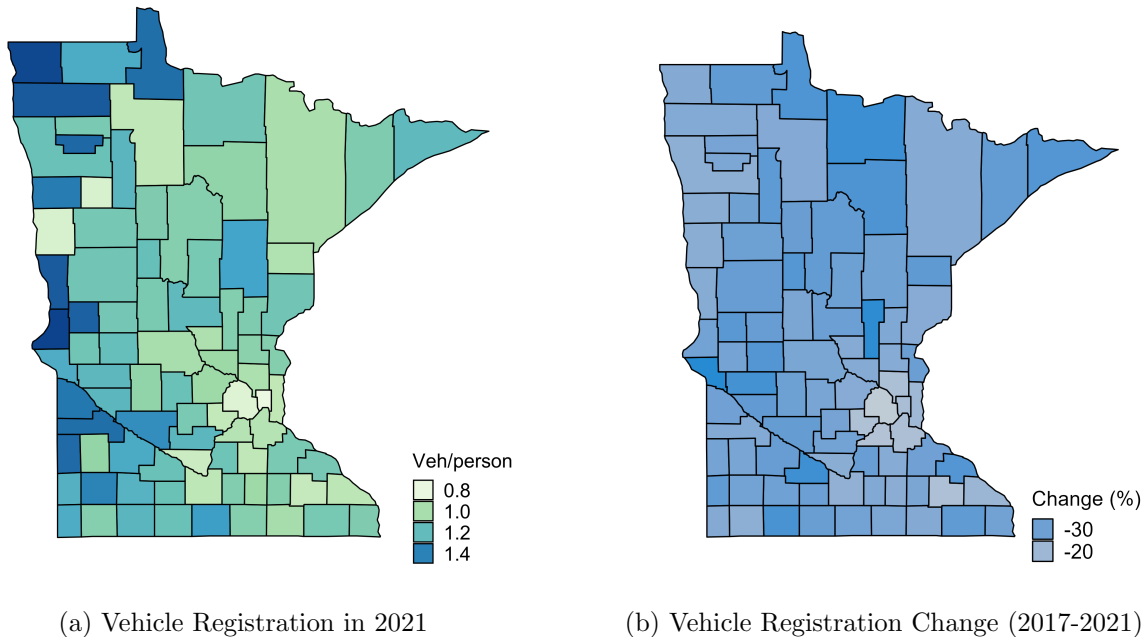


Figure 2: Per Capita Vehicle Registration in Minnesota by County

Source: Authors' calculations. Data from the Minnesota Transportation Finance Database (File W1).

Overall, vehicle ownership trends in Minnesota are similar to the national trends. The number of registered vehicles in the U.S. declined after 2008, but it rebounded slowly as the economy improved (Sivak, 2015). Overall, vehicle ownership in the U.S. continued increasing even during the COVID-19 pandemic due to the need for physical distancing and transmission risks (Thakuriah, 2023).

In terms of vehicle ownership per capita, Minnesota has a slightly higher ratio than the national average. The ratio for the U.S. was 0.8 vehicles per person in 2021, compared to 1.0 in Minnesota (Office of Highway Policy Information, 2022). Vehicle ownership per capita across the U.S. ranged between 1.9 in Montana and 0.5 in Delaware. Minnesota ranked 16th in per capita vehicle ownership across all states in 2021.

¹Researchers continue to explore the reasons behind the decline in the number of motor vehicle registrations during these years.

Despite the increasing trends, it seems unlikely that the growth rate of vehicle ownership will return to its faster pre-2000 levels. In particular, studies highlight different vehicle ownership preferences that current generations have compared to previous generations. While *Millennials* do own fewer vehicles per capita than past generations, there is debate about whether this reflects cultural differences or merely their relatively poor economic circumstances. Those who rely on the cultural explanation contend the younger generation prefers living in dense urban areas, taking public transit, and using technologies like ride-sharing and online shopping, which leads to lower car ownership (Dutzik and Baxandall, 2013; Wang et al., 2021). On the other hand, multiple studies have concluded lower car ownership rates for young people are the result of their economic situation, rather than a shift in fundamental preferences (Kurtz et al., 2016; Klein and Smart, 2016).

In addition to changes in ownership preferences, shared mobility (SM) and the introduction of autonomous vehicles (AVs) in the near future are expected to reshape mobility (Deloitte University Press, 2016; Corwin and Pankratz, 2017). It is expected that new technologies will reduce vehicle ownership as people have greater access to shared vehicles (Zhang et al., 2018). One shared autonomous vehicle could potentially take the place of many personally owned traditional vehicles. This change is likely to occur first in urban centers where mobility-as-a-service (MaaS) will be most profitable and available.

2.1.1 Alternative Fuel Vehicles

The number of alternative fuel vehicles in Minnesota has increased since 2016 (see Figure 3). Alternative fuel vehicles have grown at an annual average rate of 13.7 percent. The growth rates are higher for EVs, followed by PHEV and HEV. Between 2020 and 2021, the growth rates were 44.2, 32.8, and 13.6 percent, respectively. In 2016, alternative fuel vehicles represented 1.3 percent of total light-duty vehicle registrations. This share increased to 2.3 percent in 2021.

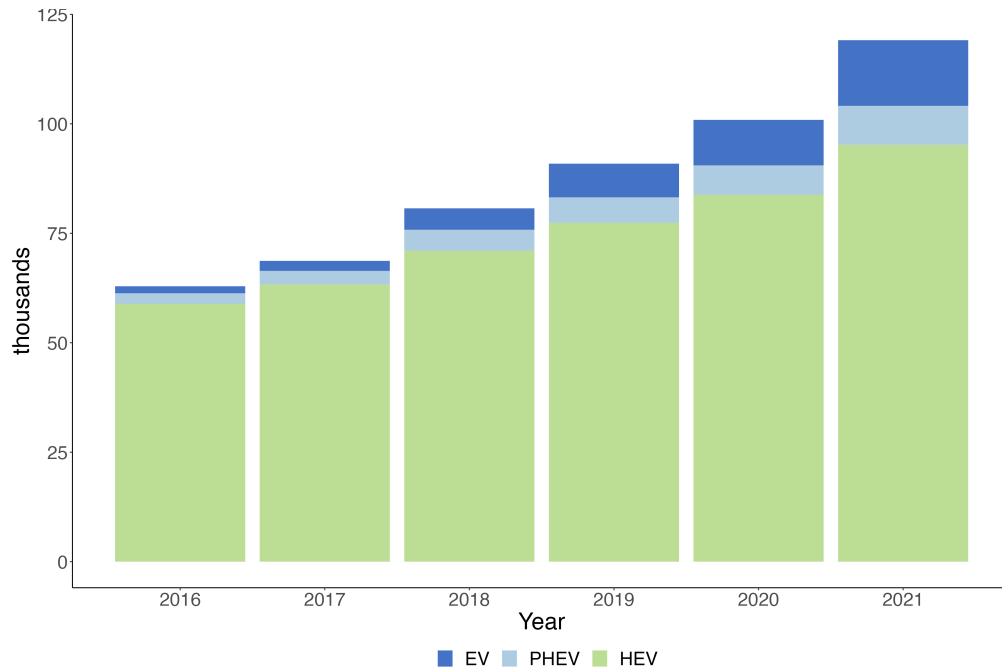


Figure 3: Alternative Fuel Vehicles in Minnesota

Source: Authors' calculations. Data from the Minnesota Transportation Finance Database (File W2a).

Nationally, alternative vehicles were 2.4 percent of light-duty vehicles in 2021. In Minnesota, the share of alternative fuel vehicles is close to the national average, with 2.3 percent. Figure 4 presents alternative vehicles as a share of light-duty vehicles across the U.S. in 2021. California presents the highest share with 6.4 percent, while Mississippi presents the lowest with 0.8 percent.

COVID-19 pandemic and did not return to pre-pandemic levels as of 2021. VMT continued increasing in 2022 (USDOT, 2022) and may grow as the global pandemic emergency ends and more employees return to office. Similarly, per driver, per capita, and per vehicle VMT have been declining significantly in recent years, particularly in 2020. VMT per driver increased steadily until 2005 (see Figure 5b), but decreased to around its mid-1990s level in 2016. VMT per capita has been less variable than either of the first two VMT measures (see Figure 5c), and has been on a more long-term downward trend than VMT per driver. VMT per vehicle peaked in 1999, and declined sharply in 2008 and again in 2020, showing that vehicles in Minnesota are driven fewer average miles than in previous decades.

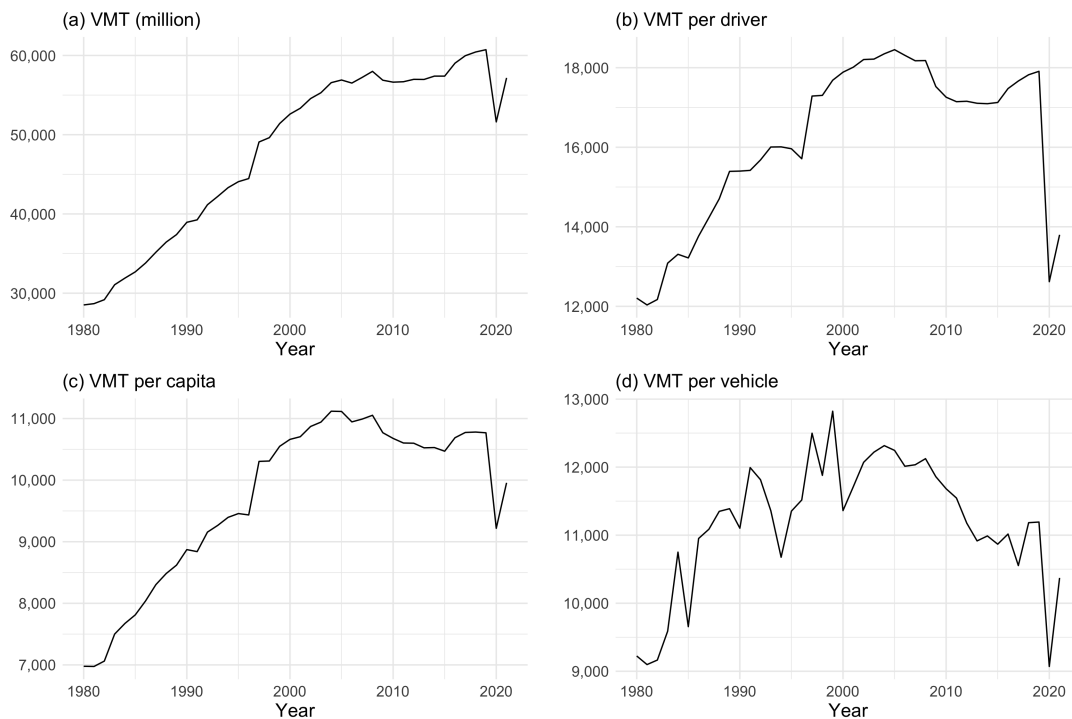


Figure 5: Vehicle Miles Traveled in Minnesota

Source: Authors' calculations. Data from the Minnesota Transportation Finance Database.

Figure 6 presents per capita vehicle miles traveled in Minnesota by county. Overall, VMT is highly concentrated in Hennepin County (Motorization Trends II, data visualization available on the TPEC website). When analyzing VMT per capita (as shown in Figure 6a), we observe that metro counties had a per capita VMT of around 9,000, while counties in Greater Minnesota had an average per capita VMT of 13,700 in 2021. The VMT difference between rural and urban areas may be due to the fact that people in rural areas have to travel long distances to their places of employment, shopping, and other activities than

people in urban areas as well as the limited access to alternative transportation options (Minnesota Go, 2022). Overall, very few counties present a per capita VMT of more than 25,000.

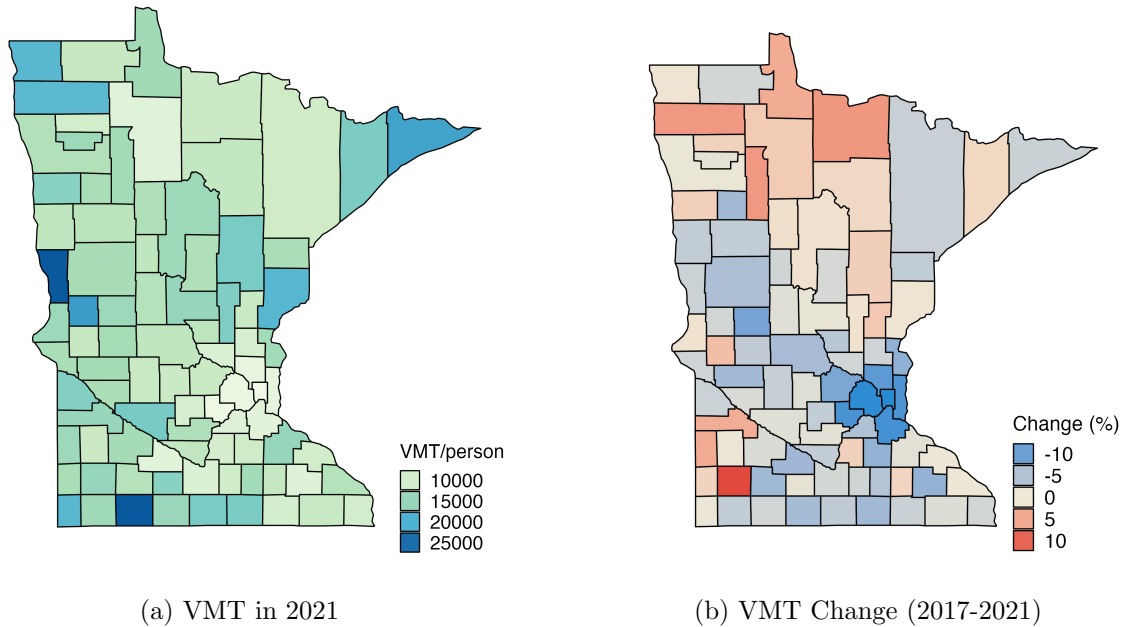


Figure 6: Per Capita Vehicle Miles Traveled in Minnesota by County

Source: Authors’ calculations. Data from the Minnesota Transportation Finance Database. (File M)

Between 2017 and 2021 (as shown in Figure 6b), while per capita VMT has decreased in most counties (particularly in the metro area), some northern counties in Greater Minnesota such as Koochiching, Lake of the Woods, and Marshall present an increase. This trend of higher VMT growth in rural Minnesota is similar to national trends (Minnesota Go, 2022). While Hennepin County experienced the highest decrease (12.8 percent) in per capita VMT, Murray County experienced the highest increase (11.8 percent). The decline for most counties over this period is likely the result of a one-year decrease in 2020 due to the pandemic (see Figure 5c).

The change in VMT across the country has been very similar to that of Minnesota. After rapid increases in VMT for several decades, national distance traveled evened out in the 2000s and possibly declined until 2015, when it began to increase significantly again (Leard et al., 2016). The Federal Highway Administration projects that VMT will once again

begin to grow, at an average annual rate of 0.7 percent between 2019 and 2049 (FHWA, 2018, 2022).

While the decline in VMT in recent years was mainly driven due to the COVID-19 pandemic and remote or hybrid work schedules, VMT presented a downward trend even before the pandemic. There is debate about the causes of changes in VMT. Some researchers emphasize cultural and societal shifts, while others emphasize the importance of economic conditions. Once again, the literature attributes changes to the behaviors of younger Americans, who in particular drive less than earlier generations. Some research indicates that Americans have been driving less because of lower incomes, rather than a preference for less driving (Manville et al., 2017). McDonald (2015) finds that while contemporary economic conditions have contributed to a decline in driving among all demographic groups, younger generations have experienced larger declines due to lifestyle and preferential changes. Other research has also suggested most of the change in VMT is due to societal and cultural factors (Circella et al., 2016; Dutzik and Baxandall, 2013). It is anticipated that the impacts of the COVID-19 pandemic on overall travel behavior may translate to longer-term impacts (Shemer et al., 2022), however, continuous research will be needed.

In addition, there are discussions about the impact of shared mobility on VMT. Initial studies found that shared mobility reduced VMT (Cervero et al., 2002; Lane, 2005; Cohen and Shaheen, 2018); but recent studies highlight increases in VMT (Dowds et al., 2021) due to changes in transportation mode choices (Henao, 2017). Particularly, AVs may lead to VMT increases because they make it possible for underserved groups like the elderly to travel (Harper et al., 2016). Similarly, it is expected that AVs will contribute to an increase in travel due to vehicle repositioning (Zhang et al., 2018) and reduced costs of travel (Childress et al., 2015).

2.3 Fuel Consumption

In Minnesota, total fuel consumption has increased since 1980 (see Figure 7a). Minnesotans consumed 2.16 billion gallons of total fuel in 1980 and 2.95 billion gallons in 2021, an average annual increase of 0.9 percent. However, most of this growth happened prior to 2000. In terms of the composition, total fuel consumption is a combination of the usage of gasoline and special fuels attributed to highway use in the state. While in the 1980s, gasoline accounted for almost 90 percent of the total fuel consumption, in recent

years, the consumption of gasoline makes up roughly three-fourths of all fuel consumption in the state, with special fuels accounting for the other fourth.

Since the 1980s, the consumption of special fuels has increased rapidly at an average rate of 2.9 percent, while gasoline consumption has grown at a much lower rate of 0.4 percent. While total fuel consumption increased slightly until 2019, it fell sharply in 2020. Similarly, consumption per driver and vehicle has declined 1.6 and 1.0 percent, respectively since 2000 (see Figure 7b and 7c). Some of the decline in fuel consumption per driver and vehicle since 2000 can be explained by the decrease in VMT per driver and vehicle, the increasing fuel efficiency of vehicles in Minnesota, and the reduced travel demand due to the COVID-19 pandemic (see Figure 7d).

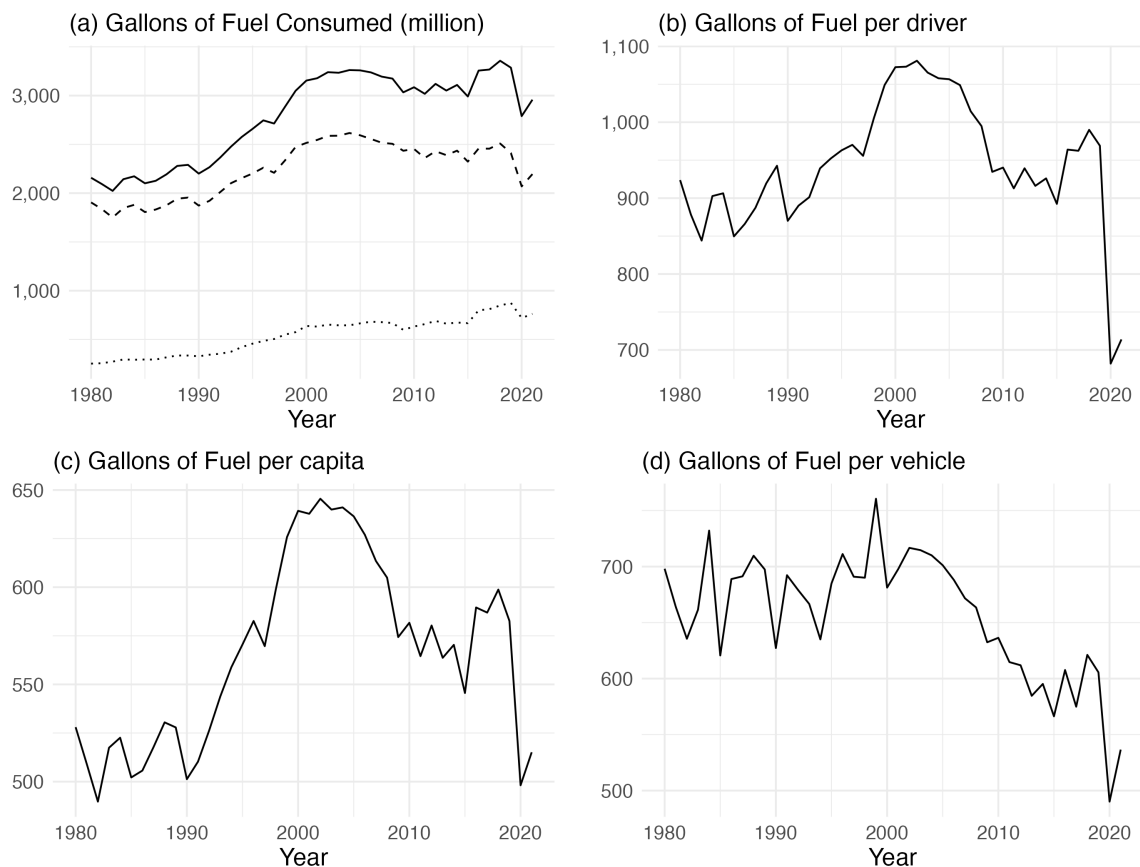


Figure 7: Fuel Consumption in Minnesota

Note: The solid line represents total fuel consumption that includes gallons of gasoline and special fuel attributed to highway use. The dashed and the dotted lines represent gallons of gasoline and gallons of special fuel, respectively. **Source:** Authors' calculations. Data from the Minnesota Transportation Finance Database (File T).

Average fuel efficiency in Minnesota continues to grow. Average fuel efficiency in Figure 8 is calculated as the vehicle miles traveled as a share of the gallons of total fuel consumed in the state (in the figure, the trend is calculated using a 5-year moving average to smooth out yearly fluctuations in the data). The fuel efficiency of the state has grown from 13.2 mpg in 1980 to 19.3 in 2021, with an average annual growth of 0.94 percent. Increasing fuel efficiency is largely the result of federal fuel efficiency standards and the adoption of new sources of power.

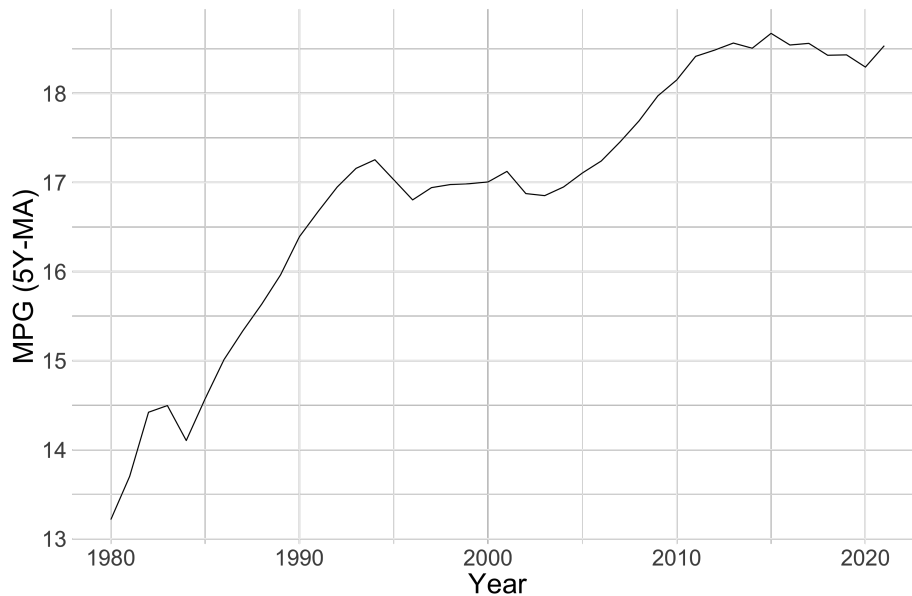


Figure 8: Average Fuel Efficiency in Minnesota

Source: Authors' calculations. Data from the Minnesota Transportation Finance Database.

Fuel efficiency standards have increased significantly over the last decade. Rules for new light-duty vehicles in the U.S. are set by the federal Corporate Average Fuel Economy (CAFE) standards.² A 2007 legislative change mandated that cars and trucks meet a fleet-wide average of 35 mpg by 2020 (Broder and Maynard, 2007). In March 2021, the Environmental Protection Agency (EPA) and the U.S. Department of Transportation set

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CAFE standards of 27.5 mpg for new cars did not increase between 1990 and 2007, while standards for light-duty trucks increased very little. These were first established in 1975.

higher fuel economy and carbon dioxide standards that increase 1.5 percent in stringency annually from model years 2021 to 2026 through the Safer Affordable Fuel-Efficient (SAFE) rule (NHSTA, 2020). The standards required an industry-wide fleet average of approximately 49 mpg for passenger cars and light trucks in model year 2026 (NHSTA, 2022d). While there have been significant increases in fuel efficiency that lead to decreases in per capita fuel consumption, the overall use of gasoline has remained relatively constant. This is in part due to Americans buying larger SUVs as the economy improved and gas prices remained low (Roberts, 2018). In addition to increases in fuel efficiency, the use of new power sources has also decreased fuel consumption and is projected to have an increasing impact in the future.

2.4 Vehicle Crashes

The number of vehicle crashes in Minnesota has declined since 2004 (see Figure 9). Overall, between 2004 and 2021, the number of vehicle crashes fell at an average annual rate of 1.6 percent. While the number of crashes continued declining until 2012, it started increasing in 2013 reaching its peak of 80,636 in 2019. In 2020, the number of crashes fell significantly due to changes in travel demand as a result of the COVID-19 pandemic. Similar to changes in VMT, while in 2021 the number of crashes started increasing, it was still well below its pre-pandemic levels.

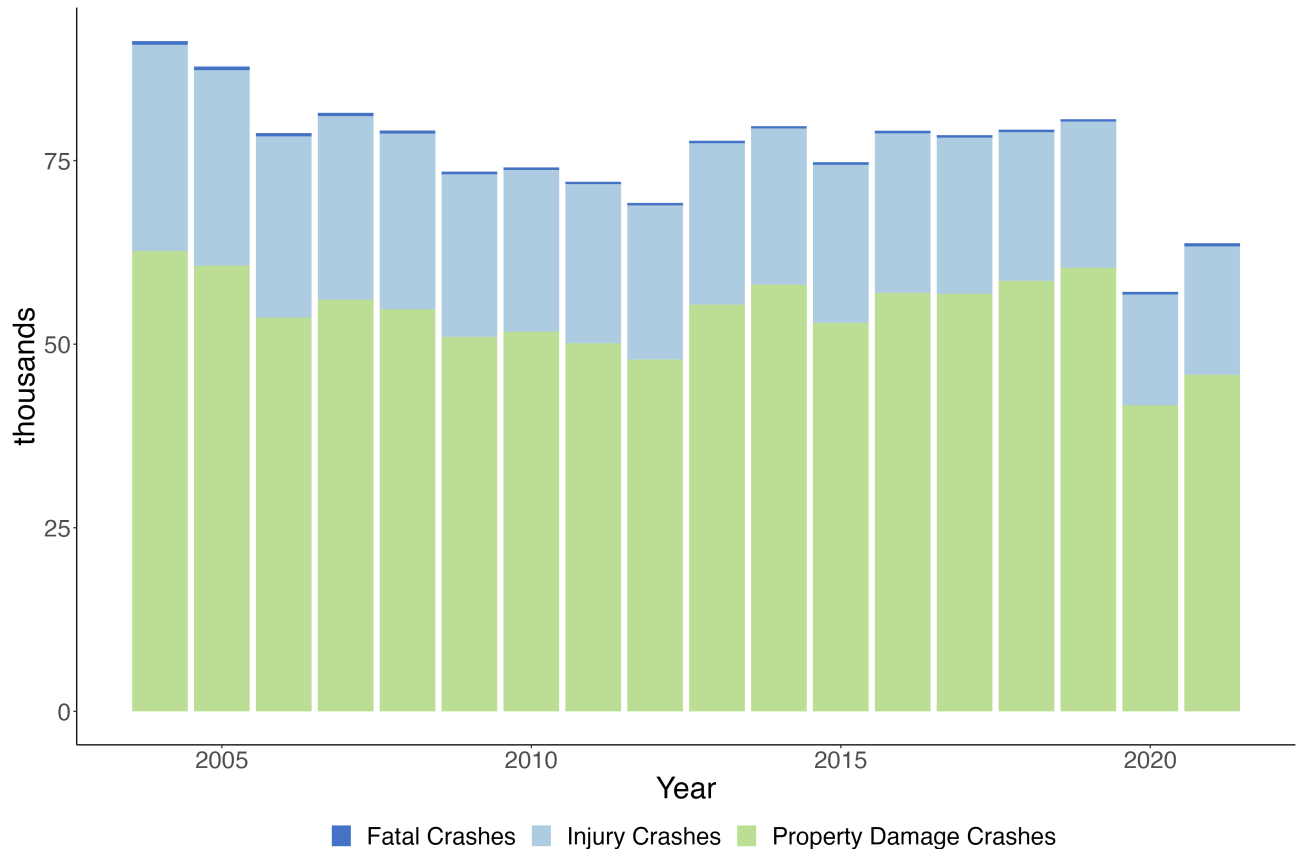


Figure 9: Crashes in Minnesota

Source: Authors' calculations. Data from the Minnesota Transportation Finance Database (File K).

Total crashes are mostly property damage crashes, which represented 71.9 percent of total crashes in 2021. Injury crashes and fatal crashes represented 27.4 and 0.71 percent, respectively in the same period. Between 2004 and 2021, the number of injury crashes experienced the biggest annual average decline (2.4 percent), followed by property damage crashes (1.3 percent), and fatal crashes (0.4 percent). While property damage and injury crashes declined drastically (31 and 24.3 percent, respectively) in 2020, fatal crashes increased (10.8 percent). While all types of crashes increased in 2021, property damage and injury crashes remained below pandemic levels. However, fatal crashes reached its highest peak increasing 22.2 percent from 2020.

Figure 10 presents vehicle crashes per 1,000 people in Minnesota by county. According to 2021 data, metro counties had on average 10.2 crashes per 1,000 people while counties in Greater Minnesota had on average 8.7 crashes per 1,000 people. Overall, some of the central and southern counties indicate higher vehicle crashes per 1,000 people (as shown in Figure 10a). Between 2017 and 2021, crashes per 1,000 people declined in northern and

metro counties, but increased in some southern counties. While Koochiching County experienced the highest decrease in the number of crashes per 1,000 people (60.1 percent), Lac Qui Parle County experienced the highest growth (29.2 percent).

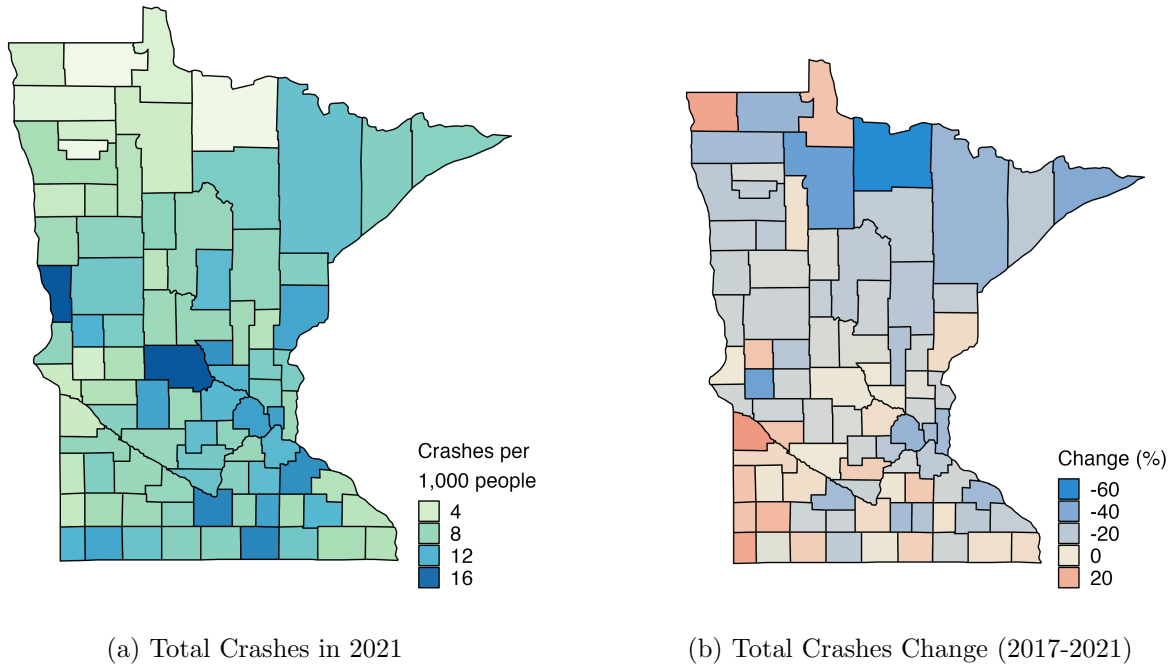


Figure 10: Crashes per 1,000 people in Minnesota by County

Source: Authors' calculations. Data from the Minnesota Transportation Finance Database (File K).

Overall, vehicle crash trends in Minnesota are consistent with national trends. In 2020, while the number of crashes and traffic injuries declined nationally, fatal crashes increased significantly from 2019 (NHSTA, 2022c). This trend continued into 2021, with fatal vehicle crashes going up 10.4 percent compared to 2020, the highest increase since 2005 (NHSTA, 2022a,b). Changing driving patterns and behaviors such as speeding, distracted driving, failure to wear seat belts, and driving under the influence of alcohol and other drugs were the key factors contributing to increased fatality crash rates (NHSTA, 2021).

3 Roadway Funding in Minnesota

3.1 Highway and Roadway Revenues

Federal and state funding makes up a significant portion of Minnesota’s highway and roadway funding. At the federal level, the primary source of revenue is the federal fuel tax, with other minor funds such as the tax on tires and trucks (Peter G. Peterson Foundation, 2018). At the state level, the major sources of revenue are the state fuel tax, the motor vehicle sales tax (MVST), and the motor vehicle registration tax (TabFee) (Zhao et al., 2010). These major sources of revenue are known as highway special revenues and provide over half of Minnesota’s roadway funding (Metropolitan Council, 2015). A new stream of revenue started in 2018: the state sales tax.³

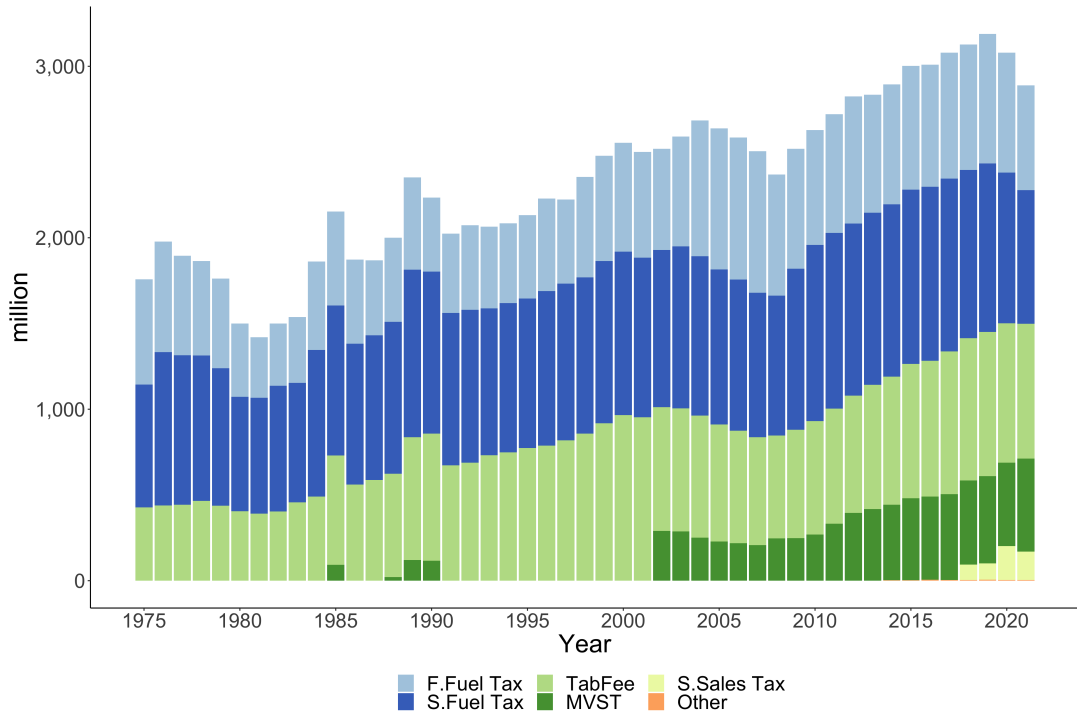
Highway special revenues have increased over time (Figure 11a). However, this growth is mainly driven by revenues from the registration tax (TabFee) and the motor vehicles sales tax (MVST). Overall, revenues from the federal and the state motor fuel tax as a share of total highway special revenues have decreased (Figure 11b). Continued improvements in vehicle fuel efficiency and the adoption of alternative fuel vehicles have put greater downward pressure on the fuel tax base. In addition, the total fuel tax rate has remained relatively constant in the last decades. At the federal level the motor fuel tax rate has been the same since 1993; at the state level, only 33 states and the District of Columbia have adjusted their rates since 2013 (EIA, 2023).⁴ Thus, inflation has significantly reduced the motor fuel tax purchasing power (Peter G Peterson Foundation, 2015).

Currently, several states are worried about the transportation funding gaps that could be generated by the reduction of gasoline consumption. The Congressional Budget Office (2012) estimated the 2012 increases in federal fuel efficiency standards would cause gasoline tax revenues to fall by 21 percent by 2040. To address this problem, some states are considering different options including: raising the gas tax, tying the gas tax rate to the price of gasoline, tying the gas tax to inflation, using additional revenue sources (such as

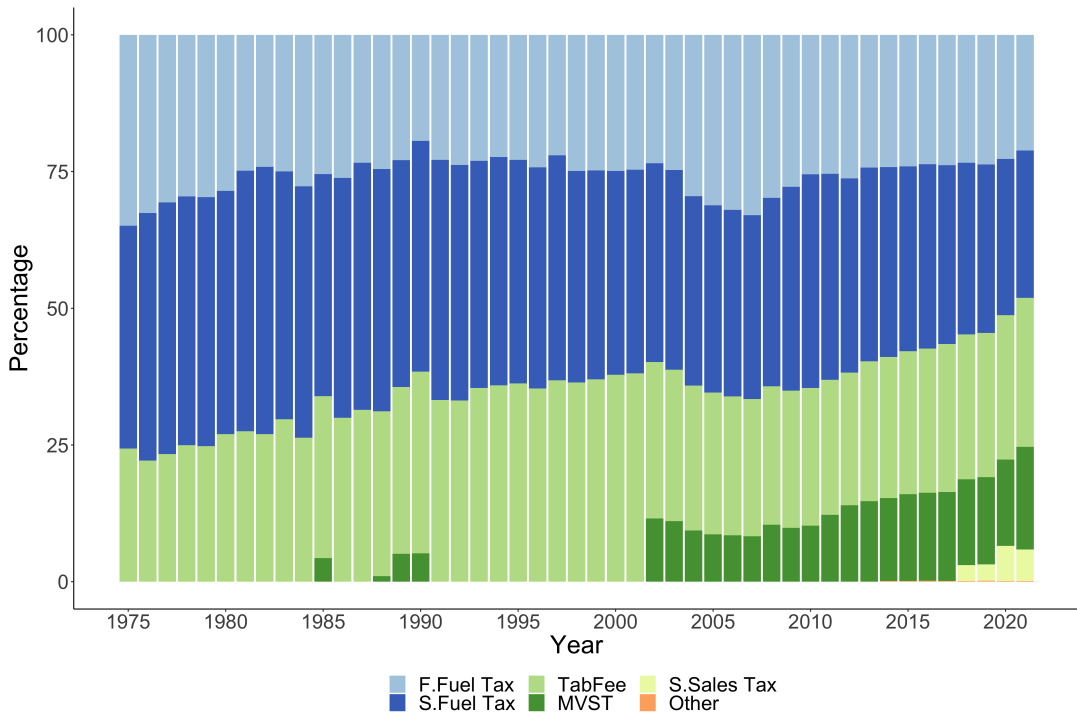
³The legislation enacted in 2017 allocates sales tax revenue streams that were previously going to the general fund. The revenue sources are (i) a portion of the general sales tax revenue resulting from sales of automotive parts - flat dollar amount specified in law, (ii) the entire general sales tax revenue from short-term vehicle rentals, (iii) all revenue from a separate vehicle rental tax imposed on short-term rentals (at a 9.2% rate); and motor vehicle lease sales tax revenue (Burress, 2021).

⁴According to the History of Mn/DOT Revenue Changes, Minnesota’s motor fuel tax rose 8.5 cents between 2008 and 2012. As of June 2023, the tax is 28.5 cents per gallon. In May 2023, bill HF2887 passed that would index the motor fuel tax to inflation starting 2024, not to exceed 3 cents a year.

appropriating funds from the state general fund), and taxing miles traveled instead of gallons of gas consumed (Urban Institute, 2018).



(a) Highway Special Revenues (const.2020)



(b) As a share of Highway Special Revenues

Figure 11: Federal and State Transportation Revenues

Source: Authors' calculations. Data from the Minnesota Transportation Finance Database.

Highway and Roadway Expenditures

Roadway expenditures include (i) the state trunk highway expenditures that are mainly construction and maintenance costs; (ii) federal and state transportation grants to support local roads that are allocated to the counties, cities, or townships; and (iii) local efforts. Figure 12 presents roadway expenditures as a share of state and local expenditures in Minnesota. This share peaked in 2006 and since then it has slightly decreased.

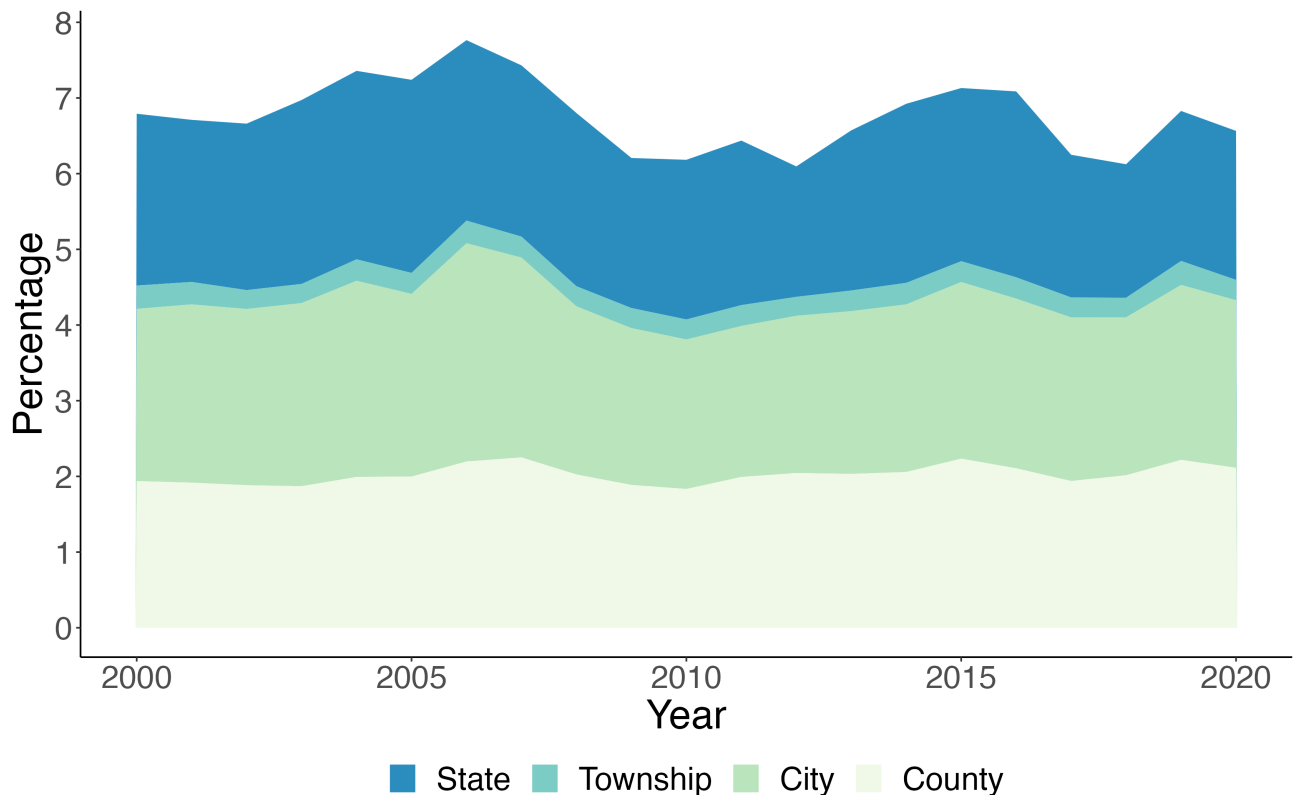


Figure 12: Roadway Expenditures as a Share of State and Local Expenditures in Minnesota

Source: Authors' calculations following Zhao et al. (2018). Data from the Minnesota Transportation Finance Database.

3.2 Highway and Roadway Revenues and Expenditures per VMT

In this part of the report we analyze roadway revenues and expenditures per mile driven in the state. Given the increasing interest in charging users for the real usage of the roadway system, the analysis of several variables per vehicle miles traveled – as a measure of road usage – has received special attention for transportation planning and policy analysis.

Federal and State roadway revenues per VMT have decreased significantly (Figure 13). Constant revenues per VMT (adjusted by inflation) registered their maximum in 1985 with over 6 cents per mile. Since then, revenues per VMT have declined consistently until 2008 when they were just over 4 cents per VMT. The declining trend reversed in 2009 after the state decided to increase the fuel tax. Since then, revenues per VMT have slightly increased but at lower rates. In 2020 revenues reached almost 6 cents per VMT. It is worth noting that recent increases are mainly due to increases in the registration tax and the motor vehicle sale tax, and in 2020 due to the state sales tax. Furthermore, in recent years, revenues per VMT from the motor fuel tax –both at the federal and state levels– have been stable (not decreased) despite the decreasing per capita/vehicle fuel consumption and vehicle ownership trends in the state. The overall declining trend we observe in Figure 13 means that, over time, users are paying less for every mile they drive. Considering all the forecasts, this situation will translate into continuous revenue reductions in the future unless the state roadway transportation funding is adjusted.

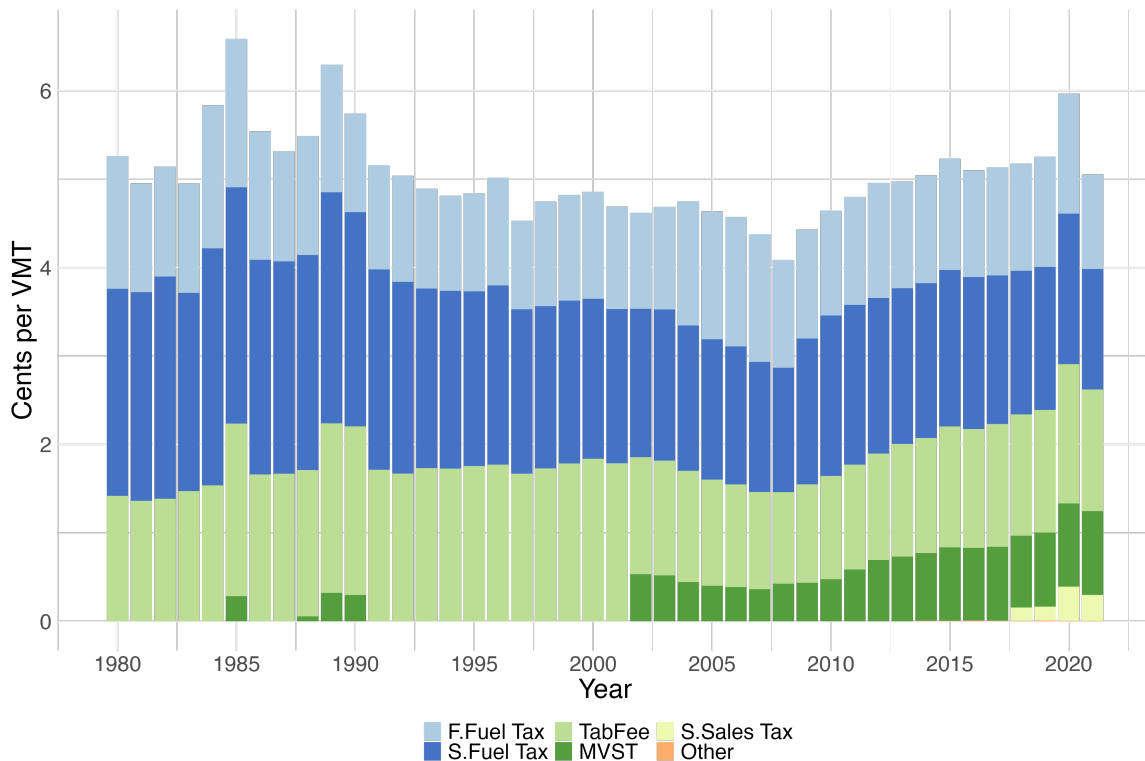


Figure 13: Highway Special Revenues by VMT (const. 2020)

Source: Authors' calculations. Data from the Minnesota Transportation Finance Database.

Federal and state roadway expenditures per VMT remained relatively constant between 2000 and 2015 (Figure 14). These expenditures declined after 2015 but reached their

maximum in 2020. When contrasting Figure 13 and Figure 14, we observe that federal and state roadway revenues are much lower than total roadway expenditures by about 4 cents per VMT, which corresponds to local effort revenues. Local government efforts offset the downward trend of highway special revenues and, in recent years, they have funded a large proportion of the roadway system.

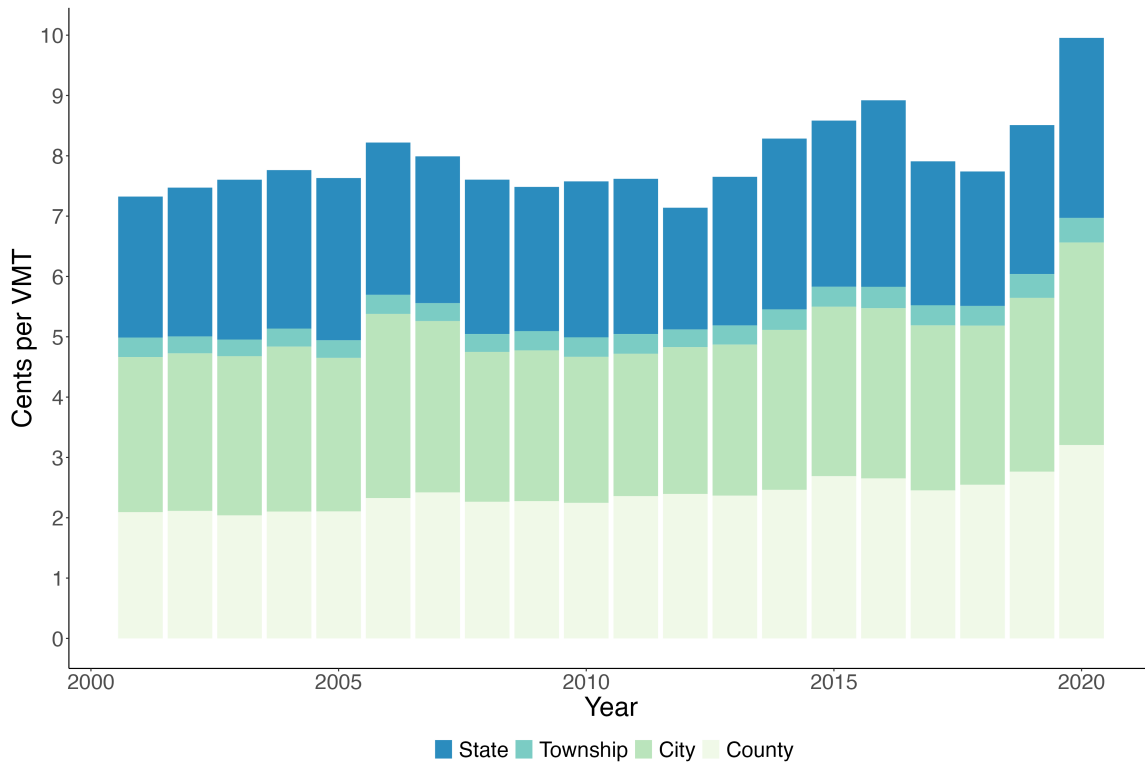


Figure 14: Federal and State Roadway Expenditures by VMT (const. 2020)

Source: Authors' calculations following Zhao et al. (2018). Data from the Minnesota Transportation Finance Database.

4 Conclusions

The report analyzes four key variables for motorization trends in Minnesota: Vehicle registration, VMT, fuel consumption, and vehicle crashes. Most of the trends in the last two years were affected by the COVID-19 pandemic. We found that the number of registered vehicles has continually increased since 1980, but has slowed since the 2000s, with the number of registered vehicles per capita and per county indicating significant declines in recent years. Similarly, the number of alternative fuel vehicles, particularly EVs, has been increasing. Vehicle miles traveled (VMT), and fuel consumption also increased,

although their per capita measures have been decreasing. On average, individuals are driving and consuming less fuel than they did in the 2000s, particularly since 2020. While overall the number of vehicle crashes has declined since, the number of fatal crashes rose significantly in 2021. These state trends are consistent with national patterns.

Overall, there is evidence the rapid increase in motorization that occurred over several decades until the 2000s has ended. While vehicle registrations increased in 2020 due to the COVID-19 pandemic, it is unlikely that it will rise that fast anytime soon. The increases in the 80s and 90s were largely the result of demographic factors that cannot be replicated, including the increase of women in the workforce, the Baby Boom, and the significant increase in household income. In addition, the COVID-19 pandemic led to a significant increase in full-time remote work, which may have long-lasting implications on vehicle ownership and travel demand. According to the Census Bureau, between 2019 and 2021, the number of people primarily working from home tripled (Census Bureau, 2022), which is likely to continue beyond the pandemic.

Similarly, per capita fuel consumption is expected to continue decreasing as a result of increases in vehicle fuel efficiency, remote work, and new and more environmentally friendly technologies. In addition, the report presents the evolution of roadway revenues and expenditures over time. Highway and roadways revenues have increased, and there is a recomposition of total funding available for the roadway system. In particular, revenues from motor vehicle registration and motor vehicle sales tax have offset the reduction in the share of revenues from the motor fuel tax at the federal and state level. Conversely, revenues per VMT have decreased significantly and this is of particular importance in terms of future highway and road planning and funding, and in particular, the burden on local governments.

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