Transportation

CHAPTER 8

In 1992, state and local governments in Minnesota spent about $2.0 billion on transportation-related activities. This chapter examines highway and transit expenditures, which represented more than 90 percent of the spending.[1] We focus mostly on expenditures for streets and highways, which accounted for $1.7 billion, or 83 percent of transportation spending in 1992. In this chapter, we address the following questions:

- **What have been the trends in highway and transit spending in Minnesota and other states?**
- **What factors have influenced spending trends?**
- **How does Minnesota's spending on highways and transit compare with other states?**
- **What factors explain the difference in spending between Minnesota and other states?**

We use spending data from the Census Bureau to analyze spending trends and make national comparisons between 1977 and 1992. More recent data are also used to review Minnesota trends. It is somewhat more difficult to identify the factors affecting spending trends in transportation than for other government functions. Unlike education and human services, more than half of the spending in transportation is for capital expenditures. In addition, it is more difficult to measure transportation workload than it is for most other government functions. In education and human services, enrollment and caseload are good indicators of workload. For highway spending, traffic is a potential workload measure, but it is less clear how this measure precisely influences spending. As a result, it was more difficult to reach definitive conclusions about the factors responsible for spending trends and differences among states in the area of transportation.

1 Other transportation functions not covered in this chapter include air transportation, local parking facilities, and water transport and terminals. About $187 million was spent on these activities in 1992.

BACKGROUND

Highway and transit spending were about 9 percent of state and local government spending in Minnesota in 1992. Funding for highways at the state level comes primarily from the motor fuel tax, motor vehicle registration fees, and federal funds. Local governments fund highway expenditures using state and federal aid, as well as local revenues. Transit funding is supported by state and local revenues, federal aid, and fares.

Minnesota has a street and highway system of almost 130,000 miles. As Table 8.1 shows, about 11 percent of the roads are in urban areas of the state, but these roads carry 52 percent of the traffic. Interstates and freeways account for less than 1 percent of the roads and 27 percent of the traffic. Local roads in rural areas carry only 6 percent of the traffic but represent 59 percent of all road miles in Minnesota.

Table 8.1: Miles of Road and Traffic by Type of Road, Minnesota, 1993

	Percentage of Road Miles	Percentage of Traffic
Interstate	0.2%	13.4%
Other Freeways and Expressways	0.1	5.5
Other Principal Arterials	0.5	7.9
Minor Arterials	1.5	13.8
Collectors	1.2	4.8
Local	8.0	6.5
URBAN	11.5%	51.9%
Interstate	0.5%	8.0%
Other Principal Arterials	2.7	13.6
Minor Arterials	4.8	9.7
Major Collectors	12.3	7.9
Minor Collectors	9.0	2.7
Local	59.2	6.2
RURAL	88.5%	48.1%
Total	100.0%	100.0%

Source: Federal Highway Administration.

Almost 60 percent of the state's traffic is on 10 percent of the roads.

Table 8.2 presents a breakdown of miles and traffic by jurisdiction. The state's trunk highway system of about 12,000 miles carries 59 percent of all traffic. City and county roads which are part of a state-aid system have 25 percent of the road miles and 29 percent of the traffic. Other city and county roads have 22 percent of the mileage and 10 percent of the traffic. Only 2 percent of the traffic is on township roads, which account for 44 percent of all mileage.

Regular transit service in the Twin Cities metropolitan area is provided by Metropolitan Council Transit Operations, "opt-out" providers in some of the suburbs, and a few private companies receiving public subsidies. Additional transit services are provided by Metro Mobility and numerous small urban and rural systems.

Table 8.2: Miles of Road and Traffic by Jurisdiction, Minnesota

	Percentage of Road Miles	Percent of Traffic
State Trunk Highways	9%	59%
County State-Aid Highways	23	21
Municipal State-Aid Streets	2	8
City Streets	10	7
County Roads	12	3
Township Roads	44	2
Total	100%	100%

Source: Minnesota Planning.

Efforts to increase transit use or to reduce automobile traffic also include park and ride lots, ridesharing and commuter van programs, and high occupancy vehicle (HOV) lanes.

Several large cities outside the Twin Cities area also have regular transit service and ridesharing programs. These services are provided in Duluth, Moorhead, Rochester, and St. Cloud. Some other portions of Greater Minnesota also receive services, although services are not provided in 20 of the 80 counties outside the Twin Cities metropolitan area.

TRENDS

State and Local Government Spending

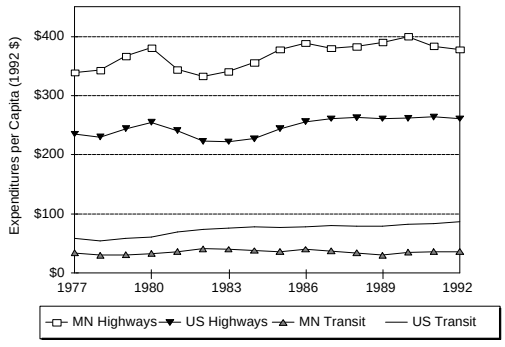
Highway and transit spending increased modestly in Minnesota between 1977 and 1992.

Census data indicate that in Minnesota:

- **There has been modest growth in highway and transit spending over the period 1977-92.**

Per capita spending on highways (in constant dollars) grew 12 percent from $339 in 1977 to $378 in 1992. As Figure 8.1 illustrates, spending declined during the last two years of this period and is now back at its 1985 level. Current operating expenditures per capita

Figure 8.1: Trends in State and Local Government Highway and Transit Spending per Capita, Minnesota and the United States, 1977-92



Source: U.S. Census Bureau.

declined 11 percent over the 15-year period, while capital expenditures per capita grew 32 percent in constant dollars.[2]

Table 8.3 shows that transit spending per capita increased only 4 percent. Spending (in constant dollars) grew from about $34 per capita to $36 per capita. Transit spending was about 9 percent of all spending on highways and transit in Minnesota.

Minnesota's transit spending grew slower than the national average.

Table 8.3: Growth in State and Local Government Highway and Transit Spending per Capita, Minnesota and the United States, 1977-92

	Percentage Change (in 1992 Dollars)	
	Minnesota	United States
Highways	12%	11%
Transit	4	49
Total	11%	19%

Source: U.S. Census Bureau.

Highway spending in other states also grew a little faster than inflation. Spending per capita increased 11 percent nationwide during the 15-year period. Expenditures grew from $235 per capita to $261 per capita. Nationally, most of that growth occurred between 1977 and 1987. Spending per capita has not changed much since 1987.

In contrast to Minnesota, transit spending nationwide increased substantially from 1977 to 1992. Spending grew 49 percent from $59 per capita to $86 per capita. The share of highway and transit spending going to transit increased nationally from 20 percent in 1977 to 25 percent in 1992.

Overall, spending on highways and transit increased faster in other states, because of the larger increases for transit functions. Spending per capita increased 11 percent in Minnesota and 19 percent nationally. As a percentage of personal income, however, overall spending declined in both Minnesota and other states. In Minnesota, highway and transit spending as a percentage of personal income declined from 2.6 percent in 1977 to 2.2 percent in 1992. The national percentage fell from 2.0 percent to 1.8 percent.

All of the above trends were calculated using the implicit price deflator for state and local government services (PGSL) to convert spending to constant dollars. We also calculated the trends in highway spending using a Federal Highway Administration price index for highway construction. This index increased less than the PGSL over this period, suggesting that prices for construction labor and materi-

2 Spending on "highways" generally includes maintenance, operation, repair, and construction of all streets, roads, highways, bridges, tunnels, and related structures. For purposes of this chapter, transit spending includes the operation, maintenance, and construction of all public mass transit systems, as well as public subsidies to privately-owned and operated transit utilities.

als did not increase as much as other state and local government salaries and materials. As a result, highway spending per capita increased 36 percent in constant dollars using the FHWA price index, compared with 12 percent using the PGSL. This suggests that growth in highway spending from 1977 to 1992 may have been more substantial than indicated earlier in this chapter.

Spending by Jurisdiction

Minnesota Planning has analyzed highway and transit spending for Minnesota by jurisdiction and fund using data from the Department of Finance and the State Auditor's Office.[3] According to Minnesota Planning, spending by the state from the Trunk Highway Fund increased 38 percent in constant dollars from 1983 to 1993. Nearly all of the increase occurred between 1983 and 1986, with little growth occurring after 1986. Overall highway expenditures by the Minnesota Department of Transportation (MN/DOT) increased 23 percent with most of the increase coming before 1986.

Municipal road expenditures, funded through local revenues and the Municipal State-Aid Street Fund, increased 28 percent from 1983 to 1992. City expenditures from the fund increased 50 percent in constant dollars from 1983 to 1993. Overall county highway spending increased 12 percent from 1983 to 1992, while county spending from the County State-Aid Fund increased 24 percent from 1983 to 1993.

These figures are somewhat difficult to compare with Census data due to the difference in years. However, the trends seem consistent with the Census data. The 23 percent increase in MN/DOT spending from 1983 to 1993 is approximately a 13 percent increase in spending per capita. Census data, which are not yet available for 1993, show an increase of about 11 percent from 1983 to 1992. Overall city and county spending per capita increased about 19 percent and 4 percent respectively from 1983 to 1992.

Factors Influencing Spending

Highway spending has been tied to certain revenue sources.

There are a number of factors which have affected highway and transit needs and spending trends. Perhaps the most significant factor is available revenue sources. State spending and state aid to local governments for highways depend on revenues from the motor fuel tax, motor vehicle registration fees, driver's license fees, and federal aid. With funding tied to particular revenue sources, trends in highway spending generally reflect the growth in those revenue sources. While some of these sources have grown as fast or faster than the inflation rate, others have not grown as fast. Between 1977 and 1992, motor fuel tax revenue per capita declined 6 percent in constant dollars, and federal aid per capita decreased 23 percent. Increases in other revenue sources such as the motor vehicle license tax (51 percent) enabled highway spending in Minnesota to grow 12 percent per capita over a 15-year period.

3 Minnesota Planning, *Working Paper, Budget 2001: Transportation,* October 1994.

Transit spending in Minnesota has been supported by general state revenues, local property taxes, and federal aid. In some other states, transit has received funding from sources that are designated for highway spending in Minnesota. Other states have also been able to get additional federal aid for new mass transit systems, while Minnesota has not approved implementation of a new system and has seen declining federal aid for transit. As a result of these factors, transit spending per capita has grown much faster nationally than in Minnesota.

According to a 1991 report by the Transportation Study Board, a number of factors have affected transportation needs. They include increasing congestion particularly in the Twin Cities metropolitan area, declining automobile occupancy rates, increasing use of the highway system for commercial transportation, increased costs due to an aging infrastructure, and a growing need for transit services to maintain personal mobility throughout the state.[4] The report concluded that future funding levels would have to be 30 percent higher than current funding levels in order to meet an acceptable level of service.

While it is beyond the scope of this report to assess highway and transit needs, it is clear that these factors have affected past spending trends and are likely to affect future spending decisions. Annual vehicle miles of travel per capita grew 30 percent in Minnesota just from 1982 to 1992. The number of miles of congested highways has also increased significantly, particularly in the Twin Cities metropolitan area. Interstates and freeways in the metropolitan area and highways outside the metropolitan area have aged and have needed, and will need, greater repairs and reconstruction. As elderly and low-income individuals become an increasing share of the population, transit services may also be in greater demand.

NATIONAL COMPARISONS

In this section, we first use spending data from the Census Bureau to make comparisons between highway and transit spending in Minnesota and spending in other states. We then use spending data from the Federal Highway Administration (FHWA) to more closely analyze highway spending differences. It should be recognized that FHWA data show Minnesota's highway spending per capita to be higher compared with the national average than do the Census data.[5]

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4 Minnesota Transportation Study Board, *Study of Minnesota's Surface Transportation Needs: Report to the Governor and the Legislature*, January 1991.

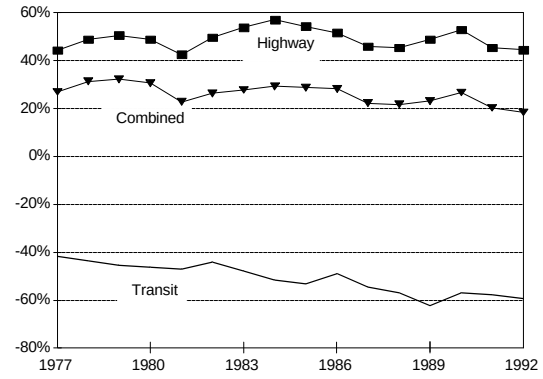
5 In 1992, according to Census data, Minnesota's spending per capita on highways was 45 percent above the national average. FHWA data show Minnesota's spending per capita to be about 59 percent above average. Some difference between the two data sources is to be expected because of differences in the definition of expenditures and the use of calendar year data by FHWA. However, the use of different reporting periods is probably not a major factor, since FHWA data have consistently shown Minnesota's spending to be higher relative to the national average than have the Census data.

Comparisons Using Census Data

Figure 8.2 illustrates that:

- **Minnesota has generally spent substantially more per capita on highways than the national average and substantially less on transit.**

Figure 8.2: Percentage Difference Between Minnesota Highway and Transit Spending per Capita and the National Average, 1977-92



Source: U.S. Census Bureau.

Minnesota spends more per capita on highways and less on transit than the nation as a whole.

From 1977 to 1992, state and local governments in Minnesota spent between 43 and 57 percent more per capita than the national average for highways. In 1992, highway spending per capita was 45 percent higher in Minnesota.

In contrast, Minnesota spent between 42 and 62 percent less than the national average on transit. In 1992, Minnesota's transit spending was 59 percent below the national average. Although Minnesota's transit spending is well below the national average, it should be recognized that the majority of transit spending is concentrated among a handful of states with some of the nation's largest metropolitan areas. As Table 8.4 shows, only eight states and the District of Columbia had transit spending above the national average in 1992. The top six states and the District of Columbia accounted for 77 percent of all transit spending and 34 percent of the U.S. population. Despite being 59 percent below the national average, Minnesota is ranked 17th highest and spends more per capita than 34 other states.[6]

Overall spending per capita on highways and transit has generally been higher in Minnesota than the national average, due to Minnesota's higher than average highway spending. Combined highway and transit spending per capita was $414 in Minnesota and $349 nationwide in 1992, or 19 percent higher in Minnesota. Over the 15-year period, Minnesota's combined spending was between 19 and 32 percent higher than the national average.

Analysis of Highway Spending Differences

There are two principal reasons why Minnesota spends more per capita on highways than other states:

6 Population density of large metropolitan areas probably is an important factor in transit funding. The Twin Cities area, while ranked 16th in 1990 among metropolitan areas in population, is one of the least densely populated major metropolitan areas. In addition, Minnesota ranks 32nd highest in population density among the 50 states and the District of Columbia.

Table 8.4: Transit Spending per Capita, 1992

Rank	State	Transit Spending per Capita	Rank	State	Transit Spending per Capita
1	District of Columbia	$1,620	25	Utah	26
2	New York	405	26	Wisconsin	26
3	Massachusetts	208	27	Delaware	22
4	Illinois	140	28	Arizona	18
5	New Jersey	128	29	Indiana	17
6	California	122	30	Kentucky	16
7	Pennsylvania	99	31	Iowa	15
8	Hawaii	97	32	Tennessee	13
9	Washington	89	33	Nebraska	12
			34	Nevada	11
	U.S. Average	87	35	Vermont	11
			36	Montana	10
10	Maryland	84	37	West Virginia	9
11	Connecticut	68	38	North Carolina	9
12	Rhode Island	65	39	New Mexico	8
13	Colorado	54	40	Alabama	7
14	Oregon	54	41	Oklahoma	6
15	Georgia	47	42	South Carolina	5
16	Texas	40	43	New Hampshire	4
17	**MINNESOTA**	**36**	44	North Dakota	4
18	Ohio	35	45	South Dakota	4
19	Virginia	34	46	Maine	3
20	Michigan	33	47	Kansas	3
21	Missouri	31	48	Arkansas	3
22	Florida	31	49	Mississippi	2
23	Alaska	28	50	Idaho	2
24	Louisiana	26	51	Wyoming	0

Source: U.S. Census Bureau.

- **Minnesota spends more per mile of road than the national average, especially on city and state roads.**
- **Minnesota has more miles of road than all but four states.**

Minnesota has an extensive system of roads.

Table 8.5 shows how Minnesota compared with other states in spending and road miles for state, city, and rural roads in 1990.[7] Minnesota spends 20 percent more per mile of road than the national average for state roads and 108 percent more for municipal roads administered by local governments. Minnesota's spending per mile is close to the national average for rural roads administered locally.

Ironically, overall spending per road mile is 15 percent lower than the national average. This result is entirely due to Minnesota having many more rural roads than other states. Many of these rural roads are unpaved and cost less to build and

7 More recent data from FHWA does not provide a breakdown in spending among these three different types of roads. However, the overall comparisons of Minnesota with the national average have not changed much.

Minnesota spends more per road mile than the national averages for municipal and state roads.

Table 8.5: Expenditures per Road Mile by Type of Road, Minnesota Compared with the National Average, 1990

	Percentage Difference from National Average			
	State-Administered Roads	Locally Administered Roads		
		Municipal	Rural	All Roads
Expenditures per Road Mile[a]	20%	108%	3%	(-15)%
Road Miles per Capita[b]	(-5)	12	157	96
Expenditures per Capita	14%	133%	164%	68%

Sources: Federal Highway Administration and the U.S. Census Bureau.

[a]Includes capital, maintenance, and administrative/miscellaneous expenditures.

[b]Excludes roads under the direct control of the federal government and expenditures on thos e roads.

maintain than other types of roads. According to the FHWA, expenditures per mile in Minnesota are about 10 times higher on state roads and 8 times higher on city roads than on rural roads. With many more low-cost roads, Minnesota's overall cost per mile is less than the national average, even though Minnesota spends more per mile for each type of road shown in Table 8.5.

Compared with other states, Minnesota has 96 percent more miles of road per capita. As mentioned above, the difference is largely due to the number of rural roads. In 1993, with almost 130,000 miles of road, Minnesota had the 5th largest road system in the nation. Only Texas, California, Illinois, and Kansas had more miles of roads. About 89 percent of the roads were in rural areas of the state, and about 78 percent of the roads were locally administered rural roads. Only Texas and Kansas had more miles of rural roads and more rural roads under local administration.

We estimated that almost 60 percent of the difference between Minnesota and the national average for highway spending per capita was due to Minnesota's higher than average spending per mile. The rest of the difference was explained by Minnesota's larger network of roads. In the next two sections, we examine factors which may explain why Minnesota's spending per mile and road miles per capita differ from other states.

The size of Minnesota's road system is related to its population density and rural characteristics.

Road Miles

Two factors contributing to Minnesota's large network of roads are Minnesota's population density and its large number of farms. Compared with other states, Minnesota's population density is 22 percent lower. Minnesota is a relatively large state and is ranked 14th highest in land area, while it is only 20th largest in population. To connect all parts of the state with roads requires a larger network of roads per capita than in more densely populated states.

However, Minnesota also has considerably more miles of road per square mile of land than other states. Minnesota's road miles per square mile exceed the national average by 53 percent. This fact may, in part, be the result of Minnesota's above average number of farms and below average size of farms. In rural areas, roads are needed to provide access to and from farms. Minnesota has 88,000 farms, or 138 percent more farms per capita than the national average. Minnesota's farms are also about 27 percent below the national average in size. Connecting a larger number of smaller farms may require more roads per square mile in rural areas of Minnesota than in rural areas of other states.[8]

Spending per Mile

It is difficult to precisely account for Minnesota's higher than average spending per mile of road. Differences in expenditures on snow and ice control explain only about 15 to 20 percent of the overall difference in spending per mile between Minnesota and the national average. It is possible that climate may be an important factor affecting the frequency with which roads need maintenance, repair, and construction. In addition, Minnesota may be building roads to higher specifications and standards than other states. Available data indicate that Minnesota's roads tend to have wider lanes than the national average. About 79 percent of the most heavily traveled roads in Minnesota have lane widths of 12 feet or more, compared with 55 percent nationwide.

Differences in spending per mile may be related to climate and road standards.

Comparative data on lane width is only available, however, for about one-fourth of Minnesota's roads. In addition, this factor is somewhat offset by a smaller number of lanes per road mile and a higher percentage of unpaved roads in Minnesota. The number of lanes per road mile is about 2 percent lower in Minnesota than nationally. About 60 percent of all road miles are unpaved in Minnesota, compared with a national average of 42 percent.

It is unclear how the relative amount of traffic on Minnesota's roads affects relative spending. Minnesota tends to have more traffic per capita and less traffic per road mile than other states. Annual vehicle-miles of travel per capita were 5 percent higher in Minnesota than in other states in 1993. Vehicle-miles of travel per mile of road were, however, 45 percent lower in Minnesota than the national average. Traffic per mile of road was lower on every type of road except non-interstate freeways and expressways in urban areas, on which traffic was 11 percent higher in Minnesota. This factor would tend to cause Minnesota's spending per mile of road to be lower than the national average, except for non-interstate urban freeways, rather than higher. Another way to examine the impact of traffic is by examining the percentage of congested roads in Minnesota and other states. Table 8.6 indicates that the percentage of more heavily traveled roads which are congested is lower in Minnesota than in other states.

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8 We also compared Minnesota with the continental United States. Minnesota's road miles per capita are still 96 percent above the national average, even if Alaska and Hawaii are excluded. However, Minnesota's population density is 34 percent below average, and the number of road miles per square mile of land is only 29 percent above average. The comparisons of the number and size of farms are not appreciably affected by excluding Alaska and Hawaii.

Table 8.6: Percentage of Highways Experiencing Congestion, Minnesota and the National Average, 1993

	Minnesota			United States		
Type of Roads	Total Miles	Congested Miles	Percent Congested	Total Miles	Congested Miles[a]	Percent Congested
Interstate	233	107	45.9%	12,878	5,839	45.3%
Other Freeway	130	61	46.9	8.857	2,788	31.5
Other Principal Arterial	623	124	19.9	52,835	13,626	25.8
Minor Arterial	1,896	290	15.3	85,822	11,629	13.6
Collector	1,623	79	4.9	85,378	4,638	5.4
Urban	4,505	661	14.7%	245,770	38,520	15.7%
Interstate	681	96	14.1%	32,652	2,858	8.8%
Other Principal Arterial	3,569	178	5.0	96,201	2,048	2.1
Minor Arterial	6,190	84	1.4	137,928	1,650	1.2
Major Collector	15,967	0	0.0	432,675	1,004	0.2
Rural	26,407	358	1.4%	699,456	7,560	1.1%
Total	30,912	1,019	3.3%	945,226	46,080	4.9%

[a]Congestion is defined as a volume-to-service flow ratio of 0.80 or more.

Source: Federal Highway Administration.

It is difficult to tell if Minnesota is keeping its roads in better or worse condition than other states and what the relative condition of roads suggests about Minnesota's relative spending. Available data from the FHWA on pavement condition suggest that Minnesota roads, which a few years earlier were in better condition than those in other states, are now in worse condition. However, these data are very suspect and may not provide a valid comparison among states. In addition, even if valid comparisons could be made, it is unclear how the comparisons should be interpreted. Having roads in worse condition could indicate that Minnesota is not getting an adequate return on its higher than average spending. Alternatively, it could mean that, despite spending more per mile, Minnesota cannot keep its roads in as good condition as other states because of the effects of climate on the need for maintenance and repairs.

SUMMARY

There was modest real growth in highway and transit spending between 1977 and 1992. Highway spending per capita increased 12 percent in Minnesota and 11 percent nationally. Transit spending per capita grew 4 percent in Minnesota but 49 percent nationwide. The growth in highway spending was more significant (36 percent), if the FHWA price index for construction is used to convert spending to constant dollars instead of the PGSL. Spending trends have been influenced by available revenues, as well as increasing traffic and congestion, aging infrastruc-

ture, increasing use of the highway system for commercial transportation, and growing transit needs.

In 1992, Minnesota spent considerably more per capita on highways (45 percent) than the national average and much less per capita on transit (59 percent). Overall highway and transit spending per capita was about 19 percent above the national average. Minnesota's above average highway spending is the result of higher spending per road mile, particularly on locally administered roads not in rural areas, and a significantly larger network of roads, particularly in rural areas. Minnesota's large network of rural roads is, in part, the result of the state's relatively low population density and its relatively large number of small farms. It was not possible to rigorously explain Minnesota's higher than average spending per mile, but it may be related to the state's climate and its road construction standards.