Minnesota Transportation Funding Redistribution (2010-2015)

Who Contributes More and Who Receives More?

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INSTITUTE FOR URBAN & REGIONAL INFRASTRUCTURE FINANCE IURIF

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9. Abstract The focus of this analysis is the redistribution of transportation funding across Minnesota. Transportation funding comes from all levels of government – the federal government, the state government, and local governments that include counties, cities, and townships. The redistribution of transportation funding arises the following questions: What areas contribute the most to transportation funding? What areas receive more funding? What areas contribute more than what they receive? Or verse versa. This report aims to answer these empirical questions with the purpose of facilitating informed decision making. In this report, we aggregate or allocate data to the county level for analysis and then present the aggregated results at the district level for a six-year period, between 2010 and 2015. We found that local governments fund a huge proportion of the transportation infrastructure in Minnesota, primarily through the property taxes they collect. The Twin Cities metro district contributes slightly more than what it receives. In addition, this district receives the largest share of funding for transit services. Districts in Greater Minnesota receive more funding that they contribute, mainly due to lower population density. Finally, we found a cost of 7 cents per vehicle mile traveled in the state. This cost tends to be much higher in counties located in the north.	
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1 Introduction

The focus of this analysis is the redistribution of transportation funding across Minnesota. Transportation funding comes from all levels of government – the federal government, the state government, and local governments that include counties, cities, and townships. Transportation funding that are directly generated by local taxes and fees are used in corresponding local jurisdictions. Federal or state transportation funding – generated through a variety of federal or state revenue sources – are also contributed by people in local jurisdictions, but these revenues are allocated through certain budgetary procedures and may or may not be used in the original point of collection. The redistribution of transportation funding arises the following questions: What areas contribute the most to transportation funding? What areas receive more funding? What areas contribute more than what they receive? Or verse versa. This report aims to answer these empirical questions with the purpose of facilitating informed decision making.[1]

Counties in Minnesota are divided into eight transportation districts, which are also called Area Transportation Partnerships (ATP).[2] In this report, we aim to examine the redistribution of transportation funding for a six-year period, between 2010 and 2015. We aggregate or allocate data to the county level for analysis, and then present the aggregated results at the district level. Federal and state transportation grants to local governments are often distributed to transportation districts before they are used in different counties. Showing the pattern of redistribution at the district level has significant policy implications. Besides, it smooths out annual fluctuations associated with transportation grants to individual counties.

The analysis presented in this report includes three steps. First, we calculate the share of transportation revenues contributed from different localities. Second, we examine the share of federal and state transportation expenditures across different localities. Third, we compare the expenditure share and the revenue share for each district to see what areas contribute more than what they receive, or verse versa. We present our findings with federal and state transportation revenues (which have redistribution effects) for both, roadway development and public transit. In appendices we also show the results for two alternative ways of analysis, one concerns only roadway expenditure but not transit, and the other includes federal and state transportation revenues as well as local efforts that by themselves do not have redistributive effects.

[1] While we at times discuss possible reasons for the current redistribution pattern, the normative judgement regarding the pattern are beyond the scope of this report.

[2] See "Transportation Planning Partners" on MnDOT website. Available through http://www.dot.state.mn.us/planning/program/mpordcatp.html.

2 The Revenue Share

The Revenue Share (R-Share) is the district's share in the collection of federal and state transportation revenues.

Federal transportation revenues (F.Tax) includes two accounts: the highway and the mass transit account. The data come from the Federal Highway Administration.

- R1a: The highway account includes revenues from motor fuels –gasoline and special fuels- and other, including federal use tax, trucks and trailers and tires. This account has annual data for the studied period. We allocated the contribution of federal fuel taxes from Minnesota to each county based on Vehicle Miles Traveled (VMT) per county. The information for 2015 is not available. We calculated VMT as the average for 2014 and 2016.
- R1b: The mass transit account includes revenues from gasoline and special fuels. It has annual data for the period between 2010 and 2015. The contribution is also allocated to each county based on county VMT.

State transportation revenues include state fuel tax (MN.Fuel), motor vehicle registration tax (TabFee), and motor vehicle sales tax (VMST).

- R2a: The state fuel tax revenue is allocated to each county based on county VMT. The information comes from the Federal Highway Administration.
- R2b: Data for motor vehicle registration tax revenue comes at the county level from the Minnesota Department of Public Safety.
- R2c: The motor vehicle sales tax revenue is allocated with the combination of two allocation bases: 50% based on vehicle registration tax and 50% based on vehicle count. The Department of Public Safety uses this approach because the number of vehicles and their value affect motor vehicle sales tax.

For all these revenues sources, the Twin Cities metro district (ATP 5) accounts for slightly less than half of statewide revenue (see Table 1). Metropolitan counties have a disproportional higher share of vehicles and travel volumes compared to other counties. Only in 2015, there were 3.3 million of vehicles in the Metro district out of 7.2 in the state. It is important to note that state transportation revenues account for lightly more than 70% of total revenues, and of them, the largest proportion is revenues from the state fuel tax.

Table 1: Average R-Share (2010-2015)

ATP	F.Tax	MN.Fuel	TabFee	MVST	R-Share
1	7.6%	7.6%	6.9%	7.4%	7.4%
2	3.4%	3.4%	3.6%	3.8%	3.5%
3	13.8%	13.8%	12.9%	13.7%	13.5%
4	5.9%	5.9%	5.3%	5.5%	5.7%
5	48.5%	48.5%	51.0%	48.8%	49.1%
6	10.1%	10.1%	9.2%	9.5%	9.8%
7	6.2%	6.2%	6.0%	6.2%	6.1%
8	4.5%	4.5%	5.1%	5.2%	4.7%
Total (M)	**$687**	**$858**	**$562**	**$331**	**$2,439**

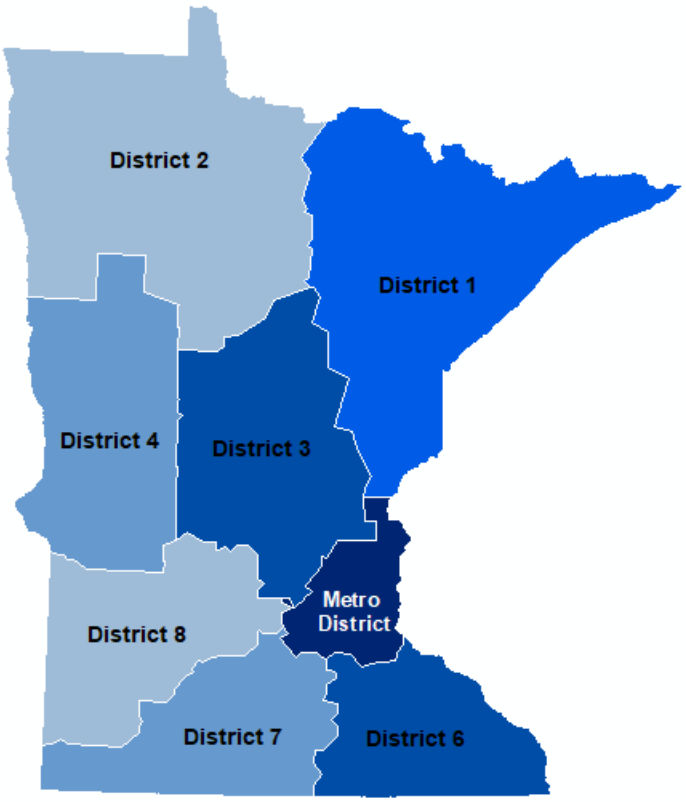

Figure 1: Average R-Share (2010-2015)

3 The Expenditure Share

The Expenditure Share (E-Share) is the district's share in the distribution of federal and state transportation expenditures, including the following three components.

First, the state trunk highway (Trunk) expenditures directly spent by the Minnesota Department of Transportation (MnDOT). It includes construction and maintenance costs.

- E1a: MnDOT allocates the statewide construction costs to the counties based on road segments.
- E1b: We allocate the statewide maintenance costs based on each county's share of lane mileage of truck highway.

Second, federal and state transportation grants to support local roads (GRT). These grants could be at the county, city or township level. The data comes from the Office of State Auditor.

- E2a: Counties receive federal and state transportation grants.
- E2b: Cities receive federal and state transportation grants.
- E2c: Townships receive state transportation grants.

Third, federal and state grants for public transit systems (Transit). The data comes from the National Transit Database.

- E3a: Grants for urban transit systems are allocated to the transportation district where the counties are located in.
- E3b: Grants for rural transit systems are allocated by their primary service counties.

Overall, the Metro district accounts for about 47% of federal and state transportation expenditures in the whole state (see Table 2). The Metro district accounts for almost 88% of transit expenditures. In addition, its share on trunk highway expenditures and on federal and state grants for local roads, doubles the share of other counties.

Table 2: Average E-Share (2010-2015)

ATP	**Trunk**	**GRT**	**Transit**	**E-Share**
1	12.4%	10.7%	3.9%	10.1%
2	6.1%	6.6%	0.5%	5.1%
3	10.6%	10.9%	2.7%	9.1%
4	7.1%	8.1%	0.9%	6.2%
5	36.4%	36.9%	87.9%	47.1%
6	13.1%	11.4%	1.9%	10.2%
7	8.4%	8.7%	1.0%	7.0%
8	5.8%	6.8%	1.3%	5.3%
Total (M)	**$1,187**	**$1,001**	**$563**	**$2,750**

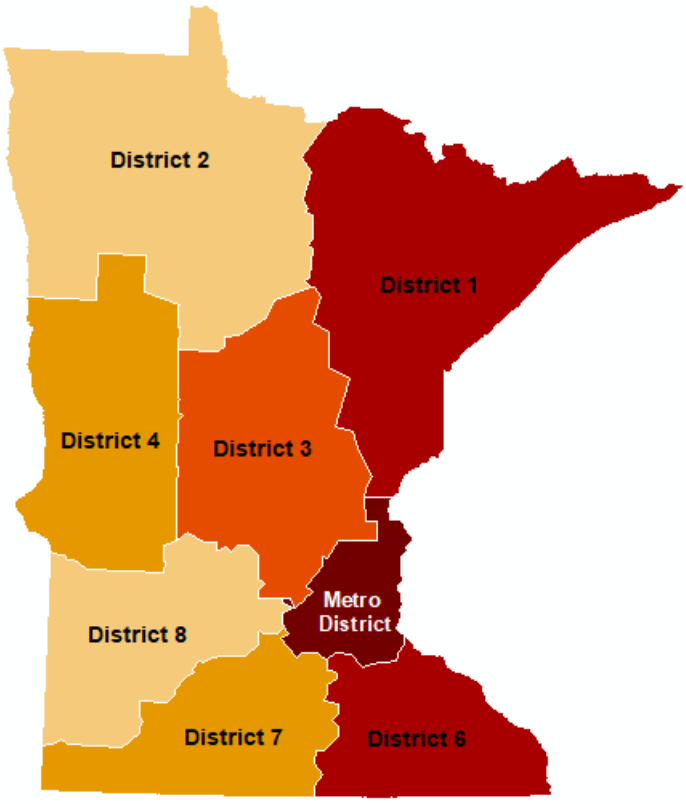

Figure 2: Average E-Share (2010-2015)

4 The Expenditure-Revenue Ratio

The Expenditure-Revenue Ratio (ER-Ratio) is defined as a district's expenditure share divided by its revenue share in federal and state transportation funding. If the ER-ratio is higher than 1, a district's share in federal and state transportation expenditure is higher than its share in federal and state transportation revenue. This means that the district receives more than it contributes. If the ER-ratio is lower than 1, the district receives less than it contributes.

Table 3 presents the average ER-Ratio for the period between 2010 and 2015. Among the eight districts, the average ER-Ratio is 1.10 with a standard deviation of 0.22. In the state only two Districts receive less than they contribute, the Metro District and District 3 (with ratios below 1). Two districts have ratios that are more than one standard deviation above the mean: District 1 and District 2. These districts receive more than they contribute probably due to a much lower population density in these counties. Conversely, District 3 - with a ratio with more than one standard deviation below the mean- receives less than it contributes, probably due to a combination of high traffic volumes and hence

high contribution of fuel taxes together with a low level of transit expenditures.

Table 3: Average ER-Ratio (2010-2015)

ATP	R-Share	E-Share	ER-Ratio
1	7.4%	10.1%	1.35*
2	3.5%	5.1%	1.45*
3	13.5%	9.1%	0.67*
4	5.7%	6.2%	1.08
5	49.1%	47.1%	0.96
6	9.8%	10.2%	1.04
7	6.1%	7.0%	1.14
8	4.7%	5.3%	1.12
Total (M)	**$2,439**	**$2,750**	

*With more than one standard deviation from the mean

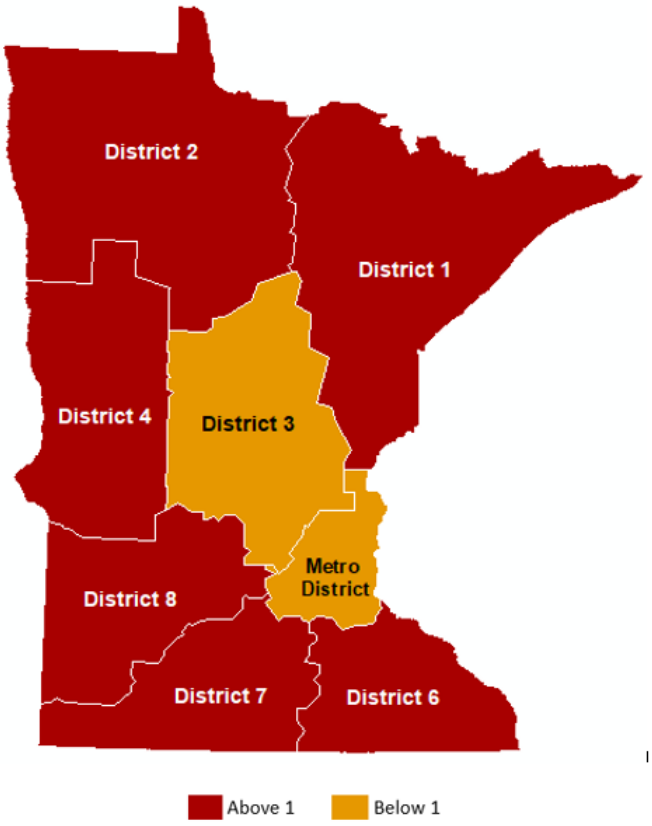

Figure 3: Average ER-Ratio (2010-2015)

Table 4 presents the evolution of the ER-Ratios for this 5-year period. District 1 and District 6 are the ones presenting considerable variations. For instance, for District 1 the

ratio decreased 16 percentage points and for District 6 the ratio increased 18 percentage points. Other districts, such as District 5 and District 8 remain relatively constant. During this 6-year period, the ER-Ratio for District 1 and 2 has been constantly greater than 1.2 and for District 3 below or equal to 0.7.

Table 4: 2010-2015 ER-Ratios

ATP	2010	2011	2012	2013	2014	2015	Average
1	1.39	1.43	1.29	1.58	1.23	1.21	**1.35**
2	1.60	1.36	1.53	1.54	1.19	1.51	**1.46**
3	0.70	0.65	0.70	0.66	0.67	0.65	**0.67**
4	1.13	0.95	1.11	1.02	1.11	1.15	**1.08**
5	0.93	1.04	0.97	0.91	0.97	0.93	**0.96**
6	1.03	0.93	0.95	0.95	1.17	1.19	**1.04**
7	1.08	0.90	1.17	1.36	1.17	1.15	**1.14**
8	1.22	0.97	1.12	1.18	1.03	1.21	**1.12**

Note: The last column shows the average ER-Ratio for each ATP between 2010 and 2015.

5 Conclusions

To sum up, for the six-year period between 2010 and 2015, we find that the Metro district contributes more than what it receives. It contributes about 49% of federal and state transportation revenues and receives about 47% federal and state transportation expenditures. District 1 and District 2 receive more than they contribute to federal and state transportation funding, mainly because they receive higher share of road expenditures than they contribute to road revenues. District 3 contributes more than it receives from federal and state transportation funding.

A Redistribution of Federal and State Roadway Funding

An alternative analysis is to consider only roadway expenditures and corresponding revenue sources. This approach is less comprehensive than the one used in the report because roadway expenditures are only part of total transportation expenditures.

The modified revenue share would include all state designated transportation revenue sources, but only part of federal fuel tax revenues – we include Minnesota's contribution to the highway account in Federal Highway Administration (R1a) but not the revenues to the transit account (R1b). With this change, revenues decrease 3.73%.

The modified expenditure share would include state trunk highway expenditures, and federal and state transportation grants for local roads, but not federal and state grants for transit. With this change, the modified expenditure decreases 20.46%.

Table 5 presents the results of the ER Ratio considering these changes. For Districts 3 and 5 the ER-Ratio is below one, as in the previous model. This means that these metro counties contribute more to than they receive from roadway funding. The Metro district's ER-ratio drops from 0.96 to 0.75, while the ER-ratio District 3 increases from 0.67 to 0.79, both with more than one standard deviation above the mean. District 1 and District 2 have higher ER-ratios compared to the previous model. These districts receive more than they contribute to roadway funding.

Table 5: Redistribution of Federal and State Roadway Funding: Average ER-Ratio (2010-2015)

ATP	R-Share	E-Share	ER-Ratio
1	7.4%	11.6%	1.57
2	3.5%	6.3%	1.78*
3	13.5%	10.7%	0.79*
4	5.7%	7.6%	1.32
5	49.2%	36.6%	0.75*
6	9.8%	12.3%	1.26
7	6.1%	8.5%	1.39
8	4.7%	6.3%	1.33
Total	**$2,348**	**$2,188**	

*With more than one standard deviation from the mean

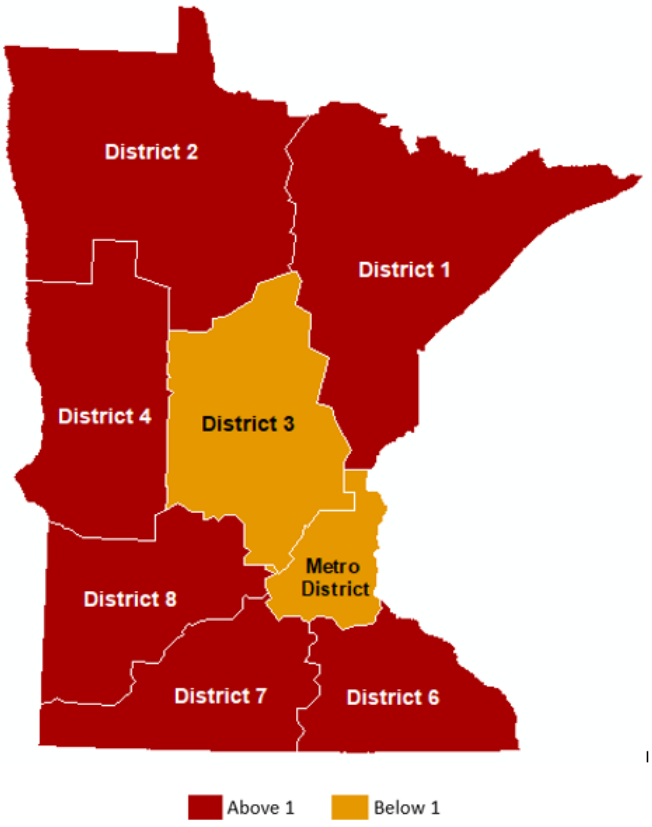

Figure 4: Redistribution of Federal and State Roadway Funding: Average ER-Ratio (2010-2015)

An additional analysis is to consider roadway expenditures and corresponding revenue sources per vehicle mile traveled (VMT) in each district. This approach will help us to quantify spent and collected resources per driven mile.

In the state of Minnesota, all districts raise 4.11 cents and spend 3.83 cents per VMT (see Table 6). Revenues per VMT are similar across transportation districts. District 2, 5 and 8 present the highest revenues per VMT due to a higher contribution of the motor vehicle registration and the motor vehicle sales tax. Conversely, expenditures tend to vary a lot across districts. Expenditures per VMT are higher in Greater Minnesota, in particular in northern districts. The metro district presents the lowest expenditure per VMT due to a higher population density. In terms of the distribution of VMT, the metro district accounts for 48.52% of the total VMT in the state, while districts 3 and 6 account for a little bit more than 10% each.

Table 6: Redistribution of Federal and State Roadway Funding: Revenues and Expenditures per VMT (2010-2015)

ATP	**Revenues**	**Expenditure**
1	3.99	5.82
2	4.21	6.99
3	4.04	2.98
4	3.96	4.87
5	4.16	2.89
6	3.99	4.70
7	4.09	5.30
8	4.33	5.38
All	4.11	3.83

Note: Values in cents per VMT.

B Redistribution of Total Transportation Funding

Another alternative analysis is to include federal and state transportation funding, as well as local efforts for transportation. This is not our preferred approach because only federal and state transportation funding would have redistributive effects, while local efforts for transportation are used within their own jurisdictions.

For each county, local efforts for roads are calculated as the difference between total local road expenditures (including all cities and townships within the county), and all federal and state transportation grants to the county (including all cities and townships within) to support local roads. The amounts would include some property tax revenues and other general or specific local revenue sources used for local roads. The data come from the State Office of Auditor.

- L1: County efforts are the difference between total transportation expenditures[3] of a county, and federal and state government grants that the county receives.
- L2: City efforts are the difference between total transportation expenditures of a city, and federal and state government grants that the city receives. This information is aggregated at the county level.
- L3: Township efforts are the difference between total transportation expenditures of a township, and state government grants that the township receives. This information is also aggregated at the county level.

Regarding public transit, local efforts are calculated as fare revenues and other local contributions for both operation and capital outlays. The data come from National Transit Database.

- L4: Fare revenues for public transit collected within a county.
- L5: Other local contributions to public transit collected within a county.

For this analysis, the modified revenue share includes not only federal and state transportation revenues, but also local efforts for roads and public transit. Total revenues increase 75.02% when adding these local resources. Similarly, the modified expenditure share includes not only federal and state transportation expenditures, but also the same local efforts. With this, total expenditures increase 66.52%.

[3]Transportation expenditures include the following expenditures: Administration, maintenance, engineering and construction of street and highways; snow and ice removal; street lighting; and all other street and highway capital outlay.

Since local efforts do not have redistributive effect, as it is expected, this analysis would yield similar results to the report. The Metro district's ER-ratio is 0.97, marginally lower than 1. District 1 and District 2 receive more than they contribute, and District 3 contributes more than it receives, all statistically deviated from the mean (see Table 7).

Table 7: Redistribution of Total Transportation Funding: Average ER-Ratio (2010-2015)

ATP	R-Share	E-Share	ER-Ratio
1	7.6%	9.1%	1.21*
2	3.3%	4.3%	1.29*
3	11.9%	9.4%	0.78*
4	5.6%	5.8%	1.05
5	51.8%	50.4%	0.97
6	9.0%	9.3%	1.03
7	6.1%	6.6%	1.08
8	4.7%	5.0%	1.07
Total (M)	**$4,268**	**$4,580**	

*With more than one standard deviation from the mean

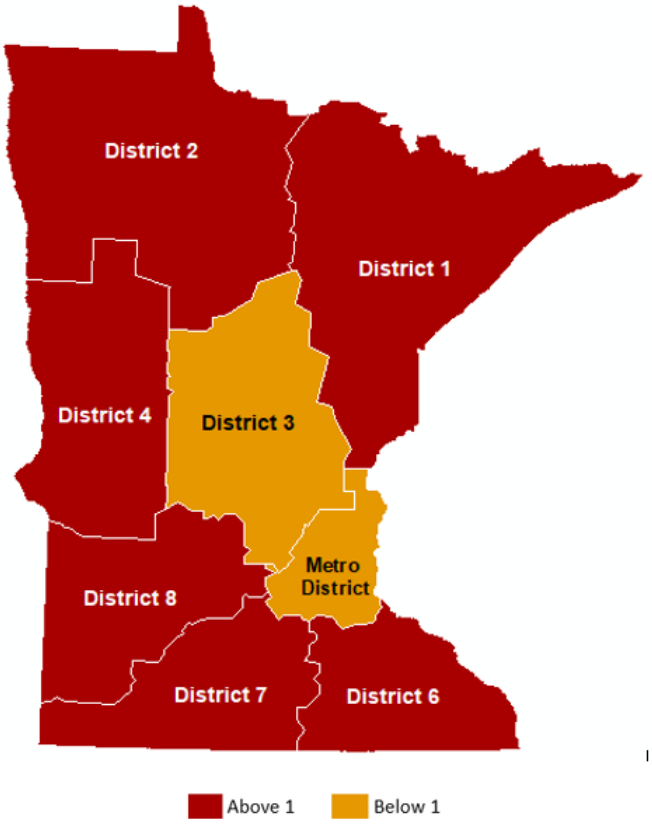

Figure 5: Redistribution of Total Transportation Funding: Average ER-Ratio (2010-2015)

C Roadway Funding Structure

This analysis shows roadway funding structure in Minnesota, in particular, the extent to which highway and local roads are funded through federal and state transportation special revenues or through local efforts in each county.

As shown in the transportation funding redistribution analysis, federal and state transportation special revenues may be allocated to each county in two ways. The first is state trunk highway expenditures directly administrated by the MnDOT.

- E1a: The statewide construction costs have been allocated by MnDOT to the counties based on road segments.
- E1b: We allocate the statewide maintenance costs based on each county's share of lane mileage of truck highway.

The second component is federal and state transportation grants to support local roads. The data are collected from the Office of State Auditor.

- E2a: Counties receive federal and state transportation grants.
- E2b: Cities receive federal and state transportation grants.
- E2c: Townships receive state transportation grants.

For each county, local efforts for roads are calculated as the difference between total local road expenditures (including all cities and townships within the county) and all federal and state transportation grants to the county (including all cities and townships within it) to support local roads. The amounts would include some property tax revenues but also other general or specific local revenue sources used for local roads. The data are collected from the State Office of Auditor.

- L1: County efforts are the difference between total transportation expenditures of a county, and federal and state government grants that the county receives.
- L2: City efforts are the difference between total transportation expenditures of a city, and federal and state government grants that the city receives. The data are aggregated at the county level.
- L3: Township efforts are the difference between total transportation expenditures of a township, and federal and state government grants that the township receives. This data are also aggregated at the county level.

During the 2010-2015 period, federal and state special revenues account for about 54.5% of total transportation funding in Minnesota, while local efforts account for about 45.5% (see Table 8). For almost all districts, federal and state special revenues account for more than 55%, only for District 2, they account for more than 70%. Nevertheless, for the Metro District the share is lower, accounting for only 44%. Metro counties have a higher reliance on local efforts, which account for about 56% of total roadway expenditures.

Table 8: Minnesota Transport Finance Structure Highways and Local Roads (2010-2015)

ATP	F&S Special Revenue	Local Effort	Total (M)
1	64.2%	35.8%	$396
2	71.6%	28.4%	$192
3	56.9%	43.1%	$413
4	63.0%	37.0%	$262
5	44.2%	55.8%	$1,815
6	65.0%	35.0%	$416
7	62.4%	37.6%	$299
8	61.3%	38.7%	$224
All	**54.5%**	**45.5%**	**$4,017**

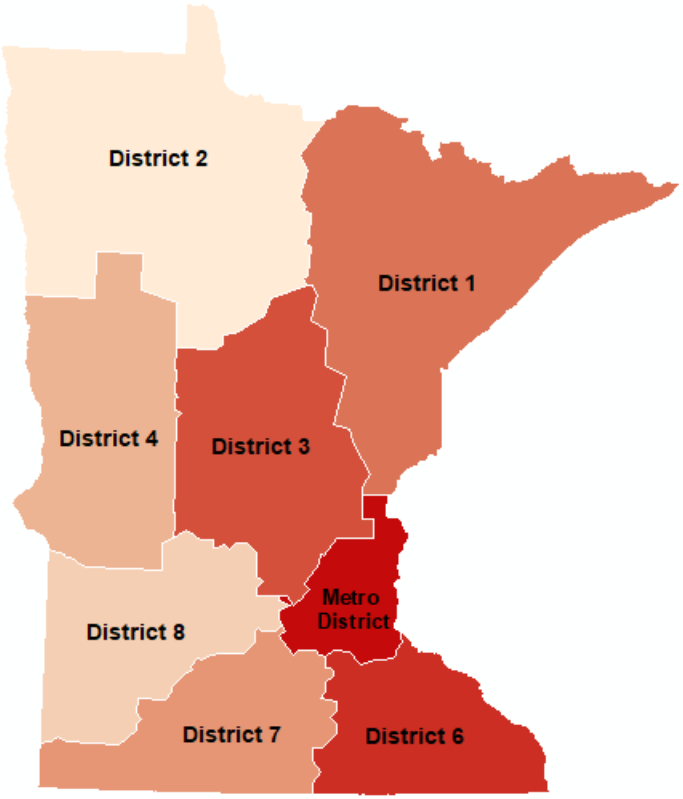

Figure 6: Minnesota Transport Finance Structure Highways and Local Roads (2010-2015)

In addition, we can analyze the roadway funding structure in Minnesota per VMT. That is, the extent to which federal and state transportation special revenues and local efforts contribute to fund highway and local roads in each transportation district.

Similar to the previous results, transportation districts have higher reliance on federal and state special revenues except the metro district, which relies more on local efforts. Overall, federal and state special revenues contribute 3.83 cents per VMT while local efforts contribute 3.20 cents per VMT for a total transportation funding of 7.03 cents per VMT. Across all districts, those located in the north of the state present the highest expenditures per VMT (as found in Appendix A).

Table 9: Minnesota Transport Finance Structure per VMT: Highways and Local Roads (2010-2015)

ATP	**F&S Special Revenue**	**Local Efforts**	**Total**
1	5.82	3.24	9.06
2	6.99	2.77	9.77
3	2.98	2.26	5.24
4	4.87	2.85	7.72
5	2.89	3.66	6.55
6	4.70	2.53	7.23
7	5.30	3.19	8.49
8	5.38	3.40	8.78
All	3.83	3.20	7.03

Note: Values in cents per VMT

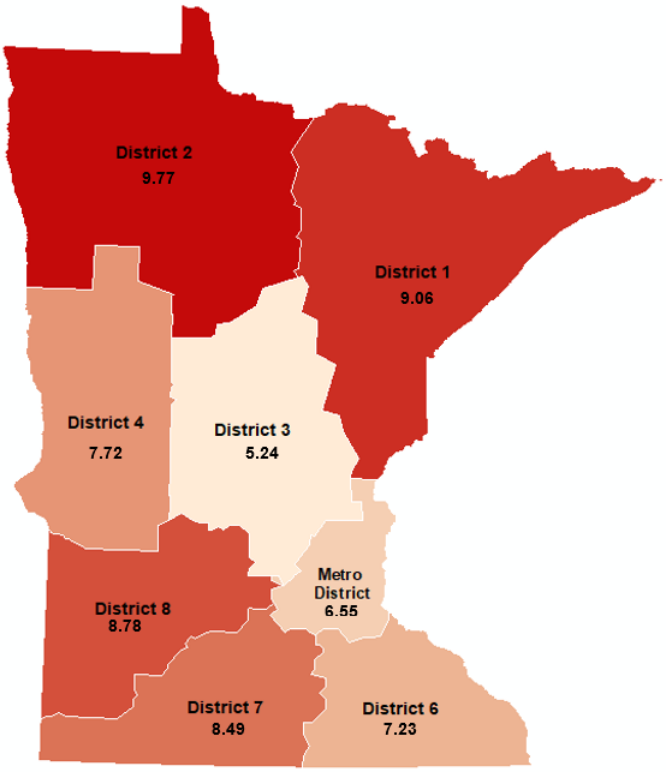

Figure 7: Minnesota Transport Finance Structure per VMT: Highways and Local Roads (2010-2015)

D Transit Funding Structure

This analysis shows transit funding structure in Minnesota, in particular, the extent to which federal and state transportation special revenues fund urban and rural transit systems, through fare revenues, or through other local efforts in each county. Data for federal and state grants for public transit systems comes from the National Transit Database:

- E3a: Grants for urban transit systems are allocated to the transportation district where the counties are located in.
- E3b: Grants for rural transit systems are allocated by their primary service counties.

Data about fare revenues and other local contributions for both operation and capital outlays. They are collected from National Transit Database:

- L4: Fare revenues for public transit collected within a county.
- L5: Other local contributions to public transit collected within a county.

The analysis shows that about 65% of public transit expenditures in Minnesota come from federal and state special revenues. Fare revenue accounts for about 14%, while other local efforts account for about 21%. Overall, Metro counties drive the pattern. In addition, these counties account for almost 90% of total public transit spending in Minnesota.

Table 10: Minnesota Transport Finance Structure Urban and Rural Transit (2010-2015)

ATP	**F&S Special Revenue**	**Fare**	**Local Effort**	**Total (M)**
1	74.4%	8.5%	17.1%	$29
2	79.3%	6.6%	14.0%	$4
3	75.0%	9.6%	15.4%	$20
4	75.2%	12.1%	12.8%	$6
5	63.9%	14.3%	21.8%	$774
6	72.9%	17.2%	9.9%	$15
7	77.5%	11.0%	11.5%	$7
8	73.3%	10.8%	15.9%	$10
All	65.0%	13.9%	21.1%	$866

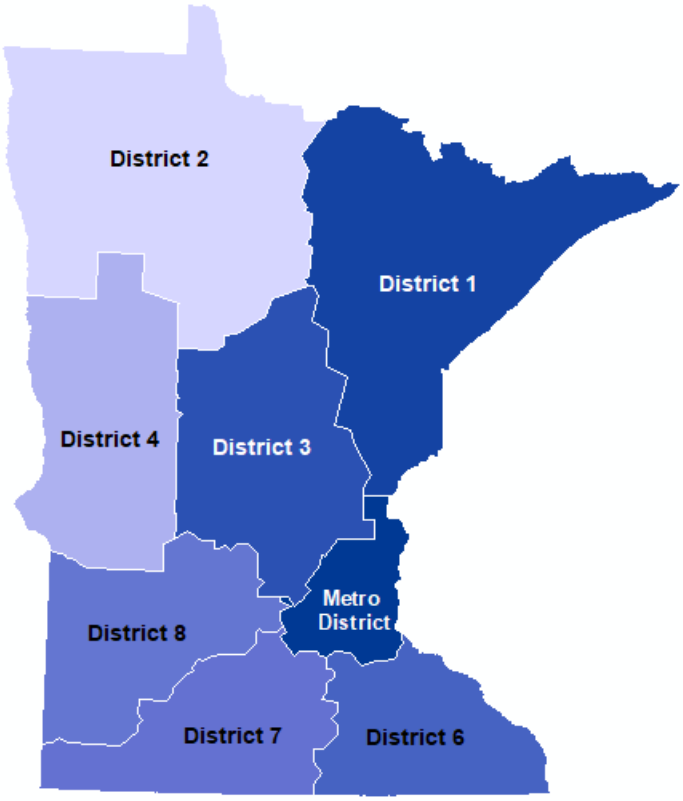

Figure 8: Minnesota Transport Finance Structure Urban and Rural Transit (2010-2015)